The Role of Sex Differences in Re-partnering for Sex Differences in Post-separation Fertility by Age 48: A Cohort Perspective

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Abstract

Individuals increasingly transition through more than one cohabiting relationship during their reproductive years. Therefore, births often occur after the dissolution of a first union. Previous research suggests that men and women differ in their re-partnering patterns, and has often found a re-partnering advantage for men. This study analysed the role of sex differences in re-partnering for sex differences in total fertility achieved after first union dissolution. We use Finnish register data to separately document all marital and cohabiting unions and all births which occur after the first union dissolution of four full birth cohorts up to age 48 for men and women. We decompose the sex difference in the summed fertility occurring after the first union dissolution up to age 48 into two parts: one rate component owing to sex differences in birth rates and a compositional component owing to sex differences in the share in re-partnered unions. On average, the post-dissolution fertility of women was higher than that of men. Women see a re-partnering advantage at early ages, while men have a re-partnering advantage at later ages. Tertiary educated men who dissolve a first childbearing union have higher post-dissolution fertility than their female counterparts and, for this group, a male ‘re-partnering advantage’ across the life course accounts for a substantial part of this sex difference.

INTRODUCTION

For much of history, a predictable facet of the life course was that the person with whom one first formed a household was also one’s reproductive partner (Coontz, 2006; Laslett, 1980). For several decades, however, this has not held true. In early adulthood, heterogeneous forms of cohabitation have, to a large degree, replaced marriage as a first-time union form (Billari & Liefbroer, 2010) and many of these first unions dissolve rapidly, often without having resulted in childbirth (Sobotka & Toulemon, 2008). Yet, childbearing continues to be a couple’s affair, occurring mostly within co-residing unions (e.g. Aassve et al., 2006). Consequently, non-trivial shares of childbirths occur in re-partnered, higher-order unions.

Under this partnering and fertility regime —sometimes theorised as serial monogamy—re-partnering influences childbearing intentions and opportunities, and impacts completed fertility (Thomson, 2014). Hence, the factors that impact the propensity to re-partner are decisive for completed fertility.

Many previous studies have suggested sex differences in re-partnering and post-union dissolution childbearing in general and a higher risk of re-partnering for men in particular (É. Beaujouan & Ní Bhrolcháin, 2011; É. Beaujouan & Wiles-Portier, 2011; Berger et al., 2018; Buyukkececi, 2021; de Graaf & Kalmijn, 2003; Ivanova et al., 2013, 2013; Kalmijn & Gelissen, 2007; Livingstone, 2014; Maslauskaitė & Baublyté, 2015; Payne, 2018; Poortman, 2007; Vanassche et al., 2015; Vikat et al., 2004; Wu, 2017; Wu & Schimmele, 2005). This raises the question of how the differences in men's and women's re-partnering relate to sex differences in births after the dissolution of the first union. However, most research tends to analyse either sex differences in re-partnering on the one hand, or sex differences in post-dissolution births on the other hand (e.g. É. Beaujouan & Ní Bhrolcháin, 2011; Ivanova et al., 2014; but see Vanassche et al., 2015 for important exceptions). Moreover, previous research has focused on individual-level incremental outcomes such as second union birth hazards, rather than the population-level question of whether sex differences in re-partnering rates matter for sex differences in completed fertility rates.

Despite the importance of partnering and childbearing after union dissolution for contemporary family demography (See Raley & Sweeney, 2020 for a recent review)—and despite theoretical interest in sex differences therein (e.g. Goldscheider, Bernhardt & Lappegård, 2015)—we know of no focused attempt to quantify the potential of sex differences in re-partnering to regulate sex differences in cohort fertility measures. This research gap hinders our understanding of fertility processes in the context of serial monogamy: re-partnered (higher order) unions will be an increasingly common context of childbirth, and sex differences in re-partnering may very well lead to discrepancies in fertility rates of men and women. Moreover, understanding systematic variation in re-partnering and childbearing across genders is important because post-dissolution partnership and parental status are important determinants of financial and social well-being (Andersson, 2020; McLanahan & Percheski, 2008; Nieuwenhuis & Maldonado, 2018).

This study addresses this research gap using Finnish register data of all births and marital and cohabiting unions from ages 18 to 48 of four birth cohorts. We derive a cohort fertility

measure of births and person-years after the first union dissolution. We then analyse the extent to which sex differences in re-partnering matter for differences between men and women in post-separation fertility by 48.

More specifically, we group the person-years observed after the first union dissolution by union status (in and not in a re-partnered union). We then calculate the fraction in union for every age group and the birth rate in a given union-status group for a given age group, sum the rates to a cohort total for men and women separately, and decompose the sex difference into two proximate components. One is attributed to sex differences in the share of a re-partnered union (re-partnering effect). The other part is attributed to sex differences in the birth rate (rate effect).

Using this approach, we obtain a parsimonious idea of the range within which a male or female ‘re-partnering advantage’ may influence fertility differentials across the sexes up to age 48. Importantly, we do not propose to capture how partnering dynamics explain ultimate fertility in general, but seek to illustrate the role of re-partnering for differences in men’s and women’s fertility after a first union dissolution. The analysis, to our knowledge the first of its kind, therefore contributes to clarifying how fertility plays out for men and women in populations where re-partnering is a common aspect of their life course. Moreover, many studies have proposed that gendered processes of re-partnering and fertility after union dissolution are contingent on socioeconomic status (SES) and parental status (Dewilde & Uunk, 2008; Di Nallo, 2019) . Therefore, we differentiate between individuals who dissolved a first childless union and who dissolve a first parental union, and between individuals with and without tertiary education. The results also provide stylised facts that in several ways improve previous estimates on sex differences in re-partnering by providing a cohort measure of sex differences in re-partnering, which includes all unions (marriages and non-marital cohabitation) across the life course.

Below, we briefly summarise previous research on sex differences in re-partnering and birth after union dissolution and describe the proposed explanations for sex differences in re-partnering and fertility.

Previous research

The overall increase in union instability and subsequent re-partnering (Elzinga & Liefbroer, 2007) has been universal insofar as it has occurred, at a differentiated magnitude, across all

social groups for both marital divorce (Bumpass, 1990) and non-marital union dissolution (Thomson, 2021). As marriage rates declined and were postponed to later ages, non-marital cohabitation increased and remained popular at an early age, largely replacing the share of the population within union among young adults (Billari & Liefbroer, 2010; Manning et al., 2014). In the US and large parts of Europe, the age at first union has remained stable over the last 50 years, but union instability has increased. The most recent comparative evidence suggests that the share that experienced a union dissolution either from marriage or a cohabiting union within 16 years of the first union, and thus are at risk of re-partnering, ranges from 16 percent in Spain to 61 percent in the USA (Andersson, Thomson & Duntava, 2017, Table A-26). Much of this union instability occurs during childbearing years, and many who have dissolved a first union have not yet transitioned to parenthood. Hence, births after union dissolution have the potential to constitute a substantial share of total population fertility. Moreover, the historically strong association between the transition into a first union and childbearing has been partially broken. This represents a shift in the life course dynamics of partnering, re-partnering, and fertility and has motivated family demographers to increasingly apply concepts to capture the role of union sequences for fertility, such as serial monogamy, serial cohabitation, multi-partner fertility, and childbearing across partnerships (See Guzzo & Hayford, 2020 for a recent review).

Re-partnering

The share of a population that re-partners after a union dissolution ranges across countries from one to three quarters (É. Beaujouan, 2012; É. Beaujouan & Ní Bhrolcháin, 2011; Blanc, 1987; Bumpass et al., 1991; Dommermuth & Wiik, 2014; Skew et al., 2009; Z. Wu & Schimmele, 2005). Likewise, estimates of re-marriage—a narrower definition than re-partnering—suggest a high prevalence of higher-order unions. By the turn of the millennium, 40% of US marriages were the second marriage of at least one of the spouses (Lewis & Kreider, 2015). Cross-country comparative estimates of re-partnering rates for men and women can be difficult to assess, as many relationship biographies focus on women or only partially enumerate non-marital unions. However, several estimates of remarriage and re-partnering suggest that men may be more likely to enter higher-order unions than women. For example, US men are consistently found to be more likely to remarry (Livingstone, 2014; Payne, 2018; Shafer & James, 2013; Z. Wu & Schimmele, 2005). Estimates based on both marital and co-residential unions in the UK suggest that about two-thirds of women and

three-quarters of men found a new partner (É. Beaujouan & Ní Bhrolcháin, 2011). Similar patterns—that men either re-partner faster or are more likely to having re-partnered within the study period—have been reported in many European countries (de Graaf & Kalmijn, 2003; Maslauskaitė & Baublytė, 2015; Poortman, 2007). However, much of the literature reports that male re-partnering is conditioned by marriage or parenthood. Measuring partner after a (marital) divorce or entry into parenthood, select sample on events that tend to occur later in life than the dissolution of a first cohabitation. Indeed, studies from both the US and Europe that have been able to analyse re-partnering from a life course perspective or to enumerate both marital and non-marital unions, find that the male advantage tends to occur after early adulthood, or roughly after the age of 30 (É. Beaujouan, 2012; É. Beaujouan & Wiles-Portier, 2011; Livingstone, 2014; Wu, 2017).

One suggested explanation for the ‘male re-partnering advantage’ is that the remarriage market is male-biased, such that sex differences in partner preferences and norms allow men to find partners across a larger age range (Gelissen, 2004; Goldscheider & Sassler, 2006; Lampard & Peggs, 1999). Some anthropological research argues that similar opportunity effects arise because men are less discriminatory in partner choice and more positively inclined towards promiscuous behaviour, increasing proclivity and preparedness to transitions between unions (See review by Borgerhoff Mulder, 2020). Others argue that the adversity brought about by union dissolution is often found to be larger for women than for men (Boertien & Lersch, 2021; Poortman, 2007) and, concomitantly, the gains from marriage may be smaller for women than for men (see McDonald, 2020 for a recent review and assessment). Poortman (2007) shows that prior union dissolution decreases the age-specific hazard of (re)-partnering to a greater extent for women in the Netherlands, and argues that union dissolution is more consequential for women regarding subsequent partner behaviour in general. Several empirical analyses problematise this picture further by suggesting that systematic sex differences in re-partnering only emerge between mothers and fathers, whereas nulliparous individuals (men and women who did not have children at the time of measurement) show a similar re-partnering incidence (É. Beaujouan, 2012; de Graaf & Kalmijn, 2003; Di Nallo, 2019; Gray, 2015; Ivanova et al., 2013; Steele et al., 2005). A number of reasons for the ‘maternal re-partnering deficit’ have been proposed. Koo et al. (1984) suggested that childcare obligations limit opportunities for re-partnering. Others propose that the potential deterring effect of partnering with someone who has children from previous relationships is lower for women than for women, because (post dissolution)

engaged fatherhood can signal competence as a spouse or commitment (Bernhardt & Goldscheider, 2006). Finally, a further set of studies propose that the effect of parental status on re-partnering is contingent on the involvement of the other parent and the level at which custodian responsibilities of the child in the first union are shared. However, the evidence remains mixed for this hypothesis (Berger et al., 2018; Di Nallo, 2019; Schnor et al., 2017; Skew et al., 2009; Vanassche et al., 2015).

In sum, within the population that dissolves a first union, the weight of previous research is in line with the notion that men might have a post-dissolution higher fertility rate because the share who re-partner is greater than that of women, given the premise that births occur largely within unions. However, such ‘re-partnering advantage’ may occur in later rather than earlier phases in the life course, which has implications for fertility. Additionally, variation in post-dissolution fertility is not only driven by differences in re-partnering incidence but also by potential sex differences in post-dissolution birth intensity within and outside of unions.

Post-dissolution births

Theoretical work offers little guidance as to why birth risk differs by sex when higher-order unions resemble first-order unions (for example, when contrasting two childless couples at similar ages, where one couple includes a spouse who has experienced union dissolution), with the exception of Poortman (2007), who argues that union dissolution is more consequential for economic autonomy and family formation processes for women. Due to structural differences in the labour market and expectations of parental responsibilities, women may have a harder time coping with new household situations and may need to balance more factors in search of a (new) partner. One of the dynamics of serial monogamy is that re-partnered unions, more often than first unions, contain one or two individuals with children from previous partners (Thomson, 2015). Different predictions apply to sex differences in births after the dissolution of a childbearing union. Here, one set of arguments maintains that the desire for a common child and the commitment and signalling value that a common child gives is particularly important for stepfamilies. Hence, stepfamilies are less restrictive in terms of having an additional child (Griffith et al., 1985). In support of this, several studies have found that higher-order unions show faster and higher transition rates than first unions at the same parity (Griffith et al. 1985; Jefferies et al. 2000; Meggiolaro & Ongaro 2010; Vikat et al. 1999, but see Guzzo 2017). The other argument maintains that the children of previous unions can be financially and emotionally taxing on relationships, which

hinders parity progression in higher-order unions. This position also finds empirical support (Buber & Prskawetz 2000; Kalmijn & Gelissen 2007; Stewart 2002; Vikat et al. 2004; Wineberg 1990). Sex differences in post-dissolution births may arise because of the gendered nature of parenthood. Vikat and colleagues (2004) argue that the residential custody of children from previous unions mitigates fertility intentions. Because women are more likely than men to maintain primary custody of children, women's second-and third-order birth risk is lower than that of men. However, the evidence for this is inconsistent. Some studies found no differences in birth risk by parenthood status (Ivanova et al., 2014; Vanassche et al., 2015) or sex differences in intention by parenthood status on birth integration (Stewart, 2002), whereas Kalmijn and Gelissen (2007) found that previous children inhibit childbearing in second unions more for women than for men.

Mechanically, individuals at risk of post-dissolution births are older than those at risk of pre-dissolution births. Age negatively impacts women's fecundity, but less so men's. Age-related infertility may decrease post-dissolution births less strongly in men (Beaujouan & Solaz, 2013). This effect is likely partially mitigated by age correlation (so that a woman's age-related infertility influences male fertility as well) and by cultural norms of parenthood at older ages (Beaujouan & Solaz 2013). Although the relative difference in birth rates at high ages favours men, the absolute birth rates are substantially lower than those at early ages. Moreover, women partner and re-partner at earlier ages than men, which increases the years at risk of birth for women.

To summarise, there is ample theoretical and empirical evidence that post-union dissolution childbearing can have nontrivial effects on fertility. Men are often found to have higher re-partnering rates, with the potential implication that men may proceed to birth in higher-order unions more often than women do. However, beyond sex differences in the share re-partnered, the general rate of childbirth post-dissolution may differ by sex. This is especially true when considering the potential sex differences in age patterns and in parental versus non-parental re-partnering. The main contributions of this study will be to illuminate this relationship, for example, to quantify how much sex differences in re-partnering and birth rates contribute to sex differences in post-dissolution fertility.

The social stratification of sex-differences in re-partnering and post-dissolution births

In Finland, and increasingly in most surveyed industrialised rich countries, there is a negative association between SES, educational level, and union dissolution (Lyngstad & Jalovaara, 2010). However, the role of social stratification in men and women's re-partnering and higher union births is less conclusive. This is partly because the lion's share of empirical research focuses on either men or women, and is limited to marriage and remarriage. Explanations based on marriage market dynamics maintain that partnering (and re-partnering) outcomes will differ at the intersection of gender and SES because preferences for potential partners' SES are gendered—high-SES men are in demand among women, but (women's) SES is relatively less important as a partner's characteristic for men (Walter et al., 2020). There is evidence in support of this theory for union formation and parental couples (e.g. Grow & Van Bavel, 2020). However, the empirical account of re-partnering is mixed. In the US, Shafer and James, (2013) show a positive socioeconomic gradient in re-marriage for men but not among women; Maslauskaitė and Baublyté (2015) find no educational gradient in re-partnering for women but a positive educational gradient for men across four European countries, whereas Hiekel and Fulda (2018) show no educational gradient in serial cohabitation. Other perspectives see re-partnering as a strategy to reduce the economic distress produced by union dissolution (See Andreß et al., 2006). From this perspective, low income is predicted to positively influence re-partnering, and most strongly so for the sex that loses the most economic autonomy from union dissolution and is more inclined to become secondary providers to the household economy. There is some evidence that low-income women and women with separation-induced income re-marry faster than higher-earning women in Europe (Dewilde & Uunk, 2008).

Post-dissolution births are often considered to be largely determined by, and endogenous to, the likelihood of finding a new partner (Thomson et al., 2012). Hence, the predictions discussed above regarding sex and SES in re-partnering can be applied to childbearing in higher-order unions. However, much of the research on stratification in births after the dissolution of the first union has been discussed in the context of multi-partner fertility (MPF), that is, about subsequent childbearing unions (Thomson et al., 2020). Having children across partnerships entails substantial individual economic costs and problematises custodian responsibilities (Guzzo, 2014). While a first birth in a higher-order union is not stigmatising, MPF is often socially unsanctioned. As with most family demographic behaviours diverging from the ideal form, MPF is particularly prevalent among low SES and vulnerable

populations (McLanahan & Percheski, 2008). Planned and unplanned pregnancies (Guzzo, 2017) leading to high birth order parity progression are more common among low-SES populations (Jalovaara et al., 2021). Simultaneously, a positive human capital effect on parity progression is often found and is especially strong for men (Jalovaara et al., 2018; Kolk, 2019). The empirical evidence is limited, but some results are in accordance with this dual SES effect. Lappegård and Rønsen (2013), for example, find a higher prevalence of multi-partner fertility among men with low and high socioeconomic status.

Finally, the efficiency of the marriage market dynamics and economic autonomy is likely partially contingent on institutional factors. Finland, the context of the present study, has an extensive welfare system, and women are integrated into the labour market. The importance of gender may be expected to be smaller in countries with individual economic autonomy via high female labour market participation and dual-earner models, and the overall importance of income would decrease via substantial social transfers (See Andreß et al., 2006).

In sum, much remains to be explored regarding re-partnering at the intersection of gender and SES. Few attempts have been made to quantify how variation in re-partnering across gender and SES translates to population level differences in post-dissolution fertility rates. A secondary contribution of this study is that it tentatively addressed this research gap.

METHODS

Data

We used Finnish register data containing individual-level yearly information on births, deaths, migration, co-residential unions, and marriages. Our population covers the full birth cohorts from 1969 to 1972, who were registered in the country by their 18th birthday, and who ever dissolved a marital or cohabiting union. These are followed from age 18 to 48 years or until right censored by death or migration. We constructed two analytical populations based on parental status in which individuals are at risk of re-partnering and birth following union dissolution. Our first analytical population consists of those who separated from a first union without having children. This population contributes person-years starting from the first years after the first dissolution of a non-parental union, up to age 48 (92,091 individuals, 1,792,260 person-years). Our second analytical population is those who separated from a first childbearing union. This population contributes person-years starting from the first years after

the first dissolution of a parental union (83,727 individuals, 1,079,209 person-years). Individuals who had their first birth outside a union but who never previously had a union (and thus did not dissolve a childbearing union) entered the second analytical population and contributed person-years from the year following the first birth. Appendix Table A1 and A2 show descriptive statistics of the share of the total population who dissolve a first union and age at union first dissolution, by union status and educational groups. Appendix Tables A3 and A4 describe size, person-years, and births for the analytical population, by union status and educational groups.

Variables

Statistics Finland includes records of co-residential unions that are unique in length, starting in 1987, and builds on individual information on dwelling residence. A person is considered to be in a union if she or he shares dwelling with a person of the opposite sex who is not a relative, beyond 90 days, and within an age difference of 20 years (the latter rule does not apply if the dyad is married or has a common child). We combined this measure with data from civic records to estimate unique union dyads. This method has been verified by previous work (Jalovaara & Kulu, 2018) and parallels the so-called POSSLQ (people of the same sex sharing living quarters) approach (Kennedy & Fitch, 2012). Union dissolutions are derived by combining civic data on divorces with dwelling moves that result in residential separation and death registers. Less than 1.2% of the union dissolutions were due to bereavement.

Birth records are very reliable in comparison to self-reported births, particularly regarding male fertility. Paternity is by default awarded to the male spouse if married, whereas formal consent for paternity is required among non-marital couples, with social services investigation pending if paternity is unrequited or unknown around the time of delivery. Approximately 2% of the children had no paternal information in their registers. We do not estimate fertility differentials due to births after the age of 48 years. Such births would, to the greatest extent, occur in the male index population. While this is suboptimal, this study follows cohorts up to age 48 because this is the longest age span for which the data can cover partnerships. Analysis of an older male cohort fertility in Finland (1963 birth cohort) shows that approximately 3% of births between the ages of 46 and 55 occur after age 46, meaning that a cut-off at age 48 somewhat resembles completed cohort fertility (Andersson et al., 2022; See also Barclay & Kolk, 2020). Nevertheless, it remains important to note that our measure of sex differences pertains to the 18–48 age span.

Educational level. We obtained the highest attained level of education by age 48 years and categorised the Finnish educational nomenclature into one group with and one group without tertiary education, which are equivalent to the 2012 ISCED schema 1–4 and 5 >, respectively (UNESCO, 2012). We use educational level as a stratifying variable, which is frequently found to matter for union formation, stability, and fertility (e.g. Wood Neels & Kil, 2014). At the same time, educational levels show less yearly fluctuations and less reverse causality with respect to childbearing, such as measures of earnings income.

Analytical strategy

First, we calculated age-specific birth rates using three-year age groups separately for men and women (Equation 1). The numerator is births in age-group_a under union status_i (in union or not in union) and the denominator is person-years in age-group_a, union status_i. Age-specific post-dissolution fertility rates were summed to derive a measure we call cohort total post-dissolution fertility rate (CPFR). This was calculated separately for the two analytical populations. Population A: individuals who separate from a first union without having children, and population B: individuals who separate from a childbearing union. For population A, CPFR can be interpreted as a type of cohort fertility rate for the distinct subpopulation who ever separate a first union without having children, where the person-years spent in the first (and dissolved), childless union are removed from the denominator. For population B, what we estimate is not a total cohort fertility measure because it counts only the births and person-years that follow the dissolution of a first childbearing union. For both populations A and B, however, CPFR reflects aggregate fertility during the life course spent after the first union dissolution, that is, when one is at risk of re-partnering and post-dissolution births. Importantly, it allows us to derive how sex differences in the share who re-partner relate to the fertility differences between men and women after the first union dissolution.

$$CPFR = \sum_{ai} \left(ASPFR = \frac{Births_{ai}}{Person-years_{ai}} \right) \quad \text{Eq. 1}$$

We used a standard demographic decomposition (Das Gupta, 1993; Kitagawa, 1955) to discriminate sex differences in CPFR into one part attributed to sex differences in birth rates and one part attributed to sex differences in the share of person-years spent in-union after the first union dissolution (Equation 2). The total difference in the total fertility rate ($\Delta CPFR$) is equal to the sum of the proportion of women and men in age_a and union-status_i (w_{ai}), times

the average age and union-status-specific fertility rate among men and women $\left(\frac{ASPFR_{aimen} + ASPFR_{aiwomen}}{2} \right)$, plus the difference in age_a and union-status_i-specific fertility $\Delta ASPFR_{ai}$, times the average of the proportion of men and women in age_a and union-status_i $\left(\frac{w_{aimen} + w_{aiwomen}}{2} \right)$. In the present study, a positive delta indicates a higher *CPFR* for men, whereas a negative delta indicates a higher *CPFR* for women. To illustrate, consider the scenario in which we see a male advantage in fertility after union dissolution ($\Delta CPFR > 0$). Equation 2 quantifies whether and the extent to which this male advantage is due to higher shares re-partnered among men than women (person-years in union generate more births than person-years outside of unions). It also quantifies if and how much the male advantage is due to higher birth rates among men than women (rather than person-years in union). We calculate Equation 2 separately for our two analytical populations and separately for the non-tertiary educated and tertiary educated groups.

$$\Delta CPFR = \sum_{ai} \left[\left(w_{ai} \cdot \frac{ASPFR_{aimen} + ASPFR_{aiwomen}}{2} \right) + \left(\Delta ASPFR_{ai} \cdot \frac{w_{aimen} + w_{aiwomen}}{2} \right) \right]$$

Eq. 2

RESULTS

We proceeded in three steps. First, we showed the age-specific fertility rates in union and out of union for men and women separately. We then showed the age-specific re-partnering rate, measured as the share of the population in and out of union, for men and women separately. Finally, we zoom in to answer the research question and analyse the extent to which sex differences in fertility rate are due to sex differences in the share in and out of unions—the ‘re-partnering component’.

Re-partnering and fertility after first childless union dissolution

In Figure 1, Fig. A shows the fertility rate among those who separate from their first union without having children. The total fertility rate (CPFR) was higher in women (1.935) than in men (1.776). Among both individuals in and not in unions, women had higher fertility than men. Fertility out of union is marginal. Women have markedly higher birth rates after separating at early ages (0.95 for women and 0.22 for men, at age 18–20). This gap narrows until the age of 30–32, after which male fertility is higher. In the latest observed age group,

fertility rates are marginal, but with a strong male advantage (< 0.005 for women and 0.4 for men). Fig. B in Figure 1 shows that among those who dissolve a first union, women are more often in union from the age groups 18 to 32. At later ages, men have higher shares in union, but the absolute sex differences are smaller than at early ages (e.g. 5.9 for women and 6.2 for men at age group 42–44). In sum, men have a ‘re-partnering advantage’ in the later age groups, but at these ages birth rates are relatively low; women have a ‘re-partnering advantage’ in the first half of the reproductive period, when birth rates are higher.

Figure 1. Birth rate (a) and share in union, men and women who separated from a first childless union.

Figure 2 shows the difference in fertility in each age group, along with the summary statistics for total fertility. On the y-axis, positive values signify a fertility advantage for men, whereas negative values signify a fertility advantage for women. The blue portions of the bars show the effect of sex differences in higher birth rate, and the green bars show the effect of sex differences in union status (‘the re-partnering-effect’). As we learned from Fig. A of figure 1, women have higher fertility rates at younger ages, and men at higher ages. Women’s early-age re-partnering advantage leads to a substantial positive effect because there are high shares in a re-partnered union when birth rates are high. The male re-partnering advantage at older ages does not have a strong effect on fertility (it is below 0.01 for each age group). Overall, women have higher fertility, and the sex difference is 0.159. The total effects of the rates largely cancel each other out. The majority of the fertility difference is attributed to sex differences in re-partnering: women’s advantage in re-partnering at early ages, where women also had high birth rates, explains most of the female fertility advantage.

Figure 2. Decomposition of the sex-difference in CTPFR into birth rate and re-partnering effect, men and women who dissolve a first childless union.

Re-partnering and fertility after first parental union dissolution

In Figure 3, Fig. A shows the birth risk among those who separate from a childbearing union. The total fertility was higher in women (1.424) than in men (1.539). As shown in Figure 1, this is true for births both in and out of union. Births out of union account for a minor but non-negligible part of fertility (0.229 for women and 1.179 for men). The age pattern is similar to that shown in Figure 1, with male birth rates surpassing female birth rates after approximately 30 years. Women have a re-partnering advantage at earlier ages, and men at later ages. However, the female re-partnering advantage is smaller in absolute percentage points compared to those who separate from a first childless union (Fig. B, Figure 1). The cross-over to a male re-partnering advantage occurs around age 33–35. The share in union is markedly lower among those who separate from a childbearing union than those who separate from a non-childbearing union (Fig. B, Figure 1).

Figure 3. Birth rate (a) and share in union, men and women who separated from a first childbearing union.

Figure 4 shows the decomposition of sex differences in fertility among those who separate from a childbearing union. Again, women have higher fertility rates at younger ages, and men at higher ages. Total fertility is higher for women, with a sex difference of -0.159 . Women have a total re-partnering advantage. Men have a slight positive re-partnering effect at older ages. The summed sex difference here is much weaker than that in Figure 2. Sex differences in re-partnering contribute more than half of the sex differences in total fertility after childbearing union dissolution.

Figure 4. Decomposition of the sex-difference in CTPFR into birth rate and re-partnering effect, men and women who separated from a first childbearing union.

Educational gradients in re-partnering and fertility after parental union dissolution

Finally, we repeat the above analysis separately for individuals with and without tertiary education. For brevity, we directly turn to the decomposition analysis. Sex-specific rates and shares in union are shown in Appendix Figure A1 to A4. To the left, Fig. A1 and Fig. A2 in Figure 5 show sex differences in fertility among those who separate from their first union without having had children by then (corresponding to Figure 2). To the right, Fig. B1 and Fig. B2 shows sex differences in fertility among those who separate from a childbearing union (corresponding to Figure 4). Starting from a comparison of Figs. A1 and A2, we observe a strong educational gradient. Among non-tertiary-educated individuals, the higher female birth rate at early ages is pronounced (Fig. A1), while it is less so among tertiary-educated individuals (Fig. A2). The male birth rate advantage in later ages is present among the non-tertiary educated (Fig. A1), as in all our analyses thus far, but is far more pronounced among the tertiary educated (Fig. A2). Female re-partnering advantage at an early age is present among both educational groups, but less so among the tertiary educated. The male re-partnering advantage at later ages is weak among the non-tertiary educated (Fig. A1). However, the male re-partnering advantage in later ages is fairly pronounced among tertiary-educated individuals (Fig. A2). For the non-tertiary educated (Fig. A1) population who separate from their first union without having had children, cohort fertility is higher for women ($\Delta = -0.236$). A substantial approximate cause for this is higher re-partnering rates at early ages (rate effect = 0.096, re-partnering effect = -0.141). In contrast, cohort fertility is higher for men among the tertiary educated, although the magnitude is much smaller ($\Delta = 0.026$). This is attributed to the positive effect of higher male birth rates, mitigated by a slightly higher female re-partnering effect in total (rate effect = 0.037, re-partnering effect = -0.011).

Next, we turn to the decomposition of sex differences in fertility among those who separate from a childbearing union (Figs. B1 and B2). Among the non-tertiary educated, we see the following familiar pattern: higher female birth rates at early ages, higher male birth rates at later ages, and a female re-partnering advantage at an early age that is stronger than the male re-partnering advantage in later ages; the total difference ($\Delta = -0.194$) is substantively attributed to the female re-partnering advantage in early ages (rate = -0.080 , re-partnering effect = -0.115). However, the picture is different among tertiary-educated individuals. The most critical difference is the male re-partnering advantage across all ages. In total, fertility is slightly higher among tertiary-educated men than women ($\Delta = 0.074$). The majority of

this difference is driven by a male advantage in re-partnering, the only subgroup in our analysis for which this is the case.

Figure 4. Decomposition of the sex-difference in CTPFR into birth rate and re-partnering effect by educational level, men and women who dissolve a first childless union (a) and who separate from a first childbearing union (b).

DISCUSSION

Men and women increasingly dissolve their first unions and move on to re-partner within the main ages of reproduction. However, not all people who dissolve a union re-partner. Previous research has studied sex differences in the life course after union dissolution, often finding that men are more likely to re-partner. This study has advanced the argument that if men and women differ in their propensity to re-partner after union dissolution, this may influence sex differences in cohort fertility, especially in societies where serial monogamy is ubiquitous. Therefore, this study aimed to analyse how sex differences in re-partnering relates to differences in post-dissolution fertility.

To answer this question, we used unique union histories on not only marriage but also all cohabiting unions covering the ages 18–48 of complete birth cohorts for men and women. This allowed us to estimate age-specific fertility rates after the first union dissolution by union status, as well as the shares re-partnered across the life course, from a cohort perspective. We then used standard demographic decomposition techniques to quantify, for the first time, the share of sex differences in a cohort fertility measure attributable to sex differences in re-partnering.

We found that for the analysed cohorts in Finland, there is a higher share of re-partnered women in the early and peak-birth phases of reproductive careers (ages 18–32). Men had a higher share of re-partnered men thereafter. Female birth rates are higher than male birth rates prior to age 32, after which male birth rates precede those of women. On average, total fertility after first union dissolution, measured up to age 48, was higher among women than among men. Decomposing this sex difference, we find that the female fertility advantage is driven to a substantive extent by compositional re-partnering effects. Births are most common in the first half of the age span that we studied; during which women have substantially higher shares in a re-partnered union. This pattern was found for individuals who separate from their first union without having had children, as well as for those who separate from a childbearing union. Sex differences in total post-dissolution fertility, as well as the role of re-partnering, differed substantially between individuals with and without tertiary education. Among the tertiary-educated who separate from their first union without having had children, cohort post-dissolution fertility is higher among men. This sex differential was due to higher male birth rates at older ages. Among tertiary-educated individuals who separate from a childbearing union, cohort post-dissolution fertility is also higher among men. In this population, a male re-partnering advantage, present across the life course, drove the sex differential.

These findings provide a population perspective for studies that have analysed individual-level predictors of hazard rates in re-partnering and birth across partnerships. By presenting an example of a way to link sex differences in re-partnering to sex differences in births, this study bridges insights from the literature, which has been characterised by an unmotivated degree of (empirical) balkanisation, either studying sex differences in re-partnering or sex differences in births across partnerships. Moreover, we have revisited the question of sex differences in re-partnering incidence using data and a research design that has many

advantages over most previous influential studies. We compare men and women using not only (re)marriages but all co-residential unions, and we do this across the life course. This reveals important aspects likely to be in place in other contexts as well, such as the age-graded pattern in male and female re-partnering rates. The bulk of influential prior research reporting a male remarriage advantage may look different if the whole range of re-partnering unions has been studied across the life course. The basic insight that sex differences in re-partnering appear to be strongly structured by age is related to fertility: although men see a re-partnering rate higher than women do at later ages, the effect can be limited in terms of total fertility because birth incidence is comparably low at late ages. While our analysis of socioeconomic heterogeneity was mainly exploratory and tentative, our findings contribute to the understanding of educational gradients in family and fertility dynamics. For example, congruent with the notion of gendered preferences in the marriage market and income effects on fertility and partnering, we show that highly educated men, but not non-tertiary educated men (who separate from a childbearing union), have a positive re-partnering advantage in cohort fertility. Most importantly, however, this study provides a novel examination of fertility processes under serial monogamy. Once the historical link between entry into the first union and entry into parenthood is decoupled, re-partnering will be key to further childbearing and, ultimately, to cohort fertility. We analysed how these conditions play out for two salient social groups—men and women—who differ somewhat in partnering and fertility behaviour.

This study has several limitations and has covered only aspects of the issues surrounding the phenomenon of sex differences in fertility. For example, we did not analyse parity-specific patterns. This might mask important variations. Childbearing union separation, for example, is highly dependent on birth parity achieved when the childbearing union was dissolved. Instead, we opted to give a general focused picture, and disaggregation by parental status as well as educational level would not have allowed this, and also would have infused noise into the analysis owing to the small cell size at the tail of the distribution. We did not analyse the causal effect of re-partnering. Throughout the study, we have remained agnostic to the antecedents of men's and women's re-partnering and fertility behaviour, including the causal order between re-partnering and fertility; undoubtedly, the intention and ability to have children after union dissolution will drive parts of re-partnering behaviour. Nevertheless, the study adds to the state-of-the-art by providing observational descriptions of the joint demographics of re-partnering and births after union dissolution. Such stylized facts may be

useful for future inquiry, including causal analysis. An obvious improvement to the current study would be to study a greater age span. While fertility is fairly marginal beyond ages 50 also for men, age dynamics is potentially an important component in the link between re-partnering, childbearing postponement, and sex-differences in cohort fertility (e.g. Beaujouan & Wiles-Portier, 2011). Another important limitation concerns the operationalisation of household structure. Using register data, this study improved on previous research by using both marital and non-marital union trajectories largely untroubled by attrition, under-coverage of children and births, and other features of survey data. Unfortunately, a disadvantage of register data is the inability to provide detailed household composition and qualitative information regarding custodian arrangements and the involvement of non-resident parents found in the survey material. Such factors likely impact fertility in higher union orders, and a more thorough account of sex differences in these parameters may advance our understanding of this topic. Nevertheless, to improve the understanding of fertility in societies where childbirth takes place across unions, demographers will continue to need to engage with the gendered aspects in both partnering and fertility, and contrast the behaviour between both men and women from a life course perspective. This may at times require simplifying assumptions, sometimes due to data limitations. Overall, given the centrality of gender in theorising contemporary fertility dynamics, empirical fertility analyses that contrast men and women have received relatively little attention (Nisén et al., 2014; Schoumaker, 2019), potentially because fertility scholars have traditionally focused on women, and the topic remains an intriguing area for future research.

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Appendix

Table A1. Share of the 1969–1972 birth cohorts who ever separate from a first childless union by age 48. Mean and interquartile range of the age at separation from a first childless union. Men and women, by educational level.

	Ever separate a first childless union						Age at event			
	Total pop.	Exp. event	%	Total pop.	Exp. event	%	Mean	IQR	Mean	IQR
	Women			Men			Women		Men	
<i>All</i>	137088	46181	0,34	144696	45910	0,32	28.7	23, 32	23, 32	25, 34
<i>Non-tertiary educated</i>	62177	21568	0,35	90234	29692	0,33	29.0	23, 34	23, 34	25, 35
<i>Tertiary-educated</i>	74911	24613	0,33	54462	16218	0,30	28.5	24, 31	24, 31	26, 33

Table A2. Share of the 1969–1972 birth cohorts who ever separate from a first childbearing union by age 48. Mean and interquartile range of the age at separation from a first childless union. Men and women, by educational level.

Ever separate a first childless union							Age at event			
Total pop.	Exp. event	%	Total pop.	Exp. event	%		Mean	IQR	Mean	IQR
Women			Men				Women		Men	
<i>All</i>										
137088	43902	0,32	144696	39825	0,28		35.1	29, 41	36.6	31, 43
<i>Non-tertiary educated</i>										
62177	23449	0,38	90234	27633	0,31		33.4	27, 40	35.5	30, 42
<i>Tertiary-educated</i>										
74911	20453	0,27	54462	12192	0,22		37.1	32, 43	38.9	34, 44

Table A3. Sample description, individuals who separated from a first childless union by age 48: total individuals experiencing the event, person-years and births. Men and women, by educational level.

	Individuals		Person-years		Births	
	Women	Men	Women	Men	Women	Men
All educational groups						
Total	46181	45910	936491	855769	51188	50226
In union			578343	527299	48104	48546
Not in union			358148	328470	3084	1680
Non-tertiary educated						
Total	21568	29692	431648	550198	22001	29573
In union			249291	315394	20211	28235
Not in union			182357	234804	1790	1338
Tertiary-educated						
Total	24613	16218	504843	305571	29187	20653
In union			329052	211905	27893	20311
Not in union			175791	93666	1294	342

Table A4. Sample description, individuals who separated from a first childbearing union by age 48: total individuals experiencing the event, person-years and births. Men and women, by educational level.

	Individuals		Person-years		Births	
	Women	Men	Women	Men	Women	Men
All educational groups						
Total	43902	39825	600725	478484	18712	18515
In union	24495	22468	262619	219558	16203	16599
Not in union	39890	34732	338106	258926	2509	1916
Non-tertiary educated						
Total	23449	27633	359606	357153	12470	13710
In union	14057	15656	157941	158073	10526	12044
Not in union	21446	24471	201665	199080	1944	1666
Tertiary-educated						
Total	20453	12192	241119	121331	6242	4805
In union	10438	6812	104678	61485	5677	4555
Not in union	18444	10261	136441	59846	565	250

Figure A2. Birth rate (a) and share in union, men and women who separated from a first childless union without tertiary education.

Figure A3. Birth rate (a) and share in union, men and women who separated from a first childless union with tertiary education.

Figure A4. Birth rate (a) and share in union, men and women who separated from a first childbearing union without tertiary education.

Figure A5. Birth rate (a) and share in union, men and women who separated from a first childbearing union with tertiary education.