

RESEARCH ARTICLE

Leadership skills and family formation among males. A study based on Swedish register data

Steffen Peters^{1,2}  and Kieron Barclay^{1,2,3} 

ABSTRACT Having leadership skills (LS) may increase an individual's chances of ascending to a higher rank in hierarchical social structures, which can, in turn, provide the resources needed to support a partner and/or a child. Nevertheless, research on the association between LS and family formation processes (marriage, fertility) is scarce. We explore the prospective association between LS and marriage/completed fertility for 650941 Swedish males. Poisson regression and linear probability models are applied, including sibling fixed effects models. Our findings demonstrate a positive association between men's LS, as measured at the age of assignment to military service (17–20 years), and their probability of marrying by age 39 or older (depending on the birth cohort). Furthermore, among the men in our sample, we find that LS are positively linked with the number of children, and are negatively linked with the probability of remaining childless. These associations are only partially explained by education and income.

KEYWORDS Leadership • Marriage • Completed fertility • Male fertility

Introduction

Interest in examining the role of psychological factors in family formation processes has been growing (e.g., [Jokela and Keltikangas-Järvinen, 2009](#); [Peters, 2023](#)). Recently, it has been shown that non-cognitive abilities have become more relevant for the likelihood of entering fatherhood among men in Sweden, with higher abilities predicting lower levels of childlessness ([Aldén et al., 2022](#)). Leadership skills (LS) are considered non-cognitive abilities, and previous research has suggested that LS are relevant for both economic and non-economic outcomes. For instance, LS have been linked with socio-economic status (SES) indicators such as career outcomes ([Floris et al., 2020](#); [Maurer et al., 2017](#)), earnings ([Kuhn and Weinberger, 2005](#); [Lund et al., 2007](#)) and the probability of promotion ([Kragt and Day, 2020](#); [Maurer et al., 2017](#)). Therefore, LS may reinforce inequalities in social positions, and can contribute to certain individuals having greater opportunities to have children because they have more resources to support a family. Additionally, leadership skills may benefit and strengthen partnerships, e.g., via communication or motivational skills

✉ Steffen Peters, peters@demogr.mpg.de

1 Max Planck Institute for Demographic Research, Rostock, Germany

2 Stockholm University, Stockholm, Sweden

3 Swedish Collegium for Advanced Study, Uppsala, Sweden

(Porter and Baker, 2005). Thus, individuals with strong LS may have higher quality partnerships, which might, in turn, increase their chances of entering marriage and parenthood.

However, research on the extent to which LS are associated with marriage or childbearing is scarce. To the best of our knowledge, only one study by Jokela and Keltikangas-Järvinen (2009) has looked at the association between LS in adolescence and the probability of having a first, second and third child by ages 30–39. We argue that this study design can be extended by more in-depth analyses. First, we examine both marriage and fertility as separate outcomes in order to provide a more complete picture of the association between LS and family formation. Second, the sample of the previous study was relatively young. As a result, the authors could only study fertility behaviour up to ages 30–39. However, childbearing is often not complete by the younger ages in this range, particularly when second and third childbirths are considered. Our study is based on completed fertility measured between ages 39 and 55, depending on the specific birth cohort. Previous research has shown that male fertility does not change much after age 40 in the Nordic context (Nisén et al., 2014). Thus, our study design provides insights into the predictive power of LS for completed fertility in Sweden. Third, whereas the sample of the previous study was relatively small (1313 individuals), we make use of Swedish population register data for all men in Sweden. Fourth, using Swedish register data allows us to employ a fixed effects sibling comparison design to examine whether unobserved heterogeneity explains the relationship between LS and marriage/fertility patterns. However, this study cannot address the question of whether LS are similarly linked with family formation among women, as the sample of the current study only includes men. Additionally, LS are only evaluated for men with higher cognitive abilities (Lindqvist and Vestman, 2010).

Theoretical background

Leadership skills in the current study

Leadership skills (LS) can be broadly defined, and typically refer to organisational agility, decision quality, ethics and command skills (Floris et al., 2020), as well as to the ability to act in a trustworthy manner, engage in individual time management, take initiative in different contexts, encourage others to act and network (Boone and Peborde, 2008). These skills can be very beneficial in several life domains, such as career success, partnering and fertility.

The development of leadership skills (LS) almost certainly depends on both nature and nurture. Indeed, recent theoretical approaches have suggested that LS are a mix of genetically inherited and learned skills (Benmira and Agboola, 2021; Hunt and Fedynich, 2018). Therefore, some parts of LS may be built up over life course, whereas other parts of LS cannot be learned (Gunn, 2000; Malakyan, 2014). Moreover, it could be argued that LS that are acquired at earlier life stages count as “early life experiences”. For instance, an individual who served as captain of a sports team at a young age may have learned to take responsibility and motivate other team members. These skills will most likely not be lost over time, and may prove helpful in other life situations, e.g., in a later job

in which the individual leverages these leadership skills to become a group leader. Thus, people with LS may attain higher social status, which could, in turn, be beneficial on the partner market, and increase their fertility chances.

Therefore, having LS from younger ages may affect future processes, such as the development of other skills, career paths and family formation processes; although skills require ongoing adjustments based on changing environments. In line with the observations above, the current study examines LS from young adulthood (17–20 years), measured at the time of military conscription, and their impact on family formation outcomes up to ages 39 to 55, depending on the birth cohort, based on the assumption that LS are at least somewhat stable.

Furthermore, in the current study, LS are considered as a set of social skills in the military context. The Swedish military measures leadership and social skills, primarily in order to find suitable candidates for officer positions. Military officers are expected to support recruits during their service in the army and encourage high levels of motivation within the team, and strong leadership and social skills may help them attain these goals (Larsson and Kallenberg, 2006). Indeed, it is important for the military to ensure that good and trusting relationships are established between recruits and officers, because recruits who feel loyalty towards officers may be more willing to take risks (Grönqvist and Lindqvist, 2015). Therefore, the military is particularly interested in finding candidates for officer positions who score high on measures of leadership and social skills.

Individuals continue to live within a social environment throughout their entire lives (although the social environment itself may change, of course). Therefore, LS may be developed over time at any stage of life. For instance, individuals might learn to lead a sports team (e.g., in adolescence), a group of peers in group educational tasks (e.g., in young adulthood) or a project team in the workplace after they have gained more experience (e.g., in adulthood).

Leadership skills and family formation via non-socio-economic factors

Although this relationship has not been scientifically well explored, LS might be associated with partnering processes, which may, in turn, predict marriage and childbearing patterns. Indeed, previous research has shown that a partnership could be strengthened by the leadership skills of one or both partners (Weiss et al., 2002). These findings suggest that LS may be desirable in a potential partner, i.e., LS might predict the chances of entering a romantic relationship and of getting married. While we are aware that cohabitation rates are very high in Sweden, we still consider it valuable to study whether personality factors such as LS affect entry into marriage, as having such skills is a strong indicator for the formation of a stable relationship in our data, and we lack good data over time on cohabitation initiation in the absence of childbearing.

There are different types of leadership that may be attractive for different people on the partner market. For instance, a previous study provides a more traditional definition of a leader as an exceptional individual who stands at the top of a hierarchy, does not share power with (many) others, is charismatic and has a broad mix of skills and expertise (Allred and Hancock, 2015). This profile of a potential partner may be particularly desired by

women, in line with hypotheses from evolutionary psychologists suggesting that women are more likely than men to search for a dominant and protective partner (Buss, 1994). This hypothesis has been supported by previous research on students from the United States (US) from a few decades ago, although the exact time of data collection in this study remains unclear (presumably early 1990s) (Regan and Berscheid, 1997). One potential strength of such a partner is the ability to motivate people, which has been a key argument for how leadership may be linked with romantic relationships (Porter and Baker, 2005). Motivational skills might be beneficial for parents, particularly when children are still young, and high levels of parenting skills are required to understand children and to motivate them to perform daily routines such as dressing, eating or going to bed. Parenting skills may also help when children are of school age, e.g., when parents are attempting to explain the value of learning or of achieving good school grades (Garn et al., 2012).

Similarly, (traditional) leaders may be good at making decisions. A person who struggles with decision-making may want to have a partner who is capable of making decisions on the couple level. For instance, if a person has two promising job opportunities but cannot decide which option to choose, a partner with strong decision-making skills may be able to help. These abilities in a potential partner might be desired by some individuals depending on their individual preferences and attitudes.

Another leadership type has been called “servant leadership” (Allred and Hancock, 2015). Servant leaders consider the interests of others in order to find the best solution to a problem, and support individuals in their development (Greenleaf, 2002; Sullivan, 2009). A servant leader may have other strengths that might be attractive on the partner market, at least to a certain group of individuals. For instance, an individual’s communication style within a relationship may play an important role in stabilising the partnership (e.g., in determining how much to tell the partner, or whether to involve the partner in decision-making processes) (Porter and Baker, 2005). Having a respectful communication style that allows both partners to express their interests and standpoints may be desired in a serious romantic relationship, as it may indicate the potential for a happy and long-term connection. Similarly, servant leaders share power with others, which may strengthen their relationship with a partner (Allred and Hancock, 2015). If power is shared within a partnership (instead of one person deciding everything), both partners can feel confident in their ability to shape their relationship and their family life according to their own desires, without ignoring the preferences of the other partner. This may lead to higher relationship satisfaction.

While the considerations above have shown how LS may influence partnerships, they can be easily translated to fertility outcomes as well. For instance, parents may be seen as leaders, and parents who are servant leaders may contribute to the psychological, physical and academic development of their offspring (Burnham, 2024). People who are classified as servant leaders tend to have a communication style that considers the interests of all family members. Such individuals may be seen as great parents, as they tend to be good at dealing with children and other people as unique individuals (Anderson, 2005). As previous research has shown, servant leadership influences children’s capabilities to forgive and resolve conflicts (Burnham, 2024). As another example, leaders in the traditional sense may take responsibility for their child(ren), while not being afraid of making (wrong)

decisions. These abilities may also be desired by their partner when raising a child. Assuming that individuals begin a romantic relationship with a partner who has the desired type of leadership skills (communication, decision-making skills, etc.), LS may be positively linked with family formation outcomes. As was mentioned above, studies on leadership and family formation processes are rare. However, the initial evidence points to a positive association between leadership skills and being in a romantic relationship (Miller et al., 2009), and between LS and fertility (Jokela and Keltikangas-Järvinen, 2009).

Leadership skills and family formation via socio-economic status

SES factors, which are usually related to access to goods and resources, affect the ability to support a family (Cummins, 2006), and are, therefore, important factors in the association between leadership skills (LS) and family formation. On the one hand, LS and SES are positively associated with each other. For instance, managers rate job applicants as a better fit for a job if they demonstrate higher LS (Stone et al., 2018). Additionally, Maurer and colleagues (2017) have shown that the motivation to develop LS can increase leadership capacity, which may, in turn, be linked with increasing income. These findings are in line with previous research reporting a positive association between leadership facets (that were particularly present among males) and income in Norway (Lund et al., 2007). Furthermore, previous research focusing on males found a positive relationship between holding leading positions in high school (e.g., captain of a sports team, president of a club) and the likelihood of getting a managerial position 9–13 years after leaving high school (Kuhn and Weinberger, 2005). Additionally, a positive association between holding leader positions in adolescence and later life income levels has been found (Hopp and Pruschak, 2023; Kuhn and Weinberger, 2005).

Furthermore, income has been positively associated with marriage, particularly among men (Kanazawa, 2003; Shafer and James, 2013). Similarly, income has been shown to be positively associated with the onset of a serious relationship (Rapp, 2018), and with the entry into a stable partnership for males in high-income countries (Kalmijn, 2011; Kuo and Raley, 2016; Schneider et al., 2018; Shafer and James, 2013). Additionally, income has been positively linked with fertility among males in high-income countries (Hopcroft, 2006, 2015; Nettle and Pollet, 2008; Stulp et al., 2016). There is, however, evidence that this positive association has attenuated over time in both the US (Bar et al., 2018) and European countries (Skirbekk, 2008). Positive associations between income and childbearing have also been observed in the Nordic countries (Andersson and Scott, 2007; Jalovaara and Fasang, 2020). For instance, one study found that Swedish men with lower incomes are more likely to be childless at age 40, and that this relationship has persisted across cohorts (Chudnovskaya, 2019). Moreover, higher cumulated earnings up to middle adulthood have been connected with higher offspring counts across cohorts in Sweden (Kolk, 2019; Kolk and Barclay, 2021).

As a second SES indicator, education can shape the relationship between LS and family formation. As Horishna and colleagues have shown (2019), social work graduates have higher LS scores than undergraduates from the same field. However, the non-parametric

tests from their study cannot clarify whether this correlation is based on other effects, e.g., via education or age. Moreover, the analyses cannot generate any conclusions about causality. Education, in turn, is positively associated with union formation among men. For instance, a mother in the US is more likely to marry the father of her child if he has a higher educational level (Sassler et al., 2014). Furthermore, a positive relationship between education and the chances of marrying has been well established for men (Schneider, 2011; Shafer and James, 2013). This positive association may stem from the increasing relevance of education for marital behaviour across cohorts in the second half of the 20th century (Sweeney, 2002). Furthermore, in European countries, men with higher educational levels are more likely than men with lower education to enter partnerships (Kalmijn, 2011). In line with these partnering patterns, men with the lowest educational levels also have the lowest cohort fertility rates in Sweden and in the other Scandinavian countries (Jalovaara et al., 2019).

As was shown above, there is strong evidence for a positive association between SES factors and family formation among males in Sweden, i.e. for the assumption that men with high levels of education and income have higher rates of marriage and fertility. Therefore, having the ability to provide resources appears to be linked with benefits on the partner market for men. As men with lower income or educational levels may be disadvantaged in finding a partner and in having children, their other characteristics, such as their personality or skills, might be more relevant for their family formation processes – that is, there may be interactions between SES and leadership scores. For example, men with fewer resources may compensate for their SES-related disadvantage through psychological qualities such as leadership skills.

Confounding by shared family factors

Interest in examining family background factors as determinants for family formation processes has been increasing. Previous research has shown that marital behaviour is associated with parental SES (Brons et al., 2021; South, 2001), parental divorce (Erola et al., 2012; Wolfinger, 2003) and family structure (South, 2001). Fertility outcomes have been linked with siblings' fertility behaviour (Buyukkececi and Leopold, 2021; Kuziemko, 2006; Lyngstad and Prskawetz, 2010; Murphy, 2013), the presence of siblings (Cools and Hart, 2017; Murphy and Knudsen, 2002) and birth order (Morosow and Kolk, 2020). Genetics may also influence fertility behaviour (Kohler et al., 1999; Mills et al., 2018; Mills and Tropf, 2015). Furthermore, fertility patterns are linked across generations, potentially via the intergenerational transmission of fertility preferences and attitudes (Anderton et al., 1987; Johnson and Stokes, 1976).

Apart from fertility behaviour, cognitive and psychological factors such as LS may also be determined by family background. Previous research has uncovered an association between genetics and leadership (De Neve et al., 2013). Additionally, leadership has been linked with parental education (Brunello and De Paola, 2013), paternal education (Özcan et al., 2019) and parents' leadership styles (Hartman and Harris, 1992). There is also evidence that the probability of having leadership roles is higher among first-born children than

among middle- or last-born children (Andeweg and Berg, 2003), and among males with only sisters (Brunello and De Paola, 2013). Consequently, it appears that family background factors shape both leadership and family formation processes. Potential associations between LS and family formation may disappear when controlling for shared background information within families, and we aim to address this issue using sibling fixed effects models.

Data and variables

Data

Our analyses are based on Swedish register data. Each Swedish resident obtains a unique identification number, through which information from different sources (e.g., fertility, marital behaviour) can be linked. The birth data are from administrative registers on fertility. Leadership skills (LS), as our explanatory variable of interest, are measured for all men with relatively high scores on the intelligence quotient (IQ) test administered at earlier stages of the military conscription process (Lindqvist and Vestman, 2010) between 1983 and 1997. During that time period, all young males were obliged to take part in military recruitment, but women were not. We restrict the analytical sample to men who were 17–20 years of age at the time of recruitment, which captures the vast majority of the male population (98%) in the considered cohorts (1963–1979). Thus, our analytical sample is relatively homogeneous (e.g., in terms of age, gender, educational status), and contains information on 650941 males who were registered in Sweden throughout the entire period between the time of military recruitment and the most recent available data (2018). Men who emigrated from Sweden or who died before age 39 were excluded from the analyses. The age range for the measurement of marital behaviour and completed fertility in our analytical sample is between 39 and 55 years, depending on the birth cohort. This allows us to include as much marriage and fertility information as possible, while the independent variables are either fixed (e.g., family background) or are measured at the time of military recruitment (LS, cognitive ability) or at the exact age of 39 years (cumulated income, highest education). Age 39 can be considered a reasonable age at which to determine a man's marital status and completed fertility. Although men can still get married and have children after this age, previous research has shown that marriage rates are low beyond age 40 (Ohlsson-Wijk, 2014), and that fertility is largely complete by age 40 (Barclay and Kolk, 2020; Nisén et al., 2014). We also conduct robustness checks using age 45 and age 50 as the fertility thresholds, and find that the patterns remain stable. Multigenerational registers are used to derive information on full siblings and family background via the identification numbers of both mothers and fathers. For the fixed effects approach, only full siblings with the same registered mother and father are considered. This allows us to control for unobserved heterogeneity based on genetics, parental education and other shared background information. In addition, information on marital status and educational level is drawn from administrative registers. Cumulative income is calculated based on data from annual tax registers.

The register data allow us to examine the association between personality facets and family formation on the population level, whereas previous studies have, to the best of our knowledge, examined this link using survey data only. While surveys are usually prone to selection effects or non-response bias, population registers also capture individuals who would not be willing or able (e.g., disadvantaged men) to respond to surveys. Therefore, we can consider (almost) the entire male population instead of just a subsample. This is an important advantage of our data, because males with certain characteristics (e.g., low cognitive ability) may be more likely to refuse to participate in surveys and, for instance, to remain childless over time, which would result in biased estimates. Since we consider (almost) the entire Swedish male population (regardless of whether their LS were measured), the statistical power of our analyses is very high.

Our data provide some further advantages compared to the data used in previous research. For instance, in our sample, LS were assessed by psychologists and not by self-reports, which may be more subjective (Jokela and Keltikangas-Järvinen, 2009). Furthermore, while Jokela and Keltikangas-Järvinen (2009) could follow their participants for 18 years, the youngest individuals were 12 years old at the first observation, and thus were followed only until age 30, when fertility is often incomplete. In this study, we follow individuals throughout almost their entire fertility history, from the time of military recruitment (17–20 years) until age 39 or older. Furthermore, the register data allow us to consider family background by comparing siblings, which was not possible in previous work on this topic.

Outcomes

There are two outcomes of our study. First, we explore the association between LS and the probability of getting married by mid-adulthood (at least up to age 39 for all cohorts; up to age 55 for the oldest cohorts). Second, we examine the association between LS and completed fertility. Completed fertility is measured as both the number of children (range: 0–22) and childlessness by age 39 or older.

General information about the psychological interviews

Our main explanatory variable, leadership skills (LS), was measured by well-trained and qualified psychologists in interviews with a number of specific features. Psychological interviews in the Swedish military conscription process usually lasted for 20–25 minutes (Bihagen et al., 2013; Lindqvist and Vestman, 2011), were conducted in separate rooms (Lindqvist and Vestman, 2010; Nyberg et al., 2020) and were semi-structured (Ludvigsson et al., 2022; Nilsson et al., 2001). Thus, the psychologists had to follow some interview guidelines, such as using neutral language and giving no advice on potential military assignments (Lindqvist and Vestman, 2010), but were free in the specific formulation of the questions (Nyberg et al., 2020). Unfortunately, detailed information regarding the guidelines or methods used in the psychological interviews has not been made publicly available (Nilsson et al., 2001; Nyberg et al., 2020).

One of the main goals of the psychological interviews was to judge the recruits' overall suitability to serve in the army. For this purpose, the psychological constitution of the young men was examined (Carlstedt, 1998). This included assessing the recruits' ability to cope with different challenging situations, with war being the most extreme scenario (Lindqvist and Vestman, 2011), and their stress resilience and leadership skills (Ludvigsson et al., 2022). The evaluations of the psychologists were oriented towards the International Classification of Diseases (ICD) of the World Health Organization, and conscription physicians examined individual recruits further if psychologists found indicators of bad mental health during the interviews (Nyberg et al., 2020).

The military suitability of the recruits was assessed by the psychologists on a scale from one to nine (Lindqvist and Vestman, 2011). Higher scores meant that the recruits were evaluated as having relatively high levels of mental health and military aptitude (Nilsson et al., 2001). Four subscales (scores one to five) on different personality factors (emotional stability, social maturity, psychological energy, intensity) helped the psychologists to assess the conscripts' military aptitude (Lindqvist and Vestman, 2011). Further details on the four subscales are provided in the Supplementary material (available online at <https://doi.org/10.1553/p-kbjc-5fmm>). In general, however, recruits with high levels of independence, extraversion, emotional stability, responsibility and persistence were judged to have a high level of military aptitude (Lindqvist and Vestman, 2011; Ludvigsson et al., 2022). The measure of leadership skills (LS) has been separated from the personality or military aptitude measures, although they are strongly linked (Mood et al., 2012). Additionally, the psychologists evaluated the conscripts' ability to adapt to new environments and situations (Lindqvist and Vestman, 2011; Ludvigsson et al., 2022), as well as their overall stress resilience (Nyberg et al., 2020).

Leadership skills in the military conscription data

The Swedish military has long collected data on the LS of recruits in order to find suitable candidates both for military service in general and for more responsible roles in the army in particular (Lindqvist and Vestman, 2010; Ludvigsson et al., 2022). For this purpose, young men were selected for evaluation of their leadership skills based upon their scores in preceding examinations during the enlistment process (IQ test, physical tests, etc.) (Ministry of Defense Sweden, 1984). All conscripts were interviewed by well-trained psychologists (Lindqvist and Vestman, 2010; Ludvigsson et al., 2022) who considered their levels of dominance, responsibility, and mental agility in evaluating their LS (Ministry of Defense Sweden, 1984).

The assessment of leadership skills was based upon what the military called a "command assessment" (Ministry of Defense Sweden, 1984). The command assessment has been described as an evaluation of social adaptation and personality. The factors assessed by the interviewer included responsibility, social relations, independence, initiative and stability (Ministry of Defense Sweden, 1984). The information that formed the basis of the interviews was obtained from the answers to questions on a questionnaire submitted by the enlistee on the first day of enlistment (Lindqvist and Vestman, 2010). The information on this form related to the recruit's childhood and home environment, educational and occupational background and leisure activities, as well as emotional and other psychological

factors (Ministry of Defense Sweden, 1984). The emphasis of the interview was always on clarifying the conscript's relationships across different social contexts. For instance, leadership qualities were identified by evaluating the social role within different relationships (Ministry of Defense Sweden, 1984). Characteristics such as dominance, agility, initiative, responsibility, independence and outgoing attitude were associated with a stronger leadership profile (Ministry of Defense Sweden, 1984). Furthermore, in each interview, interviewers were asked to pose the question: "What do you think of your ability to lead a group of peers?" (Lindqvist and Vestman, 2010). Recruits were selected as army officers depending on their LS scores during the conscription process, and attending leadership training was mandatory for all selected males, regardless of whether they wanted to become an officer (Ministry of Defense Sweden, 1984).

Psychologists were further asked to consider the previous experiences and/or future life plans of the enlistees in order to evaluate their LS (Lindqvist and Vestman, 2010). For instance, recruits were asked about their school and work experience, corresponding environments, relationships with family members or career plans (Lindqvist and Vestman, 2010).

The meaning of LS for the military during the conscription tests stemmed from the hierarchical structure of the army. The vast majority (about 90%) of the officers occupied lower positions within the military hierarchy and stayed for a relatively short period of time (ca. one year) (Grönqvist and Lindqvist, 2015). About one-third of the recruited males from each birth cohort were trained for these lower officer positions (Grönqvist and Lindqvist, 2015). Therefore, the military measured not only LS, but also cognitive skills and personality factors, such as social maturity or emotional stability.

Each young male had to go through a fixed procedure of tests and interviews during the military conscription process in order to prove his (mental and physical) capability to serve in the army (*Mönstringshandboken*, 2021). Cognitive skills were measured at the beginning of the conscription process (*Mönstringshandboken*, 2021), and the test results were available to the psychologists during the interviews (Ludvigsson et al., 2022).

It is, however, crucial to keep in mind that LS were systematically measured only for males from the top half of the IQ distribution (Lindqvist and Vestman, 2010), and that less than 1% of the men with IQ scores of 1 to 4 received a LS score (Table 1). Therefore, both high IQ scores from the conscription tests and high LS scores from the psychological interview were important for role assignments within the military. For instance, only recruits with LS scores of 6 or higher were considered for sergeant positions, while only those with LS scores of 7 or higher were considered for lieutenant positions (Ludvigsson et al., 2022).

Receiving higher scores on cognitive skills, serving as a military officer and attending the corresponding training programs may have also had beneficial implications for the men's non-military career outcomes in later life stages. For instance, the probability of being a manager outside of the military between ages 30 and 40 was greater for individuals with higher cognitive skills scores at the time of military conscription, and for those who served as an upper officer within the military (Grönqvist and Lindqvist, 2015). Furthermore, conscripts who scored higher on cognitive skills tests or occupied higher officer positions were more likely to obtain tertiary education after their military service (Grönqvist and Lindqvist, 2015). These findings suggest that military officers, i.e., conscripts with higher LS, were advantaged on the civilian, i.e., non-military, labour market. This may be due in part to

Table 1 Leadership skills according to cognitive ability (column percentages)

LS	Cognitive ability										N (total)
	Missing	1	2	3	4	5	6	7	8	9	
Missing	97.37	99.01	99.79	99.68	99.34	3.29	2.69	2.34	2.08	2.13	256404
1	0.23	0.07	0.02	0.02	0.01	1.25	0.77	0.65	0.49	0.53	3734
2	0.31	0.08	0.04	0.03	0.05	4.65	3.19	2.55	2.21	2.21	14477
3	0.45	0.08	0.03	0.05	0.08	10.07	7.31	5.79	4.97	4.65	31934
4	0.29	0.14	0.04	0.08	0.12	19.81	15.74	12.94	10.91	9.64	66118
5	0.49	0.26	0.03	0.07	0.16	29.28	27.55	24.06	20.69	17.66	109362
6	0.41	0.17	0.04	0.04	0.13	19.44	23.51	24.72	24.60	23.57	93608
7	0.21	0.15	0.02	0.02	0.07	9.53	14.37	18.91	21.55	23.20	62028
8	0.20	0.04	0.00	0.01	0.03	2.33	4.21	6.82	10.42	13.00	22070
9	0.04	0.00	0.00	0.00	0.01	0.33	0.66	1.23	2.07	3.40	4106
N (total)	9593	21236	45297	69973	100313	154535	108751	80672	47416	26055	663841

Note: Calculations were made using the original sample of 663841 males in order to show descriptive statistics including missing values. For the upcoming analyses, missing values of cognitive skills and other covariates were deleted, which reduces the analytical sample to 650941 men.

certain skills that the recruits developed during army officer training programs. Having acquired these skills, and having obtained a better position on the civilian labour market as a result, might have also given these recruits advantages on the partner market.

The Swedish military provides information about LS on a scale ranging from 1 (low skills) to 9 (high skills). Therefore, LS are included as a categorical variable in our models using the middle category (score of 5) as the reference group. There is an additional “0” category, which has to be considered with caution since a relatively large number of males belong to this category, and it remains unclear how individuals were assigned to this group. We have decided to combine the score of 0 with the group of missing values, since additional analyses have shown that estimates for the “0” category and the “missing” category are very similar (see [Figures S1 and S2](#)).

Cognitive skills

The Swedish military collected information on LS mainly for men who scored in the top half of the IQ distribution. Cognitive skills were measured on a scale ranging from 1 (low skills) to 9 (high skills), and this information also came from the military enlistment. [Table 1](#) provides an overview of the tabulation between LS and IQ scores. It seems obvious that the vast majority of young men with scores from 1 to 4 on the cognitive ability scale did not undergo an assessment of their LS (99% or more), and were assigned a missing value on LS. When we examine the association between LS scores (that are non-missing) and family formation, it is important to keep in mind that men who performed relatively poorly on the cognitive

ability tests are underrepresented in our analyses because the leadership skills of men with low cognitive skills were not generally assessed, presumably because the military was interested in assigning leadership roles only to men with cognitive scores at the median level or higher.

The role of socio-economic status

We consider income as an important factor in the link between LS and family formation. Since income can vary for individuals over time, we cumulate disposable income for each individual up to age 39, and include the logarithm of it in our models. Disposable income includes all sources of income and welfare support, e.g., income from earnings, income from capital and parental leave benefits. This measure of disposable income is net of taxes. Income has been adjusted for inflation using data provided by Statistics Sweden ([SCB CPI, 2022](#)).

Furthermore, education – measured as the highest educational level obtained by age 39 (1 “no basic education”, 2 “primary”, 3 “lower secondary”, 4 “upper secondary”, 5 “post-secondary”, 6 “tertiary”, 7 “doctor”) – is included in our models. Moreover, LS are regressed on educational outcomes in later life. For purposes of simplification, and due to our particular interest in the transition to the highest level of education, we use a binary-coded indicator (0 “lower than tertiary”, 1 “tertiary and higher”).

Additional covariates

We also control for birth order (1–16) in our models, since this variable is linked with several factors of relevance in our study, such as intelligence ([Barclay, 2015](#); [Rohrer et al., 2015](#)). Additionally, psychological factors, such as personality or skills, may differ by birth order since first-borns receive full parental attention for at least some period of time ([Sulloway, 1996](#)). Furthermore, we control for sibling group size (1–18). Both birth order and sibling group size are created using the full family information, i.e., sisters are involved in the counts. Additionally, we include the year of birth (1963–1979) in order to control for potential birth cohort effects, since several factors may have changed over time. For instance, LS and their meaning for couples might have changed over the decades. While LS may have been particularly important among older cohorts due to the standard expectation in more traditional family forms that the husband should make the major decisions, LS may have been more balanced among younger cohorts.

Statistical models

We apply Poisson regression models in order to examine the association between LS and the number of children born to men by age 39 or older. The models are based on the following equation:

$$\log(E[Y_i|X_i]) = \beta_0 + \beta_1 leadership_i + \beta_2 cognitive_i + \beta_3 \ln(income)_i + \beta_4 education_i + \beta_5 birth_year_i + \beta_6 birth_order_i + \beta_7 sibling_group_size_i \quad (1)$$

The outcome of the Poisson regression models is the logarithm of the expected kids count Y for each individual i conditioned on the vector of all independent variables X_i . The intercept of the model is represented by β_0 . The independent variable of main interest is *leadership*, which is included as a categorical variable (scores 1–9) in the models as well as the covariate *cognitive* (scores 1–9). *Income* has been cumulated until age 39, and we include the logarithm of it as a continuous variable in our models. The covariate *education* represents the highest educational level of the individual (1 “no basic education” to 7 “doctor”). The last set of covariates represents family background information: *birth_year* is a vector of dummy variables for all birth cohorts in the analytical sample (1963–1979); *birth_order* stands for the birth order of the individual within the family (constructed with information on both full male and female siblings); and *sibling_group_size* provides information on the total number of brothers and sisters (including the individual himself). The last covariate is excluded in the fixed effects models since these require variation in all explanatories between siblings by definition.

Linear probability models (LPM) are run to explore the link between independent variables and the likelihood of remaining childless by age 39 or older. The LPM of our analyses are based on the following equation:

$$Pr(Y_i = 1|X_i = x_i) = \beta_0 + \beta_1 leadership_i + \beta_2 cognitive_i + \beta_3 \ln(income)_i + \beta_4 education_i + \beta_5 birth_year_i + \beta_6 birth_order_i + \beta_7 sibling_group_size_i \quad (2)$$

We are interested in the binary-coded information on whether the individual was still childless at age 39 or higher ($Y=1$), or not ($Y=0$). Therefore, the outcome can be considered as the probability of being childless at age 39 or older. The independent variables are the same as those shown in the Poisson regression models in equation (1). Again, sibling group size is excluded for fixed effects approaches. The LPM is also conducted to examine the association between LS and marital status. Compared to equation (2), only the outcome changes from “childlessness” to “marriage” by age 39 and higher (1 if ever been married, 0 if not). We apply logit regression models as robustness checks. Patterns are similar irrespective of which method is used. We focus on the findings from the LPM, rather than on the log odds from logit models because the linear model allows us to compare estimates across models (e.g., with and without SES factors), and the logit model does not (Mood, 2010). Logit model estimates may be transferred to average marginal effects, but previous research has shown that the differences between these estimates and the LPM model coefficients are small (Angrist and Pischke, 2009). Thus, LPM is a reliable model, including for binary-coded outcomes. Additionally, we run linear models using income and education as the outcomes to explore the association between LS and cumulated income/educational level due to the particular relevance of education and income in the association between LS and family formation.

Results

Descriptives

Supplementary material [Table S1](#) gives an overview of the variables that we use in our models. Approximately 60% of the analytical sample have ever been married by age 39 and higher (59.50%). About one-fifth of our study population remains childless at age 39 or older (20.64%), and twice as many have two children (42.82%). We group the number of children from nine onwards for visualisation purposes only. As an outcome of our analyses, this variable is included without an open-ended category, i.e., the highest value is 22, which is observed for one individual. It appears that LS is roughly normally distributed, with the largest share of males having a score of 5 (16.72%). However, the largest category contains males who are coded as “missing” (37.79%). We have conducted analyses with and without the missing values to examine whether the patterns are consistent (based on listwise deletion). Further information about the variables from our models can be seen in [Table S1](#).

Additionally, we show the mean values of the family formation outcomes and of further important factors according to LS scores in [Table 2](#) below. It is apparent from these simple descriptive statistics that an increase in LS is accompanied by an increase in several other factors (e.g., education, income, cognitive skills). For instance, the number of children increases with LS, with a range of 1.34 (LS score of 1) to 2.10 children (LS score of 9). The overall mean number of children born to Swedish men in these birth cohorts by 2018 is 1.73. Consequently, the childlessness level decreases across LS scores, with the lowest scores (1–3) being associated with the highest proportions of childlessness (>30%). Additionally, men with higher LS scores have higher probabilities of getting

Table 2 Mean values of relevant factors according to leadership skills

LS	# Children	Childlessness	Cogn. ability	Education	Income dec.	Married	N
Missing	1.67	0.23	3.19	3.44	5.02	0.53	246015
1	1.34	0.38	5.81	3.92	3.83	0.42	3690
2	1.36	0.35	5.89	4.09	4.47	0.47	14367
3	1.48	0.31	5.91	4.11	4.82	0.51	31753
4	1.61	0.25	5.95	4.19	5.26	0.56	65833
5	1.75	0.19	6.06	4.40	5.67	0.62	108837
6	1.85	0.15	6.33	4.74	6.14	0.68	93002
7	1.95	0.12	6.62	5.03	6.62	0.72	61569
8	2.03	0.10	6.99	5.27	7.02	0.76	21829
9	2.10	0.09	7.23	5.38	7.30	0.79	4046
Average	1.73	0.21	5.08	4.14	5.52	0.59	650941

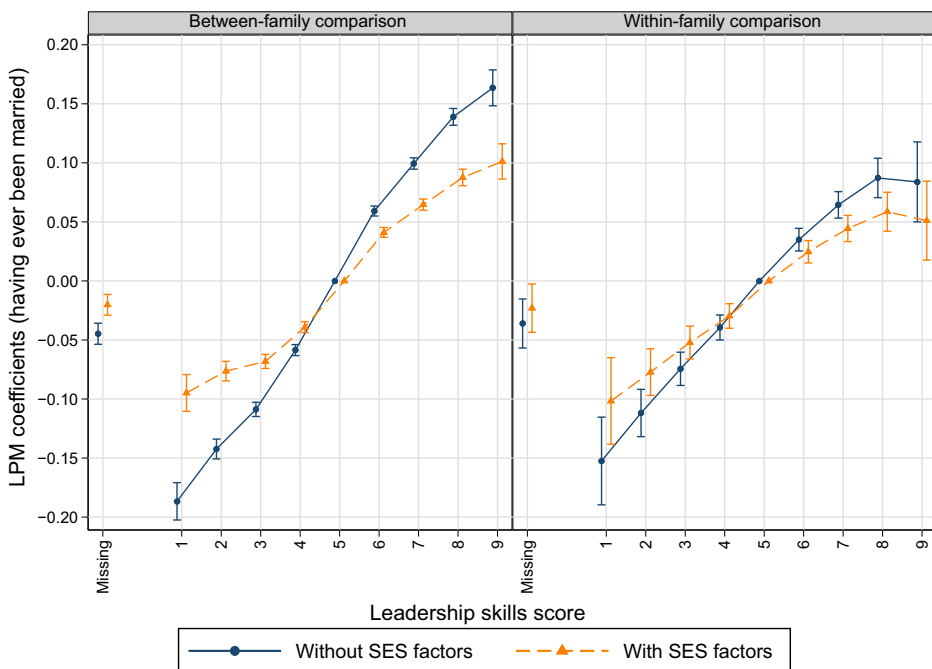
Note: The number of children column shows the average number of children; the childlessness column shows the proportion childless; the cognitive ability column shows the measure of cognitive ability from the military conscription evaluation on a stanine scale; the education column shows the level of education; the income deciles show the average income decile of the men; the married column shows the proportion ever married.

married (0.42 for a LS score of 1 and 0.79 for a LS score of 9). Further information on other relevant characteristics, such as education or income, can be seen in Table 2.

Leadership skills and entry into marriage

As shown in Figure 1, LS are positively linked with the probability of having ever been married by age 39 or older. Males with the lowest LS scores (1–3) have a 10–20% lower probability of having ever been married by this age, compared to the reference group (LS score of 5), holding all other covariates constant. Males with the highest LS scores (7–9) have a 10–16% higher probability of having ever been married by age 39 or older than the reference group (LS score of 5). These magnitudes are reduced when SES factors (income, education, parenthood) are included in the models. For instance, the marriage probabilities for males with high LS scores are 5–10% higher than those for men from the reference group (LS score of 5). The patterns persist, but are weaker, when brothers are compared to each other (within-family analyses), when missing values are excluded from the analyses (using listwise

Figure 1 The relationship between leadership scores measured at ages 17–20 and the probability of getting married by age 39 or older among Swedish men of the 1963–1979 birth cohorts. Linear probability models, error bars are 95% confidence intervals



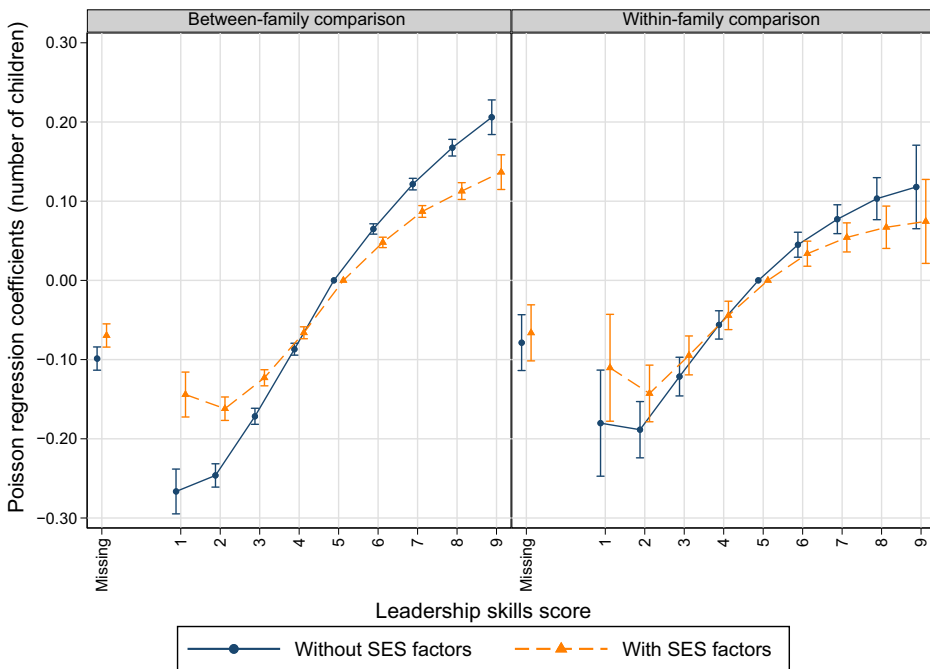
Note: Models without SES factors control for cognitive abilities, birth year, birth order and, in case of between-family analyses, sibling group size. Models with SES factors also include income and education.

deletion, Figure S3) or when logistic regression models are applied (Figure S4). Additionally, the differences in the estimates from models with and without income and education (Figure 1, Table S2) suggest that these factors play an important role.

Leadership skills and number of children

Figure 2 shows the LS coefficients from the Poisson regression models with the number of children born to men by age 39 or older as outcomes for both between- and within-family comparisons. Both models are estimated with and without SES factors (income, education), but always include the other covariates (cognitive ability, birth year and birth order; sibling group size only for between-family models). Figure 2 illustrates that lower LS scores are associated with having fewer children, and higher LS scores are linked with having more children. For instance, the lowest LS scores (1 and 2) are associated with having 0.25 fewer children compared to the reference group (LS score of 5), whereas the highest LS scores (8 and 9) are linked with having 0.15–0.2 more children than the reference group. This represents a

Figure 2 The relationship between leadership scores measured at ages 17–20 and the total number of children born by age 39 or older to Swedish men of the 1963–1979 birth cohorts. Poisson regression models, error bars are 95% confidence intervals



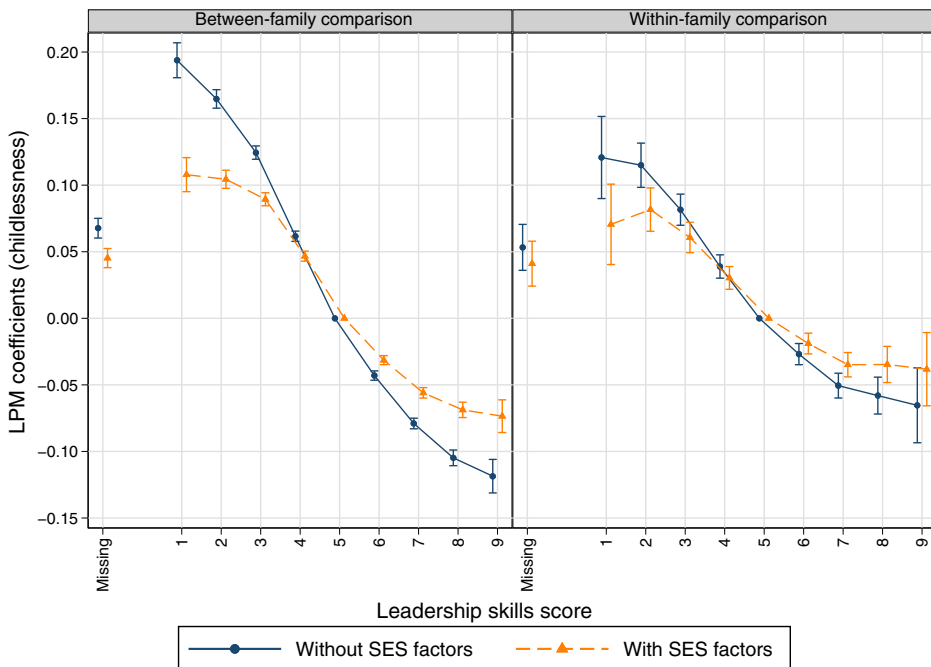
Note: Models without SES factors control for cognitive abilities, birth year, birth order and, in case of between-family analyses, sibling group size. Models with SES factors also include income and education.

14.45% reduction in the number of offspring among men with the lowest LS scores and a 8.67%–11.56% increase in the number of offspring among men with the highest LS scores compared to the average number of children in the overall population (1.73). Models that include SES factors show similar patterns, but with smaller magnitudes. These patterns can be described as S-shaped, since neither the lowest nor the highest LS scores differ very much when compared to each other. When male siblings are compared to each other (within-family comparison), the general patterns remain similar, but at a slightly lower level. Full regression estimates are shown in [Table S3](#). Similar patterns have also been found in additional analyses using ages 45 and 50 ([Figures S5–S6](#)) and the listwise deletion of missing values ([Figure S7](#)).

Leadership skills and childlessness

[Figure 3](#) below depicts the association between LS and the probability of remaining childless at age 39 or older. Again, the results are shown for the total sample (between-family analyses), as well as for the sample including brothers only (within-family analyses).

Figure 3 The relationship between leadership scores measured at ages 17–20 and the probability of remaining childless at age 39 or older among Swedish men of the 1963–1979 birth cohorts. Linear probability models, error bars are 95% confidence intervals



Note: Models without SES factors control for cognitive abilities, birth year, birth order and, in case of between-family analyses, sibling group size. The models with SES factors also include income and education.

The graphs contain estimates from models with and without SES factors. In all models, a negative trend can be seen: the men with the lowest LS scores are more likely to be childless at age 39, while the men with higher LS scores have a lower probability of being childless. The results from the models that exclude income and education show a steeper gradient in the relationship between LS and childlessness than the models that include these variables, particularly in between-family analyses. According to these models, the men with the lowest LS scores have an almost 20% higher probability of remaining childless compared to the reference group (LS score of 5). On the other tail, the men with the highest LS scores have a more than 10% lower probability of being childless relative to the reference group. This pattern weakens when the models control for income and education. Nevertheless, the men with the lowest LS scores have a coefficient of 0.07, which means that they have a more than 30% higher probability of remaining childless compared to the baseline probability (0.21). Again, the fixed effects models show similar patterns, but on a slightly lower level (see [Table S4](#)). Additional robustness checks reveal that the patterns persist when looking at childlessness at age 45 and age 50 ([Figures S8–S9](#)) and applying logistic regression models ([Figure S10](#)).

The findings above demonstrate that LS scores are linked with completed fertility among males in Sweden. We attempt to explain this association by examining the relationship between LS and SES factors that have been found to affect fertility as well. Therefore, we run linear regression and linear probability models using income and educational level as outcomes and LS as an independent variable. Results are shown in the Supplementary material [Figures S11–S12](#). In general, positive associations between LS and income/education can be seen, i.e., a higher LS score predicts a higher cumulated income and a higher probability of having tertiary education by age 39.

The role of cognitive ability

Given that men's LS were measured based on their performance on the cognitive ability test, we run models with and without adjustment for cognitive skills. Supplementary material [Figures S13–S15](#) suggest that controlling for or excluding higher scores on cognitive skills does little to change the LS-marriage/fertility association. The estimates from both models (with and without cognitive abilities) are very similar, as the results from both the between-family and within-family analyses show. The only exception to this pattern relates to the group with missing values in the between-family analyses. Nevertheless, the available data do not allow us to draw any conclusions about men with lower cognitive abilities. Thus, whether the patterns would hold for males with lower cognitive abilities remains unclear.

Discussion

Conclusions

Our study examined the relationship between leadership skills (LS) and family formation among males in Sweden. Swedish register data allowed us to analyse the extent to which LS

scores (measured at the time of military conscription) are linked with marital status, number of children and childlessness at age 39 or older. The findings point to a positive association between LS and the probability of getting married by age 39 and higher. Additionally, higher LS are linked with a higher offspring count and lower levels of childlessness, while lower LS are associated with a smaller number of children and higher levels of childlessness.

In general, our results show associations in (reversed) S-shaped patterns in the full models including all covariates. Comparisons of the within-family model (fixed effects approach) and the between-family model show no strong differences in the link between LS and family formation processes, which indicates that differences in family formation behaviour by LS scores are not strongly driven by shared family background factors.

A mediating role of SES factors is suggested by a comparison of coefficients from models with and without income and education. However, in this study, conclusions about mediation should be made with caution because the order of the SES factors and the family formation outcomes may be reversed in time for many individuals. For instance, income might increase more after entering parenthood, which suggests that LS may predict fertility leading to higher income levels. Previous research has supported the idea of the so-called fatherhood premium effect for the Swedish context, i.e., the claim that men benefit particularly strongly from entering fatherhood through increasing income (Angelov et al., 2016; Bygren et al., 2021).

Nevertheless, even small mediation effects may cumulate over time to form a larger effect, as is suggested in the LPM using cross-sectional data at the end of men's fertility histories from the current study. This association may also reflect other unmeasured factors. For instance, if LS are seen as attractive traits on the partner market, leaders are more likely than non-leaders to be in a partnership (Miller et al., 2009). Furthermore, leadership can be seen as an important factor in relationship success, e.g., given the beneficial effects of a leader's communication skills (Porter and Baker, 2005). This would imply that having LS increases the chances of getting married and having children.

The findings of this study should be interpreted with caution, as LS were mainly evaluated for individuals in the top half of the cognitive skills distribution, which implies that the LS of a large share of the male population were not assessed. To keep individuals with missing values on LS in our analyses, we included them as a separate category in our statistical analyses. Although the results do not allow us to evaluate the relationship between LS and the various outcomes that we studied for the men with missing values, we can see that men with missing values on LS have fertility patterns similar to those of men with low leadership scores.

Limitations and strengths

Our study has both strengths and limitations. One of the most important weaknesses of our analyses is that we could not examine the relationship between LS and family formation for women in Sweden, since information on LS is only available for men who took part in the military recruitment process. For women, we might expect to observe patterns that are

similar to those found in this study. Previous research on the correlation between LS and birth parities including both genders has shown that LS affect fertility similarly among both men and women, with even larger effects among women (Jokela and Keltikangas-Järvinen, 2009).

Another limitation relates to the reciprocal link between LS and SES factors. We could examine the association between LS measured at the time of military recruitment on the one hand, and income and education by age 39 on the other. This analytical approach is in line with previous research. For instance, personality may predict career development (Silver and Spilerman, 1990) and occupation indicators such as income, particularly if the personality facets fit the job demands (Denissen et al., 2018). However, we could not examine the reverse relationship between SES and LS since no changes in LS over time have been recorded. Previous research has suggested that personality facets may change due to certain life events in younger adulthood, e.g., the first romantic relationship or the transition to work or university (Bleidorn et al., 2018). Additionally, previous research has shown that personality changes may be observed over time, particularly when they are measured by interviews instead of by questionnaires (Hopwood and Bleidorn, 2018). Nevertheless, in our case, LS was measured in early adulthood, and this obviates any concerns about reverse causality driving the association that we observe between LS scores and fertility. Moreover, the patterns may even be underestimated given that LS were measured a long time before the family outcomes in mid-adulthood were assessed, indicating the need for further research examining the effects of LS on family formation in narrower time frames.

Our study also has several strengths. Due to the unique identification number assigned to each individual in Sweden, we could link LS from military service data with a number of socio-demographically relevant factors, such as fertility, marital status and education. Moreover, the power of our data allowed us to compare male siblings to each other in order to examine whether the results of within-family analyses differed from those of between-family analyses.

Another strength of our study is that it explored the prospective association between LS measured at the age of military recruitment (17–20 years) and the age of virtually completed family formation in mid-adulthood (age 39 or older). One previous study by Jokela and Keltikangas-Järvinen (2009) had a similar study design for fertility. However, the authors' sample was drawn from the Cardiovascular Risk in Young Finns Study, and was therefore much smaller, at about 1300 participants. Furthermore, the participants in their study were aged 30–39. By contrast, our analyses were based on males who were 39 years or older, and who therefore had largely completed fertility.

Register data from Sweden have further advantages over survey data. For instance, surveys usually suffer from selection biases, since some individuals may reject participation for various reasons. These individuals might have specific patterns in relation to our research interest. For instance, disadvantaged males may be both more likely to reject survey participation and less likely to have children. These patterns would bias the results in analyses based on survey data. We must condition our analyses on males with higher cognitive abilities since only these men received a LS score. Unlike in studies using survey data, we are aware of the reasons for the missing values on LS. We controlled for cognitive

abilities in our models and did not find very large differences between these models and the models without this factor. Nevertheless, we may be underestimating the effect of LS on fertility. As shown in [Figures S16 and S17](#), scores from the top half of the IQ distribution show a positive linear association with LS. Lower IQ scores are linked with lower LS scores, but uncertainty for this group is higher (as an IQ score of 1 is very rare in our data, these estimates are not very reliable). Therefore, the negative association between lower LS scores and fertility from our analyses may even be underestimated, since both low IQ and low LS may be detrimental on the partner market.

Outlook

Although we were able to explore the LS-fertility link on a population level based on Swedish register data among males, there is still substantial room to examine this specific association further. For instance, it would be interesting to explore the leadership-fertility link among women as well, since previous research has suggested that among females, there are different, and potentially even stronger, associations between LS and fertility ([Jokela and Keltikangas-Järvinen, 2009](#)).

Moreover, there are additional personality facets that may deserve more attention in fertility research. The Swedish Military Enlistment data provide further information on intensity (self-motivation, frequency and intensity of leisure time activities), social maturity (extraversion, social network size, responsibility, independence), emotional stability (ability to manage nervousness and stress), and psychological energy (perseverance, concentration) ([Bihagen et al., 2013](#)) that may affect childbearing as well. In particular, social skills and emotional stability have become increasingly relevant for fertility over time in the Nordic countries ([Aldén et al., 2022](#); [Skirbekk et al., 2025](#)). As LS are related to such personality factors, their relevance for fertility trends may increase in the future as well. In particular, in times characterised by numerous societal and economic challenges, LS may be essential for family formation, as the capacity to cope with stress, solve conflicts and establish relationships (as facets of LS) will become more important for individuals, potential partners and parents. Therefore, we may expect LS to be associated with higher and more stable fertility in the future, although these predictions must remain speculative.

Additionally, personality may affect other important life outcomes with respect to family formation, e.g., marital behaviour. The personality-fertility link might also be explored in other cultural contexts, particularly considering the differences in the association between SES and fertility in the Scandinavian countries on the one hand and in other (high-income) countries on the other.

Supplementary material

Available online at <https://doi.org/10.1553/p-kbjc-5fmm>

Supplementary file 1. Description the psychological interview data collection purpose and process (S1), Tables S.1–S.4, Figures S.1–S.17.



Funding

This paper was supported by the Strategic Research Council (SRC), FLUX consortium, decision numbers 345130 and 345131; and the European Union (ERC Synergy, BIOSFER, 101071773). The views and opinions expressed are, however, those of the author only, and do not necessarily reflect those of the European Union or the European Research Council. Neither the European Union nor the granting authority can be held responsible for them. Kieron Barclay was supported by a Pro Futura Scientia XIV Fellowship funded by the Swedish Collegium for Advanced Study and Riksbankens Jubileumsfond.

Acknowledgements

We would like to thank our hosting institutes, i.e., the Max Planck Institute for Demographic Research (Rostock, Germany) and Stockholm University, for enabling us to realise this research project. We are particularly grateful for the access to Swedish register data provided by Stockholm University and, in particular, Prof Martin Hällsten. Special thanks go to Stefanie Möllborn for valuable suggestions that this paper has benefited considerably from. We would also like to thank the anonymous reviewers and all of our colleagues from Germany, Sweden and other parts of the world for very useful comments that have improved the quality of our paper. Furthermore, we would like to thank all members of the International Max Planck Research School for Population, Health and Data Science (IMPRS-PHDS) for all their support.

ORCID iDs

Steffen Peters  <https://orcid.org/0000-0002-9607-0366>

Kieron Barclay  <https://orcid.org/0000-0002-5142-8467>

References

- Aldén, L., Boschini, A. D., & Sundström, M. (2022). *Who becomes a father? The rising importance of non-cognitive ability*. SSRN I. <https://doi.org/10.2139/ssrn.4207533>
- Allred, K. W., & Hancock, C. L. (2015). Reconciling leadership and partnership: Strategies to empower professionals and families. *Young Children*, 70(2), 46–53. <https://www.jstor.org/stable/ycyoungchildren.70.2.46>
- Anderson, J. (2005). *Servant leadership and the true parental model: A construct for better research, study and practice*. School of Leadership Studies-Regent University.
- Andersson, G., & Scott, K. (2007). Childbearing dynamics of couples in a universalistic welfare state: The role of labor-market status, country of origin, and gender. *Demographic Research*, 17, 897–938. <https://doi.org/10.4054/DemRes.2007.17.30>
- Anderton, D. L., Tsuya, N. O., Bean, L. L., & Mineau, G. P. (1987). Intergenerational transmission of relative fertility and life course patterns. *Demography*, 24(4), 467–480. <https://doi.org/10.2307/2061386>
- Andeweg, R. B., & Berg, S. B. V. D. (2003). Linking birth order to political leadership: The impact of parents or sibling interaction? *Political Psychology*, 24(3), 605–623. <https://doi.org/10.1111/0162-895X.00343>
- Angelov, N., Johansson, P., & Lindahl, E. (2016). Parenthood and the gender gap in pay. *Journal of Labor Economics*, 34(3), 545–579. <https://doi.org/10.1086/684851>
- Angrist, J. D., & Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton University Press.
- Bar, M., Hazan, M., Leukhina, O., Weiss, D., & Zoabi, H. (2018). Why did rich families increase their fertility? Inequality and marketization of child care. *Journal of Economic Growth*, 23(4), 427–463. <https://doi.org/10.1007/s10887-018-9160-8>
- Barclay, K. J. (2015). A within-family analysis of birth order and intelligence using population conscription data on Swedish men. *Intelligence*, 49, 134–143. <https://doi.org/10.1016/j.intell.2014.12.007>

- Barclay, K., & Kolk, M. (2020). The influence of health in early adulthood on male fertility. *Population and Development Review*, 46(4), 757–785. <https://doi.org/10.1111/padr.12357>
- Benmira, S., & Agboola, M. (2021). Evolution of leadership theory. *BMJ Leader*, 5, 3–5. <https://doi.org/10.1136/leader-2020-000296>
- Bihagen, E., Nermo, M., & Stern, C. (2013). Class origin and elite position of men in business firms in Sweden, 1993–2007: The importance of education, cognitive ability, and personality. *European Sociological Review*, 29(5), 939–954. <https://doi.org/10.1093/esr/jcs070>
- Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait change: Life events and trait change. *Journal of Personality*, 86(1), 83–96. <https://doi.org/10.1111/jopy.12286>
- Boone, L. W., & Peborde, M. S. (2008). Developing leadership skills in college and early career positions. *Review of Business*, 28(3), 3–13.
- Brons, M. D. (Anne), Liefbroer, A. C., & Ganzeboom, H. B. G. (2021). Parental socioeconomic status and the timing of first marriage: What is the role of unmarried cohabitation? Results from a cross-national comparison. *Demographic Research*, 45, 469–516. <https://doi.org/10.4054/DemRes.2021.45.15>
- Brunello, G., & De Paola, M. (2013). Leadership at school: Does the gender of siblings matter? *Economics Letters*, 120(1), 61–64. <https://doi.org/10.1016/j.econlet.2013.03.030>
- Burnham, B. J. (2024). *Servant-leadership, forgiveness-asking, and parenting in the context of social construction: A hermeneutic phenomenological study*. Gonzaga University.
- Buss, D. M. (1994). The strategies of human mating. *American Scientist*, 82(3), 238–249. <https://www.jstor.org/stable/29775193>
- Buyukkececi, Z., & Leopold, T. (2021). Sibling influence on family formation: A study of social interaction effects on fertility, marriage, and divorce. *Advances in Life Course Research*, 47, 100359. <https://doi.org/10.1016/j.alcr.2020.100359>
- Bygren, M., Gähler, M., & Magnusson, C. (2021). The constant gap: Parenthood premiums in Sweden 1968–2010. *Social Forces*, 100(1), 137–168. <https://doi.org/10.1093/sf/soaa097>
- Carlstedt, B. (1998). *Validation of psychological predictors in the Swedish enlistment system*. Navy Advancement Center. <https://doi.org/10.1037/e623442007-001>
- Chudnovskaya, M. (2019). Trends in childlessness among highly educated men in Sweden. *European Journal of Population*, 35(5), 939–958. <https://doi.org/10.1007/s10680-018-9511-3>
- Cools, S., & Hart, R. K. (2017). The effect of childhood family size on fertility in adulthood: New evidence from IV estimation. *Demography*, 54(1), 23–44. <https://doi.org/10.1007/s13524-016-0537-z>
- Cummins, D. (2006). Dominance, status, and social hierarchies. In D. M. Buss (Ed.), *The Handbook of Evolutionary Psychology* (pp. 676–697). John Wiley & Sons, Inc. <https://doi.org/10.1002/9780470939376.ch23>
- De Neve, J.-E., Mikhaylov, S., Dawes, C. T., Christakis, N. A., & Fowler, J. H. (2013). Born to lead? A twin design and genetic association study of leadership role occupancy. *The Leadership Quarterly*, 24(1), 45–60. <https://doi.org/10.1016/j.leaqua.2012.08.001>
- Denissen, J. J. A., Bleidorn, W., Hennecke, M., Luhmann, M., Orth, U., Specht, J., & Zimmermann, J. (2018). Uncovering the power of personality to shape income. *Psychological Science*, 29(1), 3–13. <https://doi.org/10.1177/0956797617724435>
- Erola, J., Harkonen, J., & Dronkers, J. (2012). More careful or less marriageable? Parental divorce, spouse selection and entry into marriage. *Social Forces*, 90(4), 1323–1345. <https://doi.org/10.1093/sf/sos073>
- Floris, M., Wiblen, S. L., & Anichenko, E. (2020). Senior project leadership skills and career stallers: Analysis of perception differences and implications for careers. *Project Management Journal*, 51(2), 214–234. <https://doi.org/10.1177/8756972820907491>
- Garn, A. C., Matthews, M. S., & Jolly, J. L. (2012). Parents' role in the academic motivation of students with gifts and talents. *Psychology in the Schools*, 49(7), 656–667. <https://doi.org/10.1002/pits.21626>
- Greenleaf, R. K. (2002). *Servant leadership. A journey into the nature of legitimate power and greatness*. Paulist Press.
- Grönqvist, E., & Lindqvist, E. (2015). *Kan man lära sig ledarskap? Befälsutbildning under värnplikten och utfall på arbetsmarknaden (4)*. Institutet för arbetsmarknads- och utbildningspolitisk utvärdering.
- Gunn, R. W. (2000). Can leadership be taught? *Strategic Finance*, 82(6), 14–16.

- Hartman, S. J., & Harris, O. J. (1992). The role of parental influence in leadership. *The Journal of Social Psychology*, 132(2), 153–167. <https://doi.org/10.1080/00224545.1992.9922968>
- Hopcroft, R. L. (2006). Sex, status, and reproductive success in the contemporary United States. *Evolution and Human Behavior*, 27(2), 104–120. <https://doi.org/10.1016/j.evolhumbehav.2005.07.004>
- Hopcroft, R. L. (2015). Sex differences in the relationship between status and number of offspring in the contemporary U.S. *Evolution and Human Behavior*, 36(2), 146–151. <https://doi.org/10.1016/j.evolhumbehav.2014.10.003>
- Hopp, C., & Pruschak, G. (2023). Is there such a thing as leadership skill? – A replication and extension of the relationship between high school leadership positions and later-life earnings. *The Leadership Quarterly*, 34(4), 101475. <https://doi.org/10.1016/j.leaqua.2020.101475>
- Hopwood, C. J., & Bleidorn, W. (2018). Stability and change in personality and personality disorders. *Current Opinion in Psychology*, 21, 6–10. <https://doi.org/10.1016/j.copsyc.2017.08.034>
- Horishna, N., Slozanska, H., Soroka, O., & Romanovska, L. (2019). Exploring the leadership skills of pre-service social work students: Implications for social work education. *Problems of Education in the 21st Century*, 77(5), 598–615. <https://doi.org/10.33225/pec/19.77.598>
- Hunt, T., & Fedynich, L. C. (2018). Leadership: Past, present, and future: An evolution of an idea. *Journal of Arts and Humanities*, 08(02), 20–26. <https://doi.org/10.18533/journal.v8i2.1582>
- Jalovaara, M., & Fasang, A. E. (2020). Family life courses, gender, and mid-life earnings. *European Sociological Review*, 36(2), 159–178. <https://doi.org/10.1093/esr/jcz057>
- Jalovaara, M., Neyer, G., Andersson, G., Dahlberg, J., Dommermuth, L., Fallesen, P., & Lapppegård, T. (2019). Education, gender, and cohort fertility in the nordic countries. *European Journal of Population*, 35(3), 563–586. <https://doi.org/10.1007/s10680-018-9492-2>
- Johnson, N. E., & Stokes, C. S. (1976). Family size in successive generations: The effects of birth order, inter-generational change in lifestyle, and familial satisfaction. *Demography*, 13(2), 175–187. <https://doi.org/10.2307/2060799>
- Jokela, M., & Keltikangas-Järvinen, L. (2009). Adolescent leadership and adulthood fertility: Revisiting the “central theoretical problem of human sociobiology.” *Journal of Personality*, 77(1), 213–230. <https://doi.org/10.1111/j.1467-6494.2008.00543.x>
- Kalmijn, M. (2011). The influence of men’s income and employment on marriage and cohabitation: Testing Oppenheimer’s theory in europe. *European Journal of Population/Revue Européenne de Démographie*, 27(3), 269–293. <https://doi.org/10.1007/s10680-011-9238-x>
- Kanazawa, S. (2003). Can evolutionary psychology explain reproductive behavior in the contemporary united states? *The Sociological Quarterly*, 44(2), 291–302. <https://doi.org/10.1111/j.1533-8525.2003.tb00559.x>
- Kohler, H.-P., Rodgers, J. L., & Christensen, K. (1999). Is fertility behavior in our genes? Findings from a Danish twin study. *Population and Development Review*, 25(2), 253–288. <https://doi.org/10.1111/j.1728-4457.1999.00253.x>
- Kolk, M. (2019). The relationship between lifecourse accumulated income and childbearing of Swedish men and women born 1940-1970. *Stockholm Research Reports in Demography*, 19, 1–31. <https://doi.org/10.1080/00324728.2022.2134578>
- Kolk, M., & Barclay, K. (2021). Do income and marriage mediate the relationship between cognitive ability and fertility? Data from Swedish taxation and conscriptions registers for men born 1951–1967. *Intelligence*, 84, 1–11. <https://doi.org/10.1016/j.intell.2020.101514>
- Kragt, D., & Day, D. V. (2020). Predicting leadership competency development and promotion among high-potential executives: The role of leader identity. *Frontiers in Psychology*, 11, 1–16. <https://doi.org/10.3389/fpsyg.2020.01816>
- Kuhn, P., & Weinberger, C. (2005). Leadership skills and wages. *Journal of Labor Economics*, 23(3), 395–436. <https://doi.org/10.1086/430282>
- Kuo, J. C.-L., & Raley, R. K. (2016). Is it all about money? Work characteristics and women’s and men’s marriage formation in early adulthood. *Journal of Family Issues*, 37(8), 1046–1073. <https://doi.org/10.1177/0192513X14530973>

- Kuziemko, I. (2006). *Is Having Babies Contagious? Estimating Fertility Peer Effects Between Siblings* [Unpublished Manuscript], Harvard University. https://business.columbia.edu/sites/default/files-efs/pubfiles/5799/fertility_11_29_06.pdf
- Larsson, G., & Kallenberg, K. (2006). *Direkt ledarskap*. Försvarsmakten.
- Lindqvist, E., & Vestman, R. (2010). *Web appendix (B-F): The labor market returns to cognitive and noncognitive ability: Evidence from the Swedish enlistment*. https://assets.aeaweb.org/asset-server/articles-attachments/aej/app/app/2009-0140_app.pdf
- Lindqvist, E., & Vestman, R. (2011). The labor market returns to cognitive and noncognitive ability: Evidence from the Swedish enlistment. *American Economic Journal: Applied Economics*, 3(1), 101–128. <https://doi.org/10.1257/app.3.1.101>
- Ludvigsson, J. F., Berglind, D., Sundquist, K., Sundström, J., Tynelius, P., & Neovius, M. (2022). The Swedish military conscription register: Opportunities for its use in medical research. *European Journal of Epidemiology*. <https://doi.org/10.1007/s10654-022-00887-0>
- Lund, O. C. H., Tamnes, C. K., Moestue, C., Buss, D. M., & Vollrath, M. (2007). Tactics of hierarchy negotiation. *Journal of Research in Personality*, 41(1), 25–44. <https://doi.org/10.1016/j.jrp.2006.01.002>
- Lyngstad, T. H., & Prskawetz, A. (2010). Do siblings' fertility decisions influence each other? *Demography*, 47(4), 923–934. <https://doi.org/10.1007/BF03213733>
- Malakyan, P. G. (2014). Followership in leadership studies: A case of leader-follower trade approach. *Journal of Leadership Studies*, 7(4), 6–22. <https://doi.org/10.1002/jls.21306>
- Maurer, T. J., Hartnell, C. A., & Lippstreu, M. (2017). A model of leadership motivations, error management culture, leadership capacity, and career success. *Journal of Occupational and Organizational Psychology*, 90(4), 481–507. <https://doi.org/10.1111/joop.12181>
- Miller, S., Lansford, J. E., Costanzo, P., Malone, P. S., Golonka, M., & Killea-Jones, L. A. (2009). Early adolescent romantic partner status, peer standing, and problem behaviors. *The Journal of Early Adolescence*, 29(6), 839–861. <https://doi.org/10.1177/0272431609332665>
- Mills, M. C., Barban, N., & Tropf, F. C. (2018). The sociogenomics of polygenic scores of reproductive behavior and their relationship to other fertility traits. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 4(4), 122–136. <https://doi.org/10.7758/RSF.2018.4.4.07>
- Mills, M. C., & Tropf, F. C. (2015). The biodemography of fertility: A review and future research frontiers. *KZfSS Kölner Zeitschrift Für Soziologie und Sozialpsychologie*, 67(S1), 397–424. <https://doi.org/10.1007/s11577-015-0319-4>
- Ministry of Defense Sweden. (1984). *Conscription in the future* (71; Swedish Government Official Reports). <https://lagen.nu/sou/1984:71?attachment=index.pdf&repo=soukb&dir=downloaded>
- Mönstringshandboken*. (2021). Plikt-och prövningsverket. <https://pliktverket.se/download/18.3b29fb261791cde3ba045b1/1620048296684/Monstringshandboken-2021.pdf>
- Mood, C. (2010). Logistic regression: Why we cannot do what we think we can do, and what we can do about it. *European Sociological Review*, 26(1), 67–82. <https://doi.org/10.1093/esr/jcp006>
- Mood, C., Jonsson, J. O., & Bihagen, E. (2012). Socioeconomic persistence across generations: Cognitive and noncognitive processes. In J. Ermisch, M. Jäntti, & T. Smeeding (Eds.), *From Parents to Children. The Intergenerational Transmission of Advantage* (pp. 53–84). Russell Sage.
- Morosow, K., & Kolk, M. (2020). How does birth order and number of siblings affect fertility? A within-family comparison using Swedish register data. *European Journal of Population*, 36(2), 197–233. <https://doi.org/10.1007/s10680-019-09525-0>
- Murphy, M. (2013). Cross-national patterns of intergenerational continuities in childbearing in developed countries. *Biodemography and Social Biology*, 59(2), 101–126. <https://doi.org/10.1080/19485565.2013.833779>
- Murphy, M., & Knudsen, L. B. (2002). The intergenerational transmission of fertility in contemporary Denmark: The effects of number of siblings (full and half), birth order, and whether male or female. *Population Studies*, 56(3), 235–248. <https://doi.org/10.1080/00324720215937>
- Nettle, D., & Pollet, T. V. (2008). Natural selection on male wealth in humans. *The American Naturalist*, 172(5), 658–666. <https://doi.org/10.1086/591690>

- Nilsson, P. M., Nyberg, P., & Östergren, P.-O. (2001). Increased susceptibility to stress at a psychological assessment of stress tolerance is associated with impaired fetal growth. *International Journal of Epidemiology*, 30(1), 75–80. <https://doi.org/10.1093/ije/30.1.75>
- Nisén, J., Martikainen, P., Silventoinen, K., & Myrskylä, M. (2014). Age-specific fertility by educational level in the Finnish male cohort born 1940–1950. *Demographic Research*, 31, 119–136. <https://doi.org/10.4054/DemRes.2014.31.5>
- Nyberg, J., Gustavsson, S., Åberg, M. A. I., Kuhn, H. G., & Waern, M. (2020). Late-adolescent risk factors for suicide and self-harm in middle-aged men: Explorative prospective population-based study. *The British Journal of Psychiatry*, 217(1), 370–376. <https://doi.org/10.1192/bjp.2019.243>
- Ohlsson-Wijk, S. (2014). Digit preferences in marriage formation in Sweden: Millennium marriages and birthday peaks. *Demographic Research*, 30, 739–752. <https://doi.org/10.4054/DemRes.2014.30.25>
- Özcan, M., Gür, R., Erani, A. K., & Ericok, B. (2019). Investigation of the critical leadership scores of candidate teachers by parental education levels. In S. S. Ercetin & N. Potas (Eds.), *Chaos, Complexity and Leadership 2017. Explorations of Chaos and Complexity Theory* (pp. 557–567). Spring. https://doi.org/10.1007/978-3-319-89875-9_47
- Peters, S. (2023). The prospective power of personality for childbearing: A longitudinal study based on data from Germany. *Genus*, 79(1), 6. <https://doi.org/10.1186/s41118-023-00184-y>
- Porter, J., & Baker, E. L. (2005). Partnering essentials. *Journal of Public Health Management and Practice*, 11(2), 174–177. <https://doi.org/10.1097/00124784-200503000-00013>
- Rapp, I. (2018). Partnership formation in young and older age. *Journal of Family Issues*, 39(13), 3363–3390. <https://doi.org/10.1177/0192513X18783469>
- Regan, P. C., & Berscheid, E. (1997). Gender differences in characteristics desired in a potential sexual and marriage partner. *Journal of Psychology & Human Sexuality*, 9(1), 25–37. https://doi.org/10.1300/J056v09n01_02
- Rohrer, J. M., Egloff, B., & Schmukle, S. C. (2015). Examining the effects of birth order on personality. *Proceedings of the National Academy of Sciences*, 112(46), 14224–14229. <https://doi.org/10.1073/pnas.1506451112>
- Sassler, S., Roy, S., & Stasny, E. (2014). Men’s economic status and marital transitions of fragile families. *Demographic Research*, 30, 71–110. <https://doi.org/10.4054/DemRes.2014.30.3>
- SCB CPI. (2022). CPI, Fixed Index Numbers (1980=100). <https://www.scb.se/en/finding-statistics/statistics-by-subject-area/prices-and-consumption/consumer-price-index/consumer-price-index-cpi/pong/tables-and-graphs/consumer-price-index-cpi/cpi-fixed-index-numbers-1980100/>
- Schneider, D. (2011). Wealth and the marital divide. *American Journal of Sociology*, 117(2), 627–667. <https://doi.org/10.1086/661594>
- Schneider, D., Harknett, K., & Stimpson, M. (2018). What explains the decline in first marriage in the United States? Evidence from the panel study of income dynamics, 1969 to 2013. *Journal of Marriage and Family*, 80(4), 791–811. <https://doi.org/10.1111/jomf.12481>
- Shafer, K., & James, S. L. (2013). Gender and socioeconomic status differences in first and second marriage formation: Comparing first and second marriage formation. *Journal of Marriage and Family*, 75(3), 544–564. <https://doi.org/10.1111/jomf.12024>
- Silver, C. B., & Spilerman, S. (1990). Psychoanalytic perspectives on occupational choice and attainment. In Kalleberg, A. (Eds). *Research in Social Stratification and Mobility* (Vol. 9, pp. 181–214). JAI Press. <https://core.ac.uk/download/pdf/161445421.pdf>
- Skirbekk, V. (2008). Fertility trends by social status. *Demographic Research*, 18, 145–180. <https://doi.org/10.4054/DemRes.2008.18.5>
- Skirbekk, V., Blekesaune, M., & Sunde, H. F. (2025). Personality and fertility dynamics in Norway across four decades – Findings from the HUNT survey. *Personality and Individual Differences*, 233, 112862. <https://doi.org/10.1016/j.paid.2024.112862>
- South, S. J. (2001). The variable effects of family background on the timing of first marriage: United States, 1969–1993. *Social Science Research*, 30(4), 606–626. <https://doi.org/10.1006/ssre.2001.0714>
- Stone, C. B., Lengnick-Hall, M., & Muldoon, J. (2018). Do stereotypes of veterans affect chances of employment? *The Psychologist-Manager Journal*, 21(1), 1–33. <https://doi.org/10.1037/mgr0000068>

- Stulp, G., Sear, R., Schaffnit, S. B., Mills, M. C., & Barrett, L. (2016). The reproductive ecology of industrial societies, part II: The association between wealth and fertility. *Human Nature, 27*(4), 445–470. <https://doi.org/10.1007/s12110-016-9272-9>
- Sullivan, D. R.-E. (2009). *Learning to lead. Effective leadership skills for teachers of young children*. Redleaf Press.
- Sulloway, F. J. (1996). *Born to rebel: Birth order, family dynamics, and creative lives*. Pantheon Books.
- Sweeney, M. M. (2002). Two decades of family change: The shifting economic foundations of marriage. *American Sociological Review, 67*(1), 132. <https://doi.org/10.2307/3088937>
- Weiss, E. S., Anderson, R. M., & Lasker, R. D. (2002). Making the most of collaboration: Exploring the relationship between partnership synergy and partnership functioning. *Health Education & Behavior, 29*(6), 683–698. <https://doi.org/10.1177/109019802237938>
- Wolfinger, N. H. (2003). Parental divorce and offspring marriage: Early or later? *Social Forces, 82*(1), 337–353. <https://doi.org/10.1353/sof.2003.0108>