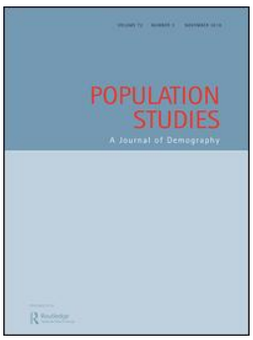

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# Parity disparity: Educational differences in Nordic fertility across parities and number of reproductive partners

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*Most research on trends in socio-economic fertility differences has focused on cohort total fertility and on women. This study aimed to analyse how cohort trends in parity-specific fertility differ across educational segments for men and women and what role multi-partner fertility plays in these trends. We used Finnish and Swedish register data on cohorts born in 1940–73/78. The main analyses used parity progression ratios, comparing ordinary ratios with similar ratios using births to first reproductive partners only. Among the low and medium educated, we observe strengthening parity polarization across cohorts, with increases in both childlessness and births of order three or higher, the latter largely reflecting increases in multi-partner fertility. Highly educated men and women more often have exactly two children. We demonstrate that cohort total fertility can mask significant parity-specific trends across educational groups and that changes in multi-partner fertility can play a part in cohort trends in socio-economic fertility differentials.*

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**Keywords**: fertility; parity; cohort; childlessness; gender; education; socio-economic; multi-partner fertility; parity progression ratios; Nordic countries

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## Introduction

Socio-economic differentials in childbearing patterns are a core demographic topic that is also of broad societal importance. Understanding the varying links between fertility and the dimensions of individuals' social and economic status, such as income, education, and occupational class, has proven an elusive task (Jones and Tertilt 2008; Kravdal and Rindfuss 2008; Skirbekk 2008). By and large, the predominant pattern in most developed low-fertility countries is a moderately positive association between socio-economic resources (income or educational level) and completed fertility for men and a negative association for women (Kravdal and Rindfuss 2008; Zeman et al. 2014; Sobotka et al. 2017). Recently, trends towards convergence in the socio-economic fertility gradients of men and women have been observed (Winkler-Dworak and Toulemon 2007; Kneale and Joshi 2008; Kravdal and Rindfuss 2008; Van Bavel 2012; Zang 2019). In Nordic countries, such trends are particularly clear. A positive association has persisted between men's education and income and their fertility (Kravdal and Rindfuss 2008; Lappegård and Rønsen 2013; Jalovaara et al. 2018; Kolk 2019), whereas the initially negative educational gradient in women's fertility has been eliminated in most Nordic countries. In terms of women's lifetime childlessness, gradients have even reversed, leading to higher levels of childlessness for women with lower levels of education (Jalovaara et al. 2018).

Most previous studies on trends in socio-economic fertility differences have focused on cohort total fertility (CTF) and, in some cases, ultimate childlessness. Limitations include the fact that measures based on averages effectively mask any differences and trends in parity-specific fertility, that is, the birth risks conditioned on the number of previous births (Wood et al. 2014). Moreover, the analyses do not

distinguish between completed fertility attained through childbearing with just one partner and that attained through childbearing with several partners, referred to respectively as 'single-partner fertility' (SPF) and 'multi-partner fertility' (MPF). As variations in both the number of children and number of childbearing partners are substantive aspects of fertility changes and socio-economically stratified fertility patterns (Seltzer 2019), we claim that research on trends in socio-economic fertility differentials would benefit from their integration into the analyses. First, trends in socio-economic differences in fertility behaviour can be parity-specific (Schoen 2006). For example, increases in lifetime childlessness and increases in higher-order births (beyond the mean number of children) can occur simultaneously within one population subgroup. Such patterns, referred to here as 'parity polarization', as well as any other characteristics of the distribution of number of children, are obscured when using measures based on averages, such as CTF (Zeman et al. 2018). Second, socio-economic differences in fertility across cohorts are influenced by socio-economic differences in partnering, separation, and childbearing with the second and subsequent reproductive partners. Partnership dynamics may impact completed fertility over and above what would be predicted by, for example, economic theories on the income effects on and the opportunity costs of childbearing (Thomson et al. 2012). Understanding the significance of MPF for cohort trends in socio-economic fertility differences is therefore useful for assessing the validity of different theories on fertility changes. Finally, many researchers have noted the need to expand fertility research to include men (Goldscheider and Kaufman 1996). Further, some recent studies have suggested that comparison of men and women is essential, as it would allow sex differences and similarities in socio-economic fertility trends and gradients to be detected (Jalovaara et al. 2018). Nevertheless, much of the research on cohort fertility has been focused on women or, in some cases, solely on men's fertility.

This study contributes to understanding the trends in socio-economic fertility differentials by focusing on two Nordic countries—Finland and Sweden—and addressing two questions. First, how do cohort trends in parity-specific fertility differ across educational segments for men and women? And second, what is the role of MPF in the educational differences in parity-specific fertility across cohorts of males and females? We used up-to-date register data with full population coverage for the two countries, to calculate measures of cohort fertility. The main analyses used the parity progression ratios (PPRs) of completed cohort fertility for men and women born between 1940 and 1973/78, stratified by educational attainment. The ordinary PPRs estimated from all births were compared with PPRs calculated from births with the first reproductive partner only. The results were also compared with and supported by other measures, including CTF, childlessness, CTF among those with at least one child, and parity distributions for the different groups.

To date, the Nordic countries have been forerunners in developments that may be highly relevant for understanding changes in fertility. These include changes in partnership dynamics, such as a decline in marriage, increases in cohabitation and childbearing in cohabitation, and high levels of separation and divorce (Surkyn and Lesthaeghe 2004; Sobotka and Toulemon 2008). Cohort fertility in Nordic countries has remained fairly stable and close to population replacement levels over the past decades and for the moment show stability, despite declines in period fertility since 2010 (Hellstrand et al. 2020). The Nordic countries are also forerunners in developing gender equality and in the adoption of the dual-earner family model (Esping-Andersen 2009), as well as in developing social equality (Ferrarini 2006; Kvist et al. 2012). Women's labour force participation rates are high in these countries (OECD 2020). As with most other European societies, they have witnessed a remarkable expansion of participation in higher education, which is particularly pronounced among women (OECD 2019). Today, these countries are seeing fundamental shifts in the educational gradients of childbearing patterns, especially among women. The possibility that the Nordics are spearheading a more comprehensive transition in fertility patterns by sex across developed societies makes Nordic developments internationally relevant.

Finland provides an enlightening case study (as previous research has indicated), because based on CTF and childlessness, parity polarization into childlessness and higher parities is stronger in Finland than in other Nordic countries (Jalovaara et al. 2018). A comparison with Sweden can inform us whether the Finnish patterns are unique or shared by another, more typical, representative of the Nordic fertility regime (Andersson et al. 2009).

### *Socio-economic status, gender, and fertility*

The microeconomic theory of the relationship between socio-economic status and fertility

emphasizes that while childbearing entails rewards, it also comes with high (direct) costs. Similar to other cases where high demand equates to high price, individuals with greater economic resources can carry such costs and may, therefore, be predicted to have more children (see Bergstrom 1996). Given the high demand for skilled and specialized labour in highly advanced societies, educational level is a key determinant of individuals' occupational success, earning prospects, and wealth (Stevens et al. 2008). An individual's high educational level is, therefore, expected to promote fertility. Further, fertility behaviour most often takes place among partners who share a household. Whether the household operates under a dual-earner or sole (male) breadwinner economic model is crucial for understanding how socio-economic fertility patterns differ between men and women (Lundberg and Pollak 1993).

However, there are strong reasons to believe that the marginal utility of childbearing decreases with each child. Individuals (or couples) may practise 'stopping behaviour', meaning that once their preferred parity is reached, childbearing stops, although continuing would seem financially bearable (Yamaguchi and Ferguson 1995). In the context of this study's countries and cohorts, following the two-child norm has been widely preferred and idealized (Sobotka and Beaujouan 2014). The fertility quantum may also be influenced by the quantity of resources invested per child that parents consider necessary. Such quantity–quality trade-offs can contribute to socio-economic differences in fertility if, for example, highly educated parents wish to invest extensively in each child and are, therefore, less likely to proceed to higher parities despite their greater total resources (see Kravdal and Rindfuss 2008).

Childbearing and child-rearing come with both direct and indirect costs. When (potential) earnings increase, so do the opportunity costs of time and energy sacrificed from paid work for parenting. Therefore, the hypothesis based on the opportunity costs of childbearing predicts a negative association between individuals' earnings potential and fertility. As mothers are often the main caregivers for their children and childbearing tends to influence mothers' work careers more than those of fathers, opportunity costs are particularly poignant for women (Oppenheimer 1994; Waldfogel 1998; Budig and England 2001). An example of such costs is the trade-offs between career and family formation, which may even result in higher lifetime childlessness among particularly career-oriented women (Oppenheimer 1988).

In summary, a higher level of socio-economic resources can positively impact fertility via direct costs (income effect), as well as have a negative impact via indirect costs (opportunity costs effect). Most accounts have suggested that the income effect steers the socio-economic gradients in men's fertility (Kravdal and Rindfuss 2008; Nisén et al. 2018), while for women, the opportunity costs are usually considered the dominant mechanism (Oppenheimer 1994). The strength of these opposing forces presumably varies across time and societal context. Institutional support to families, for example parental leave schemes and publicly provided children's day care, may help both parents to pursue their work careers in parallel to building a family (McDonald 2000). Scholars have further argued that where men's uptake of childcare and other domestic labour is greater, the opportunity costs of childbearing for women are further reduced (Goldscheider et al. 2015). Nordic countries are characterized by comparably strong support for gender equality in the public as well as the private sphere, and various policies facilitate the combination of paid work and family formation (Neyer et al. 2013). Therefore, it is possible that these countries have succeeded in significantly reducing opportunity costs of childbearing that might be severe in other contexts, especially for highly educated women.

This reasoning is congruent with the prediction that, as women's and men's social and economic roles converge and gender equality advances in the public and private spheres, the opportunity costs of family formation for women may diminish. Consequently, the effects of women's socio-economic resources on fertility may become increasingly similar to the effects of men's resources. In such scenarios, the overall socio-economic gradient in fertility may become gender neutral and overwhelmingly positive.

Individuals' socio-economic resources influence fertility not only by affecting couples' fertility but also by impacting union formation and dissolution. Given the changes in partnership dynamics, such as increases in separation and divorce (Surkyn and Lesthaeghe 2004; Sobotka and Toulemon 2008), their significance for fertility likely increases. In gender-egalitarian societies, where the domestic and economic roles of men and women are increasingly similar, both men's and women's economic resources are assets in the partner market and affect partnership formation and partnership stability more consistently and positively (Bracher and Santow 1998; Cooke et al. 2013). Partnership

formation promotes and partnership dissolution depresses fertility at all parities. Lower total fertility and higher lifetime childlessness, which are often linked to never partnering or partnership instability (Keizer et al. 2008; Jalovaara and Fasang 2017), are increasingly common among women (not just men) in the lower socio-economic strata. In addition, more mothers (not just fathers), especially in the lower strata, will see their unions dissolve during childbearing years.

Fertility rates at high parities tend to be higher among men and women in the lower socio-economic strata (e.g. Wood et al. 2014). Several reasons for this are proposed, ranging from higher unintended fertility (Musick et al. 2009) to younger ages at first birth (Morgan and Rindfuss 1999), as well as the negative effect of childbearing on further educational attainment (Baizán and Martin-Garcia 2006).

Another factor, the importance of which may be increasing, is MPF. Having children with more than one partner is the fertility-related result of several processes with a negative socio-economic gradient, including young age at first birth, childbearing outside co-residential unions, and union instability (Thomson 2015). In more recent cohorts, increasing numbers of individuals of childbearing age have separated or divorced and are repartnering. Hence, MPF may become more prevalent, especially in groups where rates of partnership dissolution are highest: men and women with fewer socio-economic resources (Guzzo and Furstenberg 2007; Manlove et al. 2008; Lappegård and Rønsen 2013; Thomson et al. 2014; Monte 2018; Jalovaara and Kreyenfeld 2020). Repartnering promotes childbearing at higher parities, as a new union may encourage childbearing regardless of the parity reached by each partner (Griffith et al. 1985; Holland and Thomson 2011; Andersson 2020). Thus, while union dissolution has a negative effect on overall fertility, repartnering can have a positive effect on progression to higher-order parities.

The notion that the fertility behaviours of men and women converge within socio-economic groups finds tentative support in reports on trends in CTF and childlessness (Jalovaara et al. 2018). Influential previous research has suggested that partnership dynamics increasingly impact socio-economic gradients in fertility (Thomson et al. 2012). However, an empirical description of the cohort trends necessary to refute or validate whether these fertility developments are in fact taking place is yet to be provided. We argue that it is useful to consider specific parities and MPF when analysing socio-economic differentials in fertility through the lens of income effects, opportunity costs, and partnership dynamics. For example, beyond the ability to bear the costs of having children, socio-economic position operates partly through other mechanisms: for childlessness via (non-)partnering, for all births via union (in)stability, and for second and higher-order births via parents' repartnering. Average measures, such as CTF, might be unable to reveal the changes in childbearing at different parities. Notwithstanding the significant interest in the increasing over-representation of MPF among those with fewer socio-economic resources, the influence of MPF on socio-economic fertility differentials has not been incorporated into research on cohort fertility trends (see Beaujouan and Solaz 2008; Thomson et al. 2012; Churilova et al. 2017). To substantiate the role of partnership dynamics, for this study we distinguished measures derived from all births from measures that exclude MPF births.

Together, the developments described entail that with each subsequent birth cohort, the positive effect of socio-economic resources on fertility becomes more salient for women, and union dissolution becomes increasingly frequent among low- and medium-educated men and women, both factors suppressing fertility of the low and medium educated relative to the highly educated. However, there are no *a priori* reasons to expect a decrease in the stronger tendency to transition to higher parities among low- and medium-educated individuals. Based on this narrative, we predict that medium- and low-educated women and men will display a trend towards parity polarization: with each passing birth cohort, the low and medium educated will be more likely to remain childless *and* more likely to proceed to higher (e.g. third and subsequent) parities (Hypothesis 1).

Second, we predict that across cohorts, births to higher-order reproductive partners will increasingly contribute to the differences between educational groups in the progression to second and subsequent births (Hypothesis 2).

## Data and methods

For both Finland and Sweden, the study used individual-level data drawn from population registers and registers of completed education. The data cover the entire populations of the respective countries. Using personal identification numbers that were anonymized at Statistics Finland and Statistics Sweden, we linked individuals' data records on births they had had, on the other registered

(biological) parent of each child, and on deaths, migration, and completed education.

The study population comprised the individuals born in each country. We included women born between 1940 and 1978 to measure women's fertility status at age 40, and men born between 1940 and 1973 to measure men's fertility status at age 45. Only a minority of women and men have children after these ages. In the estimates where we extended measurement to age 45 for women and age 50 for men (available from the authors on request), CTF increased by approximately 0.07, and childlessness decreased by about one percentage point. We decided that the coverage lost by limiting the upper age limit to 40/45 was compensated for by the ability to include more recent cohorts. By focusing on native-born individuals, the study followed the logic of a true birth cohort design, that is, the idea that cohorts of individuals born in a certain region are followed throughout their lives, starting from birth. By using these selection criteria, the study also avoided problems related to the absence of data, for instance on completed education, for the time preceding immigration. The analyses excluded data on individuals not registered as living in the respective country in the year they turned 40 (women) or 45 (men), that is, those who had died or had emigrated and not returned.

All analyses were performed separately for men and women. The results are reported for five-year birth cohorts, except for the 1970–73 cohort for men and the 1975–78 cohort for women, reflecting the fact that 2018 was the last year we had data for (compared with a recent Nordic fertility comparison [Jalovaara et al. 2018], this study added six annual cohorts). The large number of observations allowed for the detailed analyses of fertility patterns: when disaggregating the populations of Sweden and Finland by final parity (at age 40/45) across sex, cohort, and educational level, the smallest number of cases in a single cell was 687, corresponding to low-educated Finnish women from the 1970–74 cohort who had four or more children.

MPF was identified by comparing the anonymized personal identification numbers of reproductive partner(s) across children born to index men or women, where a reproductive partner refers to the other registered (biological) parent of the child. In surveys, men under-report births, especially to previous partners (Rendall et al. 1999; Gray and Evans 2008). This measurement bias underestimates the total prevalence of MPF and lowers the estimated MPF among fathers (Guzzo and Dorius 2016). In register data, men's fertility histories are almost as completely covered as those of women. In our data, approximately 2 per cent of the children born have no father registered, and such missing values were more common at young maternal ages at childbirth. Nevertheless, as paternity was established for 98 per cent of the births that contributed to our measures, the potential underestimation must be small. When the other parent was unknown (not registered) in two subsequent births, we coded births as occurring with the same partner. However, if the parent of a child was registered and the subsequent or previous one was not, we coded births as occurring with different partners.

For the main analyses we focused, first, on cohort trends in parity-specific fertility across educational segments for men and women and, second, on comparing parity-specific fertility calculated from all births with parity-specific fertility calculated only from births with first reproductive partners. We started by describing completed fertility with CTF (mean number of live births produced by a group of women or men throughout their reproductive lives), ultimate childlessness (percentage), and CTF among 'parents', that is, those with at least one child (CTF at parity >0). Further, we analysed births at each parity using PPRs (Preston et al. 2000). The PPR represents the number of individuals at parity $x + 1$ divided by the number of individuals at parity $x$. PPRs show the proportion of individuals who progress from one parity to the next. They were calculated separately for Finland and Sweden, for each cohort set, sex, and educational level (Equation 1).

$$\mathrm{PPR}_{\mathrm{parity}_{\mathrm{educ}}} = \frac{\mathrm{Parity}_{\mathrm{educ}} + 1}{\mathrm{Parity}_{\mathrm{educ}}} \tag{1}$$

The resulting PPRs were used to analyse cohort trends in parity-specific fertility across educational levels. To show the role of MPF in fertility differences by education, we compared the PPRs calculated from all births with those calculated from births with first reproductive partners only (reflecting SPF). The analysis focused on transition rates, rather than the distribution of final parities, but for completion we present the cohort parity distributions of total number of children born in this paper.

Similar to most previous studies, this study measured socio-economic status as the highest level of education obtained, in this case before 2018. The association between educational attainment and childbearing is sensitive to the age at which these are measured, because there is a two-way link between education and childbearing

(Hoem and Kreyenfeld 2006). For example, having children at a young age may lead to discontinued education. We chose the 'highest ever' approach because of the absence of data on the timing of completing education for earlier cohorts. The categories were collapsed into three groups using the International Standard Classification of Education 2011 (ISCED) (UNESCO 2012): 'low education', referring to basic education or less (ISCED 0–2); 'medium education', referring to (upper) secondary education (ISCED 3–4), and 'high education', comprising lower and higher tertiary levels (ISCED 5–8). For Finland, the information was obtained using Statistics Finland's register data on post-basic educational levels, meaning that the lowest level was inferred from the fact that the data were missing. For Sweden, individuals with missing data on completed education (4 per cent) were excluded from the sample.

When interpreting the trends across educational groups, it should be noted that as we move towards more recent cohorts, increasing proportions of men and women have attained secondary and tertiary education. Hence, in each birth cohort, the share of the population without education beyond the basic level diminishes and becomes progressively marginal. Consequently, the disadvantages for this low-educated group in both the labour and partnership markets may increase. With increases over time in tertiary education, similar processes could, to some extent, apply to those with secondary-level education. The secondary educated, however, represent a large educational group across all birth cohorts.

Table S1 in the supplementary material shows the educational distributions in the study cohorts of female and males. Attained educational levels have risen markedly across study cohorts, especially among women. The expansion of education began with an increase in those receiving secondary-level education. However, the proportion of people whose highest educational qualification is at the secondary level has already declined, as an increasing proportion of young adults in more recent cohorts have completed tertiary degrees. For example, of women born in 1975–78, the majority have completed tertiary-level education. Among men, tertiary qualifications have also become more common; however, for about half of the men in the most recent cohort in both countries, completed secondary education marks their highest level of education. Meanwhile, the proportion of people with no education beyond the basic level has declined to between 5 and 14 per cent. In Finland, levels of educational attainment are somewhat higher than in Sweden, especially for women, but beyond that, the differences between the two countries are small.

Figures S1 (Finland) and S2 (Sweden) in the supplementary material show the percentages of mothers and fathers who had had children with more than one partner, by birth cohort and educational level. In Finland, childbearing with multiple partners increased steadily across study cohorts, whereas in Sweden MPF became more common earlier and, overall, even shows a slight decline across more recent study cohorts. In both countries, MPF increased strongly among men and women with the lowest levels of education and, in Finland, increases are notable among medium-educated parents as well. MPF has remained low among tertiary-educated parents and, in Sweden, even declined. In the most recent cohorts of both countries, MPF is strongly inversely associated with educational level for both men and women. Supplementary Table S2 shows the changes in MPF between the first and last study cohorts, by parity and education. Overall, a birth with a second or higher-order reproductive partner becomes more common as parity increases. However, in both countries, MPF has become rather common among low-educated parents even at parity two.

## Results

### *Educational differences in cohort total fertility, childlessness, and cohort total fertility among parents*

To provide a background for the parity-specific analyses, we examined the trends in CTF, ultimate childlessness, and CTF among parents—that is, those with at least one child (parity >0). The use of childlessness and CTF among parents disaggregates CTF into entry into parenthood (first birth) and achievement of higher parities, providing the first evidence of parity-specific trends that are masked by CTF alone.

Figure 1 shows the results for women in Finland. The educational differences in CTF remained fairly stable across cohorts (left-hand panel). In the most recent cohort, highly educated women still had slightly fewer children on average than women with lower education. This stability in CTF contrasts starkly with the changes in educational gradients for ultimate childlessness (middle panel) and CTF among mothers (parity >0; right-hand panel). In the earliest study cohorts, childlessness was highest among highly educated women. Across cohorts,

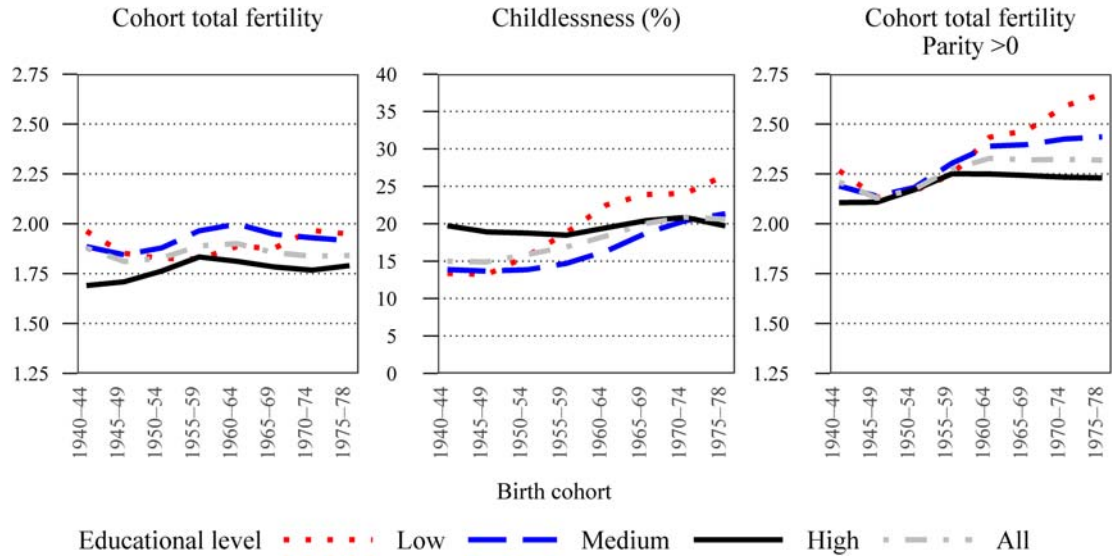


**Figure 1** Cohort total fertility, childlessness (percentage), and cohort total fertility among parents at age 40: women born in Finland 1940–78, by education and cohort

*Source:* Authors' analysis of data from population registers and registers of completed education from Statistics Finland.

childlessness increased strongly among low- and medium-educated women but remained stable among highly educated women. Consequently, levels for low-educated women are now by far the highest in Finland. However, among low- and medium-educated women with at least one child, CTF significantly increased across the 1960s and 1970s cohorts. This suggests a strengthening parity polarization among low- and medium-educated women, where lifetime childlessness is increasing but, simultaneously, women who become mothers increasingly achieve higher parities. The results for highly educated women in Finland do not imply such diverging trends; not only CTF but also childlessness and CTF among mothers are fairly stable across recent study cohorts.

The results for Finnish men, shown in Figure 2, suggest different parity-specific developments across educational groups. A consistent positive association between educational level and CTF persists; that is, across all cohorts, highly educated men had, on average, more children than men with low or medium education. In terms of men's ultimate childlessness, a strong negative educational gradient persists. However, among men with at least one child, no educational differences in CTF are observed. In other words, men with lower educational levels are more likely to remain childless, but if they do become fathers, their average numbers of children are the same as those of highly educated fathers. These trends imply a parity polarization among low- and medium-educated Finnish men, although the patterns differ somewhat from those of Finnish women.

Similar overarching trends that suggest different parity-specific trends by educational segment (which are masked by stability in CTF) are found among the Swedish population. The figures are omitted for parsimony but reported in the supplementary material (Figure S3 for women and Figure S4 for men). The main difference between the two countries is that, for the Swedish population, the signs of parity polarization into childlessness and higher parities are limited to the lowest-educated women and men.

For women in Sweden, we observe the negative educational gradient in completed fertility effectively disappearing over time as the fertility of low-educated women declines below those of medium- and highly educated women (Figure S3). This change is completely driven by a strong increase in lifetime childlessness among women with low educational levels. Childlessness has even declined among highly educated women. Simultaneously, low-educated Swedish mothers (parity >0) continue to have larger average numbers of children than highly educated mothers, and this difference slightly increases across recent cohorts.

### *Educational differences in parity-specific fertility*

The introductory analyses suggested that in recent study cohorts, new educational differentials in

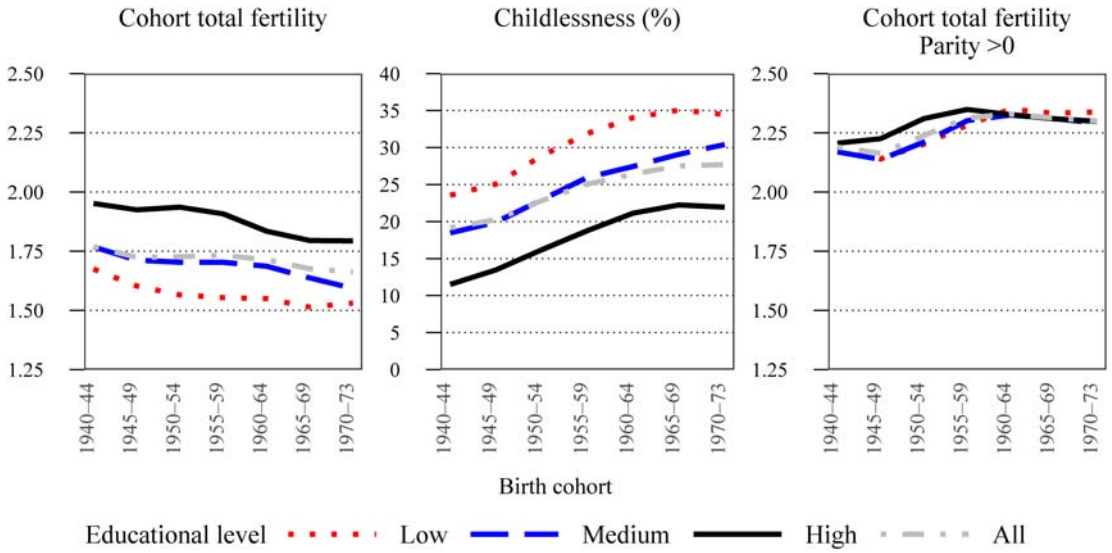


**Figure 2** Cohort total fertility, childlessness (percentage), and cohort total fertility among parents at age 45: men born in Finland 1940–73, by education and cohort
*Source:* As for Figure 1.

parity-specific patterns have emerged. We now turn to PPRs, which provide a clearer and more detailed view of the parity-specific fertility trends among women and men at different educational levels. Figure 3 shows PPRs by educational level for women in Finland and Figure 4 for men. The increase in lifetime childlessness across cohorts is seen in the progression to parity one, which declines in all sex and education groups, except for highly educated women. In the most recent cohorts, ultimate childlessness among both men and women is highest among those with the lowest level of education. Progression to second parity shows notable stability across recent cohorts of males and females, with only small educational differences.

Simultaneously, there have been increases across recent cohorts among low- and medium-educated women and men in progression to third and fourth (or subsequent) parities. In the most recent female and male cohorts, progression to third and fourth parities is consistently and inversely associated with educational level.

Taken together, these trends mean that the childbearing patterns of lower-educated men and women show strengthening polarization into lifetime childlessness and parities three, four, and higher. This parity polarization is clearest among women, and is observed among men with no education beyond the basic level; however, it is also noticeable among women and men with secondary-level education.

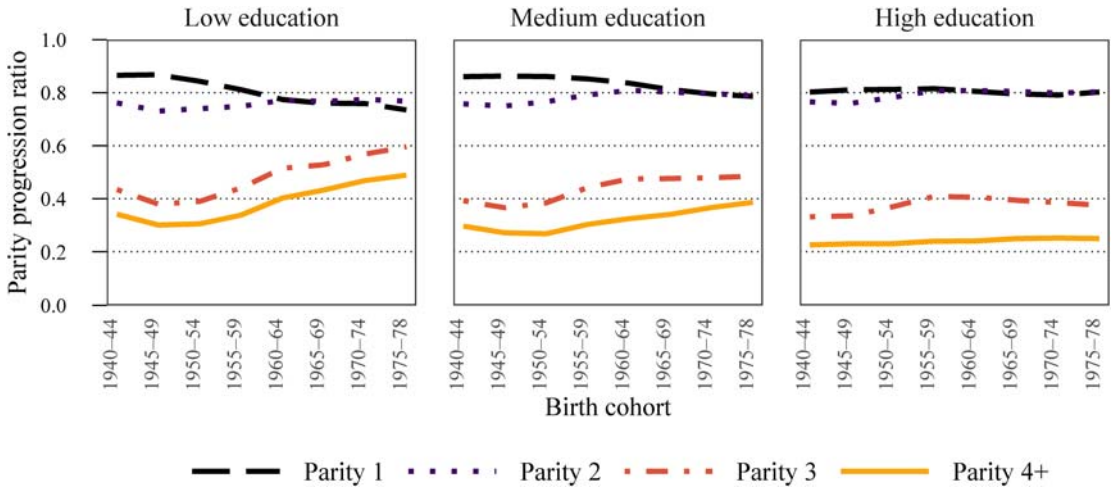


**Figure 3** Parity progression ratios: women born in Finland 1940–78, by education and cohort
*Source:* As for Figure 1.

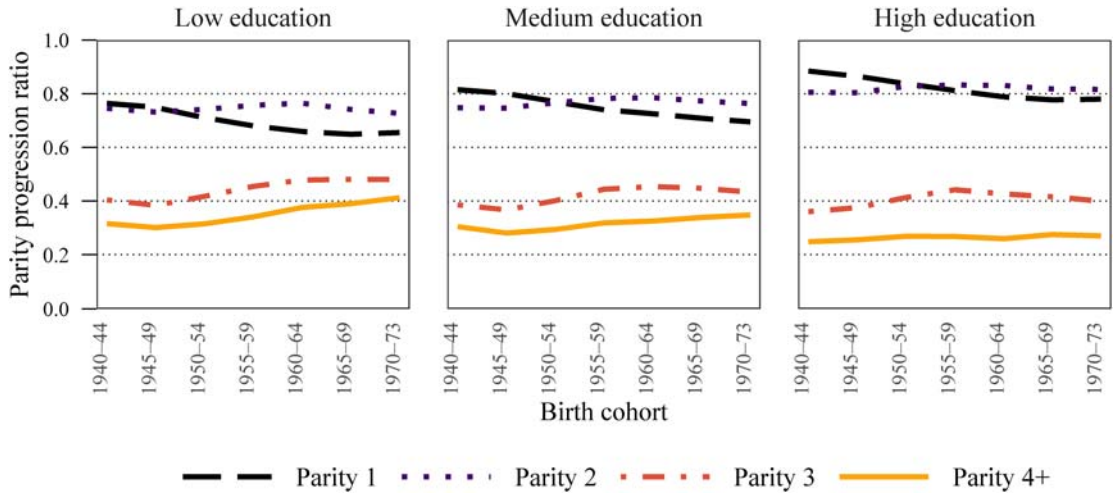


**Figure 4** Parity progression ratios: men born in Finland 1940–73, by education and cohort
*Source:* As for Figure 1.

For highly educated women and men in Finland, the PPR trends suggest a considerably different path. Progression to parity one among highly educated women shows no decrease across cohorts. Of the highly educated women, approximately 80 per cent had a first child, and around 80 per cent further proceeded to have a second child, and this pattern remains unchanged across the study cohorts. The proportions of those who proceeded to third and fourth parities are notably lower than for women with lower levels of education, and show slight declines (parity three) or stability at comparably low levels (parities four and higher). The patterns are similar for highly educated men, the only difference being that progression to parity one for highly educated men decreases across cohorts, although remaining higher than among low- and medium-educated men.

Overall, in Finland, the largest sex differences are seen in the educational gradients in ultimate childlessness. For the most recent cohorts, the educational gradient in childlessness is now negative for both men and women, but the differences are still much larger for men. Ultimate childlessness among men strongly increased up to the early 1960s birth cohorts at all educational levels. In the most recent cohorts, the trend differs: the increase for highly educated men has levelled off, while childlessness among men with secondary education has continued to rise, with the most recent cohort reaching 31 per cent (Figure 2). More than one-third (35 per cent) of the lowest-educated men in the two most recent cohorts have remained childless. The trend towards parity polarization, where this increase in childlessness is combined with increased entry into higher parities, is evident for basic-educated men, and a weaker but salient trend exists for medium-educated men.

To summarize the parity progression trends in recent Finnish cohorts, highly educated women and men are now more likely to become parents than their low- or medium-educated peers. In the transition to second birth, stability across cohorts and lack of educational differences are notable: across all educational levels and cohorts, women and men with one child are almost equally likely to have a second child, except for a small decline among low-educated men. However, especially in recent birth cohorts, low- and medium-educated men and women are more likely to proceed to third and higher parities, while the highly educated more often stop childbearing at parity two. How educational differences in the total number of children born by age 40 (women) and 45 (men) in Finland have developed across cohorts is clearly seen in the relative parity distributions (Figures 5 and 6). Among women, a positive association between educational level and the proportion of mothers of two children has emerged across cohorts. Approximately 40 per cent of the highly educated women ultimately had two children, and this proportion shows no decline. Among medium-educated women, the proportion has declined to below one-third, and among low-educated women to one-quarter. Among men, a similar pattern is observed in the earlier study cohorts but has strengthened over time, resulting in similar differences in the recent male and female cohorts. Notably, among low-educated men, ultimate childlessness is much more common than having two children, while these two outcomes are equally likely among secondary-

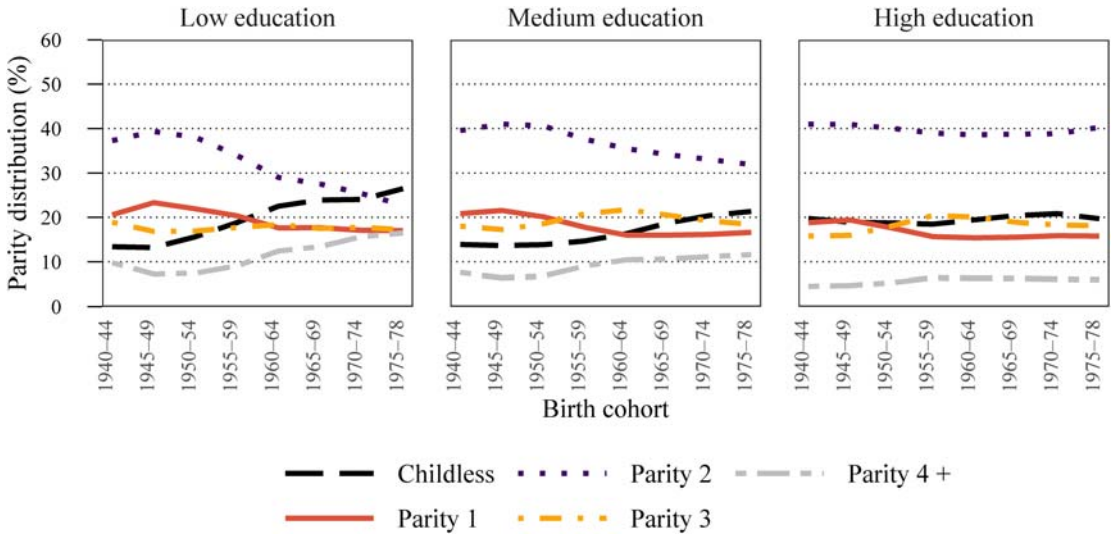


**Figure 5** Parity distributions (percentage) at age 40: women born in Finland 1940–78, by education and cohort
*Source:* As for Figure 1.

educated men. This is in strong contrast to highly educated men, who much more often become fathers to two children than remain childless.

Despite the stability in educational differences in CTF, Finnish fertility patterns have substantially changed across cohorts, showing both divergence between tertiary-educated and non-tertiary-educated segments, and strengthening parity polarization within the non-tertiary educated. Low- and medium-educated men and women in recent cohorts have increasingly had no children or proceeded to third or higher parities, whereas highly educated women and men have more often not only reached but also stopped at parity two.

The PPRs for the Swedish population are shown in supplementary Figures S5 and S6. Overall, the pattern observed for Finland is also present in Sweden. Basic-educated women in Sweden (Figure S5) follow the parity polarization pattern found in Finland. Lower-educated men (Figure S6) also show strong recent decreases in progression to parity one. However, among medium- and highly educated women and men, the previous slight decreases in progression to parity one have levelled off. Moreover, there has been a slight decline in progression to third and fourth or higher births for the secondary and tertiary educated across Swedish cohorts of both males and females. Parity

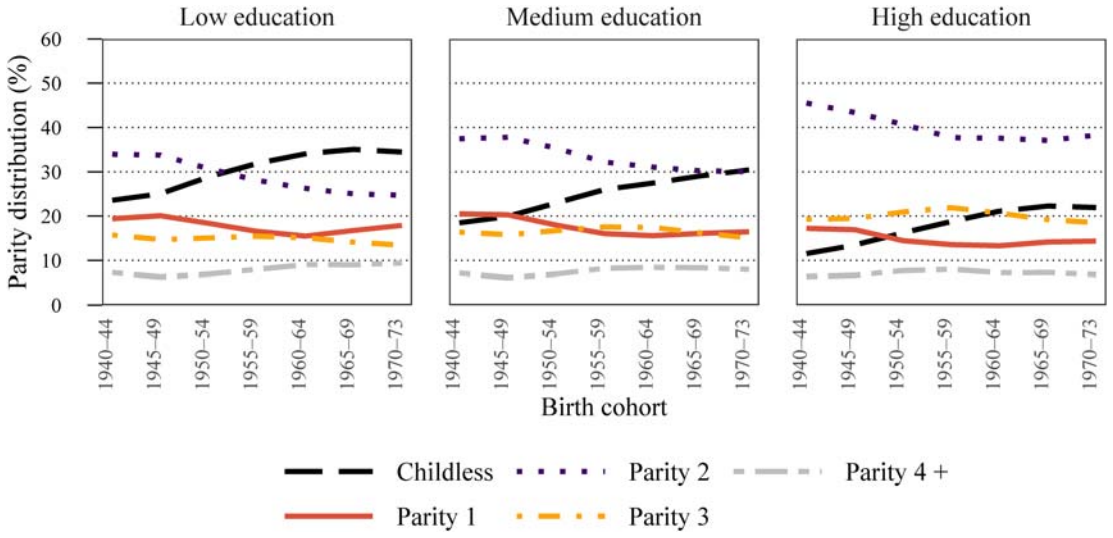


**Figure 6** Parity distributions (percentage) at age 45: men born in Finland 1940–73, by education and cohort
*Source:* As for Figure 1.

polarization is not as prominent in Sweden as in Finland, and is driven by stronger declines in higher parity transitions among the tertiary educated rather than increases among the non-tertiary educated. The resulting relative parity distributions for Sweden highlight these differences (supplementary Figure S7 for women and Figure S8 for men). They show that while decreasing proportions of low-educated men and women have ultimately had exactly two children, increasing proportions of their medium- and highly educated peers have done so. In the most recent cohorts, this share is as high as one-half among highly educated women.

To summarize, the parity-specific analysis reveals transitions to second births as a constant across cohorts, sex, and educational level for the two countries studied. Among the predicted trends, salient parity polarization among the low and medium educated is evident in Finland but weaker and more limited (to the lowest educated) in Sweden.

### *Multi-partner fertility and educational differences in parity progression*

Thus far, we have described developments in parity-specific fertility regardless of the number of reproductive partners. Next, we examine the role of MPF in educational differences in parity-specific fertility. Figure 7 shows PPRs calculated from all births

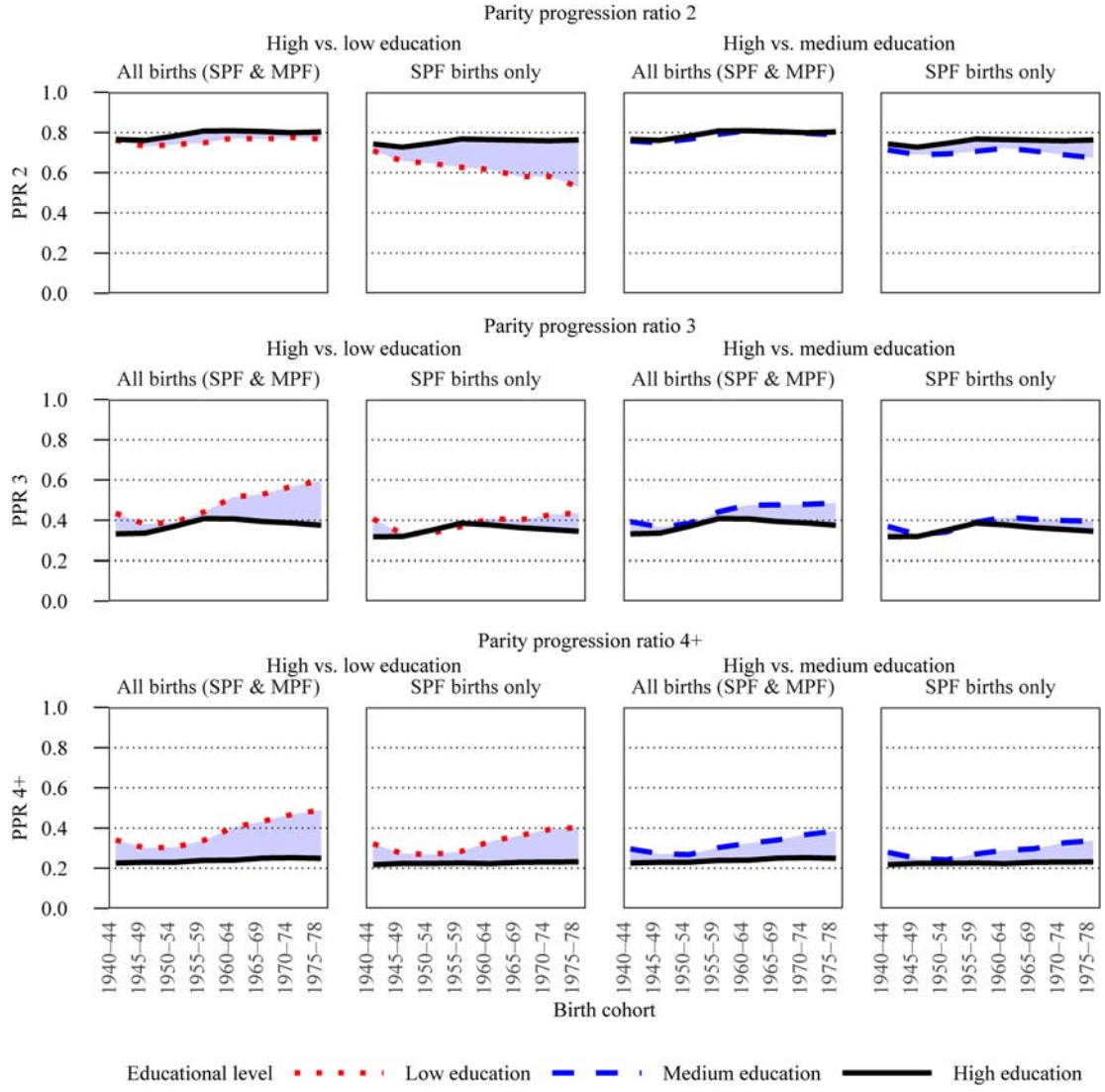


**Figure 7** Parity progression ratios calculated from all births (SPF & MPF) and from births with the first reproductive partner (SPF) only: women born in Finland 1940–78, by education and cohort

*Note:* The shaded area represents the difference between the PPR calculated from all births and the PPR calculated from births with the first reproductive partner only.

*Source:* As for Figure 1.

(SPF and MPF) and from births with first reproductive partners (SPF births only) for Finnish women by educational level. These are presented separately for progressions to parities two, three, and four or higher. Progression to parity one is left out, as all first births are assumed to be to first reproductive partners.

First, the leftmost plot of the top row shows that progression to second birth is just slightly higher for the highly educated (solid line) than the low educated (dotted line), with both educational groups remaining at about PPR2 0.8 across all birth cohorts. However, the second plot of the top row shows large and increasing educational differences in PPR2 across cohorts, if only births with women's first reproductive partner are counted (i.e. if all MPF births are removed from the numerator). For SPF births only, PPR2 decreases to below 0.6 for low-educated women in recent cohorts but remains fairly stable at 0.8 for highly educated women. In other words, if low-educated women did not have any second children with new partners, they would have fewer second births overall. The third and fourth plots of the top row illustrate the differences between the highly and the medium educated, which follow a similar pattern, but the differences are substantially smaller.

Next, we move to the plots in the middle row, which show progression to third births. In the first plot of the second row, PPR3 is higher among the low educated than the highly educated and has been so since at least the 1955 birth cohort. However, values of PPR3 calculated from SPF births only (the second plot of the second row) are fairly similar between the high and low educated. This means that the greater transition ratio to third births among the low educated is to a large degree composed of MPF births. Continuing to the third and fourth plots in the middle row, the same pattern is evident when comparing the highly and medium educated but to a far less dramatic degree. Finally, we turn to the four plots on the bottom row, which pertain to PPR4 or higher. Again, we see that the greater PPR of the low educated compared with the highly educated is partially linked to births with higher-order reproductive partners. This link is weaker than for PPR3, suggesting that the low educated also exhibit higher progression towards four or more births with their first reproductive partner.

The pattern for Finnish men, shown in Figure 8, follows the overall trends observed for Finnish women, but the educational differences in PPR are not as strong across all parities. Among Finnish men, MPF contributes most to parity progression among the low educated, and the difference between the low and highly educated increases across cohorts. The trends in differences between educational groups and their relationship to MPF among the Finnish population are remarkably similar to those in Sweden (supplementary Figures S9 and S10).

Table S3 in the supplementary material shows, for completeness and ease of comparability, the CTF of parents calculated from births with the first reproductive partner only, next to CTF, childlessness, and the standard CTF of parents for men and women in Finland and Sweden. The table shows the considerably similar trends in standard CTF in the two countries and Finland's greater overall parity polarization, that is, higher childlessness but also higher CTF among parents. In Sweden, CTF among parents declined across the 1960s and 1970s birth cohorts, while in Finland it remained higher.

## Discussion

This study has revisited trends in socio-economic fertility differentials. In Nordic countries, the current narrative is that a positive association between men's education and fertility persists across cohorts, while for women, the initially negative associations show convergence. Educational gradients in women's lifetime childlessness have turned from positive to negative, and are increasingly similar to those found among men (Jalovaara et al. 2018). In the 'new' fertility regime, a higher socio-economic status is increasingly associated with higher fertility (Kolk 2019). We argue that this narrative should be complemented by analysis of trends in parity-specific fertility and the role of MPF to improve our understanding of the changes in socio-economic fertility differentials.

This study focused on two Nordic countries—Finland and Sweden—and has extended previous research by analysing not only CTF and childlessness but also parity-specific differences and trends and by estimating the significance of MPF for these. The study also examined sex differences and similarities in the trends and differences by comparing women and men. This more fine-grained analysis revealed significant and, in some cases, strengthening differences in fertility patterns both between and within educational segments for men and women, suggesting that educational differences in Nordic fertility patterns have persisted and become stronger, and that MPF plays a role in these disparities.

Overall, trends in CTF suggest that the differences between educational segments are fairly stable and

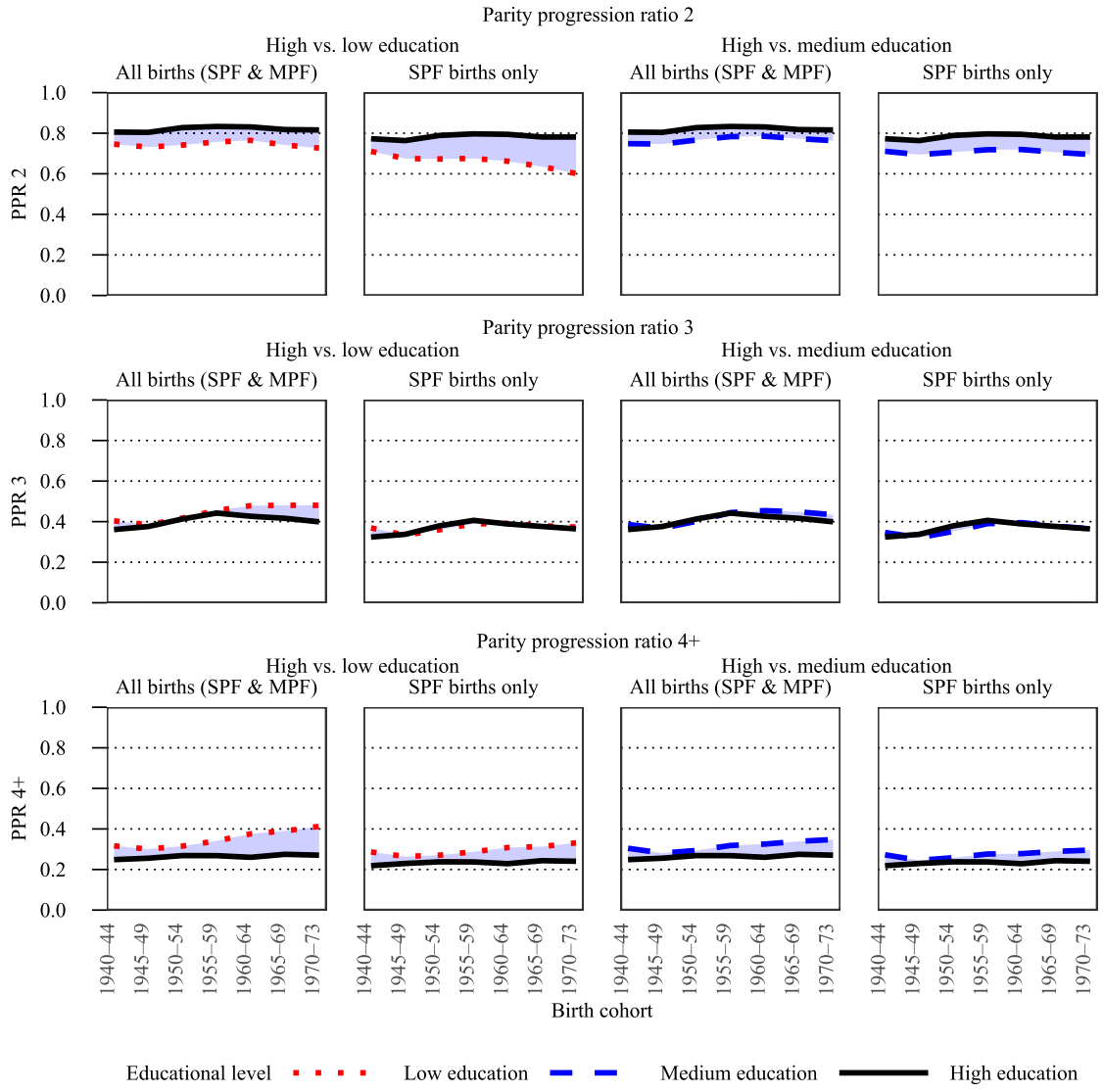


**Figure 8** Parity progression ratios calculated from all births (SPF & MPF) and from births with the first reproductive partner (SPF) only: men born in Finland 1940–73, by education and cohort

*Note:* The shaded area represents the difference between the PPR calculated from all births and the PPR calculated from births with the first reproductive partner only.

*Source:* As for Figure 1.

mostly small. However, parity-specific analyses show strong and strengthening differences between and within educational groups that were masked by the apparent stability in CTF. Compared with their highly educated peers, the fertility patterns of women and men with lower educational levels are more heterogeneous regarding the numbers of children they have and show a clear and in some cases strengthening parity polarization towards lifetime childlessness on the one hand and more frequent progression to third and subsequent parities on the other. Among lower-educated women and men, the proportions of those who ultimately have two children has declined towards more recent cohorts. Progression to third and higher-order births has become more likely among men and women without tertiary education.

Among highly educated men and women, childbearing patterns are more uniform and more often lead to the birth of precisely two children. Ultimate childlessness for highly educated men is much lower than for the less educated, and no increases can be observed for the most recent cohorts. Among highly educated women, childlessness has remained stable over time and recently even declined. While in Finland the childbearing histories of highly educated men and women show persistence in reaching and stopping at parity two, the pattern is even stronger in Sweden and has strengthened between the 1950s and 1970s cohorts.

These patterns are in line with Hypothesis 1: parity polarization is strengthening among lower-educated men and women as we move towards more recent cohorts. No such trend is observed among highly educated men and women.

Although the trends in the two countries are fairly similar, some differences emerge. The most prominent difference is that parity polarization is stronger in Finland than in Sweden. The increases in higher parity births among lower-educated individuals are more notable in Finland. However, even more importantly, parity polarization in Sweden is limited to the lowest educational segment, whereas in Finland it also concerns the large segments of medium-educated women and men. With educational expansion, the lowest-educated group has become smaller and increasingly marginalized. However, even in the most recent, most highly educated cohorts, the low and medium educated constitute 40 per cent of the women and 60 per cent of the men we studied in Finland and Sweden. Hence, the diverging trends in childbearing between the tertiary and non-tertiary educated shown in this study represent socio-economic disparities in fertility between large groups and also influence fertility at the population level.

The second key finding is that the educational differences in fertility are strongly linked to MPF. Without counting births with higher-order reproductive partners, parity progression to second births is substantially lower among the non-tertiary educated compared with the tertiary educated. Further, the non-tertiary educated more often transition to third and subsequent parities; in more recent cohorts, this is increasingly linked to births with second or higher-order childbearing partners. In support of Hypothesis 2, the contribution of MPF to the educational differences in progression to second and subsequent parities has increased across cohorts. The present findings highlight the importance of changing partnership dynamics in understanding socio-economic disparities in fertility levels and trends (Thomson et al. 2012). Numerous studies have documented how union instability and family complexity have increased disproportionately among less affluent groups across cohorts (McLanahan 2004). While stable childbearing unions are generally preferred across all social strata, such life courses are becoming increasingly selective of well-off individuals (McLanahan and Percheski 2008), which is reflected in the socio-economic differentials in MPF. To understand how socio-economic fertility differentials emerge, it is useful to identify the patterns of childbearing partnerships.

The educational differences and trends in family formation dynamics can be summarized through the idea of 'dual polarization'. The first layer of dual polarization is socio-economic polarization, where trends among more highly educated segments differ—and increasingly even diverge—from those among men and women with lower educational levels. The second layer is internal divergence within the lower educational segments, as shown by the stronger and strengthening parity polarization of childlessness on the one hand and higher parities (three and above) on the other. This strengthening parity polarization is lacking among the highly educated, among whom the two-child pattern persists or, as in Sweden, is even becoming stronger. These trends in dual polarization are observed for both men and women, and we could argue that they contribute to the educational differences in women's and men's fertility becoming increasingly similar.

One key mechanism in the strengthening parity polarization among men and women with lower levels of education is partnership dynamics. Previous research has suggested that lifetime childlessness is strongly linked to never partnering, divorce, and separation (Keizer et al. 2008; Jalovaara and Fasang 2017). Our analysis shows that increased entry into higher parities among the lower educated is often linked to childbearing with several partners, indicating that increases in partnership instability, particularly among men and women with lower levels of education, are influencing fertility patterns in the Nordic countries. It may also be the case that the Nordics' support towards gender equality and work–family reconciliation, in particular, helps highly educated men and women to follow the norm of having two or more children. An unforeseen development is that obstacles to family formation (reflected in lifetime childlessness) and family stability (reflected in MPF) are both increasingly concentrated among women and men with lower educational levels. In addition, MPF may present policy challenges relating to the well-being of the children of lower-educated parents. Parents with a weaker labour market position are particularly likely to have children with different partners, which potentially leads to less parental involvement and difficulties for parents in financially supporting all their children (Guzzo and Furstenberg 2007; Manlove et al. 2008). This implies an accumulation of disadvantage that is occurring in Nordic welfare societies, where social equality is an important goal. This calls for attention from researchers, as well as policymakers.

The finding on dual polarization in Nordic childbearing patterns warrants caution in deducing the theoretical fertility drivers from CTF. The turn towards a more positive educational fertility gradient for women has been interpreted as the result of the Nordic countries' position as forerunners of institutionally supported gender equality, which paved the way for a positive relationship between economic success and fertility for both men and women. The present findings support the idea of convergence between men and women, but conflict with the prediction of a straightforward positive association between economic resources and fertility. High educational levels appear to be positively related to entry into parenthood and ultimately having two children but not more. This could reflect a stronger ability to realize the two-child ideal and greater investment in each child among the highly educated, who then tend to stop childbearing at second parity. Simultaneously, the highly educated separate or divorce at a lower rate and are therefore less impacted by the fertility-promoting effects of repartnering; in the Nordic countries, this is equally the case for men and women.

In conclusion, the study results highlight the importance of parity-specific patterns and MPF in correctly describing and understanding socio-economic fertility differentials. Cohort analysis of fertility trends can benefit from utilizing both parity-specific and partner-specific analyses. This study demonstrates the feasibility of this approach by contributing new insights to the educational fertility differences among men and women in two Nordic countries.

Some realistic extensions of this project offer scope for future research. In particular, while this study focused on two similar countries to validate trends, subsequent research could explore a comparative perspective that draws on a larger number of countries with contrasting fertility regimes and institutional frameworks.

## Notes and acknowledgements

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