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Linus Andersson

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Stockholm University
Demography Unit

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Linus Andersson

Swedish Institute for Social Research (SOFI), Stockholm University;

Department of Sociology, Turku University

Abstract

Partnering behavior is central to understanding fertility. Influential concepts, including singlehood, serial monogamy, and multiple-partner fertility, are frequently used to analyze the interplay between partnering and fertility at the individual level. However, these frameworks are also evoked to understand population-level patterns. One fundamental population-level pattern for gauging the relationship between partnerships and childbearing, we argue, is the enumeration of fertility as the sum of births under various partnership conditions. Surprisingly, demographers rarely measure and do not yet have a clear picture of the extent to which childbearing in different partnership contexts contributes to completed fertility. We analyze Finnish register data to decompose the cohort fertility rate (CFR) into births from eight partner contexts, in conjunction with three dimensions: union status, union order, and reproductive partner order. Somewhat contrary to the discourse of partnering in the Nordics, births within first unions to first reproductive partners account for about two-thirds of CFR. Births in higher-order unions to first reproductive partners account for one-fifth. Single births and births with higher-order reproductive partners have a modest impact. This ranking holds across sex and educational level, with substantive relative differences. We argue that these descriptions provide an additional perspective to appraise childbearing and partnering dynamics.

Keywords: Fertility, Cohort fertility, union formation, union dissolution, Finland

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Introduction

Shortly after WWII, Europe and the US saw a spell of high fertility alongside widespread and early marriage. This phase helped construe childbearing as homogenous, predictable, and occurring within the benign confines of a first and life-long union—the standard partnership context for births (Coontz, 2006). The trend was quickly broken, however, and followed by a decrease in union stability and childbearing (Cherlin, 2016). These unforeseen developments propelled research on the link between various "non-standard" partnership behaviors and fertility (Wu & Li 2005).

Grand and mid-range fertility theories rely heavily on careful readings of aggregate partnering patterns (e.g., Goode, 1963). The essential empirical building blocks that underpin the theory of fertility decline proposed by second demographic transition theory (SDT), for example, includes the stock of single parents, “nuclear” families (usually in reference to opposite sex couple households with biological children), step-parent households, as well as rates of divorce and childbirth outside of wedlock or across unions (Zaidi & Morgan, 2017).

However, despite explicating the changing nature of partnerships as key to understand fertility (Shanahan 2000), analyses rarely construe completed fertility as the result of partnership-specific births. Focus mostly lies on population prevalence of household types (which do not convey birth conditions), or the risk of childbearing within household types (which does not convey the impact on population level fertility). Given that fertility always is the results of births occurring in some form of partnership state (including outside of a union), the contribution of these partnership contexts of birth to completed fertility is worth exploring.

In this study, we analyze how lifetime childbearing encompasses births in different types of partnership contexts. Surprisingly, the literature dedicated to this area of discussion is scant, with the notable exception of Thomson, Gray and Carlson (2020), who studied the contribution

of multi-partner fertility in period fertility rates in the US and Europe. This research gap is unfortunate because knowing the share of fertility attributable to a specific partnership context of birth helps to understand the nature of partnering and fertility, as it provides cues of the conditions under which childbirth is practically feasible or normatively appropriate. It adds perspective to the project of assessing diversity in family and life course experiences (Settersten & Mayer 1997): In contrast to extant measures used to describe the relationship between unions and childbearing, such as childhood household structures, partnership contexts of birth illustrate a relationship between birth context and cohort fertility rates. This approach also enables an objective assessment of popular perceptions about partnerships and childbirth. For example, although discourse on SDT forerunner societies and "modern dating" portray the sequence of co-residing relations before entering parenthood as ubiquitous (Rubin, 2020), empirical research is yet to quantify just how this is, in fact, reflected in fertility at the population level.

In order to quantify the link between partnership context of birth and completed fertility, we use Finnish register data on yearly observations of partnerships and fertility of complete birth cohorts of women aged 18 to 45 and men aged 18 to 50. We decompose cohort fertility by union birth contexts across three overlapping dimensions that are frequently represented in the literature on partnering and fertility (multi-partner fertility, singlehood and serial monogamy). Specifically, we distinguish between birth within/outside a union, births in a first/higher-order union, and births to a first/higher-order reproductive partner. We analyze heterogeneity across educational levels to assess these patterns' universality. We ask (a) what amount of cohort fertility rate (CFR) is due to birth from the respective partnering contexts? (b) Are there substantial disparities across educational levels and between men and women? (c) To what extent is it possible to delineate patterns of "standard" or "non-standard" partnering contexts?

Background and theory

Partnering and childbearing

Historical data on illegitimacy and re-marriage in monogamous western societies indicate that for the vast majority, the person with whom one first formed a household was also one's life-long reproductive partner (Goody & Goody, 1976; Coontz, 2006; Laslett, 1980). The first half of the twentieth century dominant pathway was from a family of origin into (one) family of reproduction. The ubiquity of the nuclear family trajectory is rather overestimated, however: Around 1950, nontraditional behavior such as nonmarital childbearing or divorce occurred among one if five US white women (Wu & Li 2005). Yet, as a modal trajectory, it became analogous to the vernacular "traditional family," and enmeshed within a male-breadwinner-female housewife model (Raybould & Sears, 2021). Today, being partnered remains highly predictive of childbirth (Aassve et al., 2006). Yet, beyond this observation, the "traditional" relationship between partnering and childbearing has changed further over the last decades (Cherlin, 2016).

In the demographic literature on family dynamics in the global north, partnerships and childbearing are usually considered against the backdrop of below-replacement fertility and individualization (Esping-Andersen & Billari, 2015; Goldscheider et al., 2015). Notable developments include the rise of non-marital cohabitation, the postponement of childbirth, the increase in union dissolution and re-partnering, and family complexity (Thomson, 2014). Partnerships have become more transient (e.g. Heikel & Fulda, 2018; Liefbroer 1999). It has become common to form more than one union (in sequence) in young adulthood, leading some family scholars to describe contemporary society as serially monogamous (Andersson, 2015). Substantial proportions of individuals have children outside "nuclear" families, and this fraction has been growing during the last decades (Smock & Schwartz, 2020). Cross-national

survey data show that in several countries, a majority of childbearing unions dissolve and that over a quarter of the population live in some form of a reconstituted family at some point in their childhood (G. Andersson et al., 2017; G. Andersson & Philipov, 2002). Data-driven methods tend to cluster partner trajectories into several distinct union pathways, including increasing time living apart together (LAT) during early adulthood (Bergström & Moulin, 2022). Concomitantly, while union dissolution and the various union and family forms that evolve thereafter have increased across segments of society, they are particularly prevalent in vulnerable or marginalized populations, as measured by income, education, occupational status, ethnicity and race (McLanahan & Percheski, 2008).

In summary, life course pathways that are not dominated by life-long monogamous unions, invariably result in a plethora of household forms (Raley & Sweeney, 2020). However, to what extent has this change translated to a population birthed in union partnership contexts outside the "traditional" form?

Partnering as childbearing context

From the empirical evidence cited above, it seems plausible that births from several different partnership contexts may substantially contribute to fertility. Indeed, popular accounts of contemporary family and partnering practices often argue that transitioning through relationships and MPF represents the new "normal" pathway in terms of childbearing (Rubin, 2020). The magnitude of these predictions remains conjecture, however, as few studies link partnership context to cohort fertility. In practice, the rise of family complexity need not necessarily translate into significant heterogeneity concerning the partnership context of childbirth. Even if the number of single parents increase, single births can remain rare. Likewise, the fact that an increasing number of children live in reconstituted families need not

imply that a substantial fraction of all children born, are born in these households. This moderate position finds support in theory. The cultural scripts (Bellah et al., 2007; Swidler, 2001) and economic conditions (Stevenson & Wolfers, 2007) that influence partnerships across the life course are not necessarily the same as those that affect childbirth at a given point in time. Ethnographic work shows that while people morally approve of divorce/separation with children, they at the same time see the establishment of stable relationships as the main hurdle and necessary condition to childbearing (Bäck-Wiklund & Johansson, 2012). The same duality appears on the institutional level. Many countries have adopted no-fault divorce, individual rather than household taxation, and welfare transfers that support single households. Yet, the socialization of childcare and housing policies in these same countries typically promote childbearing within couple (two-headed) family units (Nieuwenhuis & Maldonado, 2018; Orloff, 2009). Empirical data of how births in specific contexts relate to fertility, therefore, carries significance as cues for how reproduction is structured, and complements extant statistics on household structure and childbearing.

Empirical approaches to the partnering contexts of birth

Most empirical research on partnership contexts of birth estimate birth hazards in a regression framework (Griffith et al., 1985; Guzzo, 2017, p. 0; Ivanova et al., 2014; Jefferies et al., 2000; Kalmijn & Gelissen, 2007; Lappegård & Rønsen, 2013; Vikat et al., 1999). Non-parametric approaches typically present either prevalence of partnership types or birth rates in a specific partnership status (Jalovaara et al., 2021; Monte, 2018). Neither approach quantify completed fertility as the product of births in various partnership states. Naming conventions further spread conceptual incongruence. For example, as noted by Thomson and colleagues (2020), the term Multi-partner fertility (MPF) is a misnomer because while the term implies a

population rate, it is mainly used in reference to individual propensities rather than to describe the fertility of a population by order of the reproductive partners.

Of course, there is empirical work specifically aimed at providing a Life course perspective on the nexus of childbearing and partnering. Estimates on what Settersten and Mayer (1997) call 'demographic biographies' include cohort prevalence of childbearing-marriage sequences (Wu and Li 2005), parity progression by reproductive partner (Thomson et al., 2014), or comparing cohort fertility to married and re-married individuals (Van Bavel, Jansen & Wijckmans, 2012). As an additive to this battery of demographic biographies, we argue, measures that explicitly quantify cohort fertility as the sum of births across partnership contexts can provide novel relevant perspectives on family dynamics. For example, it quantifies partnership forms as venues for childbirth, rather than the only prevalence of partnership trajectories. We know of only one study that takes this approach: Thomson and colleagues (2021) used the gender and generations surveys and synthetic cohorts to describe the share of period fertility due to births to higher-order reproductive partners and in a state of singlehood. They find that MPF contributes between 3-12% of fertility and that country-wise differences in this share were not associated with TFR. This study departs from improve on this seminal work, and argues that it is necessary to (a) use a comprehensive schema of partnership states rather than focusing on one particular behavior and (b) study patterns across salient societal groups with known disparities in partnering and childbearing and (c) move from a period to cohort fertility perspective, as the former is known to distort union-specific estimates of fertility (Hoem & Mureşan, 2011; van Imhoff, 2001).

The chief contribution of the present study is to describe how cohort fertility comprises births across several fundamental partnering contexts. Drawing on unique population-wide sources

of co-residence and fertility of the total reproductive period of four entire birth cohorts, we can assess this question with great accuracy and at a granular level.

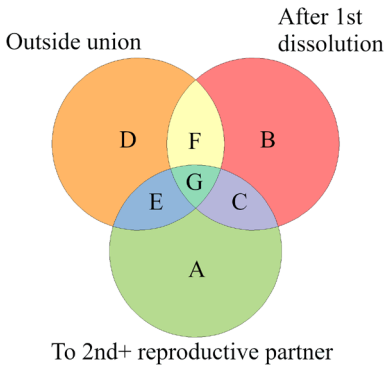
A Schema for births in standard and non-standard partner contexts

In this study, we delineate three dimensions of union context of birth: the union (birth within vs. outside union), the union order (birth in a first vs. higher-order union), and reproductive partner order (birth to a first vs. higher-order reproductive partner). These dimensions are chosen because they (a) have precedence in influential concepts in family sociology, (b) are building blocks to more complex relations, (c) are not mutually exclusive, but intersect to form a complete schema, and (d) are fairly objective rather than socio-culturally contingent measures, thereby facilitating comparability for future research (Thomson, 2015).

The Venn diagram in Figure 1 overlays the states birth outside union (blue), higher-order union (red), and higher-order reproductive partner (green). This produces seven different union contexts. The eighth and final possible union context, not visualized in Figure 1, is the presumed modal birth context: a birth within a union, which is also the index person's first union, to a first reproductive partner. Note that a necessary condition of a union order distinction is that a first union and a first union dissolution takes place: A higher-order union birth is just one out of many potential contexts of births following first union dissolution. Therefore, we use the event of union dissolution to delineate the union order dimension.

To illustrate this argument, consider a hypothetical population where cohort fertility is driven to a substantial extent by birth within higher-order unions (category C in Table 1). Under this "serial monogamy fertility regime," the standard pattern of giving birth in one's first union is abandoned. Union dissolution and re-partnering before entering parenthood are so prevalent, that childbearing mainly occurs in higher-order unions. The first union is no longer predictive

of first births and gains a different meaning in terms of entry into adulthood. Yet, couple-hood remains the norm, as does the behavior of settling with one single companion to pursue childbearing (C. Andersson, 2015; De La Croix & Doepke, 2003). Alternatively, cohort fertility could primarily be the product of individual births to different reproductive partners (category D in Table 1). Here, individuals do not pick a reproductive partner for life but distribute childbearing between unions, and hence serial monogamy takes on a very different meaning.



X: (excluded from Venn diagram). Birth in first union, to first reproductive partner, "*Modal pattern*".

A: Birth within union, in first union, to higher-order reproductive partner.

B: Birth within union, in higher-order union, to first reproductive partner.

C: Birth within union, in higher-order union, to higher-order reproductive partner.

D: Birth outside union, before first union dissolution, to first reproductive partner.

E: Birth outside union, before first union dissolution, to higher-order reproductive partner.

F: Birth outside union, after first union dissolution, to first reproductive partner.

G: Birth outside union, after first union dissolution, to higher-order reproductive partner.

Figure 1. Venn diagram of partnership contexts of birth. Union status (single) to the upper left, union order (after first union dissolution) to the upper right, reproductive partner order (higher order reproductive partner) center-bottom. The birth contexts of in union, to first union, to first reproductive partner excluded from the diagram.

The Finnish *c*ontext

Union instability, re-partnering, and complex family formations are fairly prevalent in Finland, and the country is considered a forerunner in second demographic transitions (Lesthaeghe, 2010). For the birth cohorts used in this study, second and higher-order births are more common than in most other countries in Europe. Hence, Finland is a useful context for our analyses because the possibility for variation in union contexts of birth is relatively high. Additionally, A high level of female labor market participation (FLMP) and pro-natal, pro-FLMP social policy counter somewhat, relative to many contexts, the obstacles and unfavorable consequences of union separation (Eerola et al., 2019; Salmi et al., 2017). Importantly, the country has the longest-running administrative registration of co-residence. This provides a unique opportunity to examine our research question using cohabitation as well as marriage, and from a cohort rather than synthetic cohort perspective, and at a level of statistical certainty and granular detail that would not be possible in other countries.

Methods

Data

We used Finnish register data comprising yearly individual-level information on births and co-residential union status. Our population covered the entire female birth cohorts of 1969 to 1975, which we follow from age 18 to 45 (N = 239,577). The male birth cohorts from 1969-1970 are followed to age 50 (N = 58,123). A condition for inclusion was being registered in Finland from their 18th birthday till the age of 45 (or age 50 for men), so as to obtain complete partnership histories. Statistics Finland documents cohabiting unions from 1987, based on individuals' residence. Cohabitation union status is assigned to individuals that share a dwelling with a non-relative of the opposite sex for more than 90 days, who are no more than 20 years

apart in age (unless married or have common children). This method, sometimes called the POSSLQ approach (people of the same sex sharing living quarters), is used in a number of studies using register data in Finland, Norway, Sweden, and elsewhere (Jalovaara & Kulu, 2018; Kennedy & Fitch, 2012). Union dissolution is measured both by bereavement and union separation. Birth records are close to complete and very reliable. We focused on women for comparability with previous research as well as for parsimony and data availability. Although CFR remains largely unchanged after age 45 for women, men need somewhat longer follow-ups, particularly for estimating birth rates at higher-order unions. Because our partnership information starts in 1987, we could draw on more cohorts for women than men. This somewhat compromised comparisons and estimates were slightly better for women than men, at the tails of the distribution (e.g., births at infrequent combination of age and union status). However, we also conducted all analyses for men, measuring CFR up to age 50 for the 1969 and 1970 birth cohorts. These are presented in the main results in conjunction with the results for women and reported in detail the Appendix (Figures A7 to A13).

Analytical strategy

We constructed partnership contexts based on information on individual's union status at a given year (risk of birth in or outside a co-residing or marital), on the union trajectory status (risk of birth in a first union or higher-order union), and on the parental trajectory status (risk of birth to a first or higher-order reproductive partner). A person was considered at risk of birth in a standard partnership context if he or she is in a (first) union and childless or with a partner who is also the first and only reproductive partner — a birth in a first union to a first reproductive partner. Any union beyond the first (e.g., second, third, and onward) was measured as exposure to the risk of birth in a higher-order union. Likewise, any reproductive partner beyond the first was measured as a higher-order reproductive partner. We differentiated between the risk of birth in union and outside union, and between the risk of births outside

union, that occur before and after a first union dissolution. A person was considered at risk of birth to a higher-order reproductive partner if that person was a parent and had separated from their first reproductive partner or if the person was a parent and had never resided with the first childbearing partner. Table A1 and A2 shows the person-year exposure and births of the combination of possible states based on union status, parental, and union trajectory.

Finally, we quantified the fraction of CFR that could be attributed to births in a given partnership context. In Equation 1, we calculated age-specific birth rates (ASFR) for each state (f_{nx}) and multiplied this rate by the share of women at each age and in each state (p_{nx}), and took the sum of this measure (see Barclay & Kolk, 2020 for similar applications using cohort fertility). These main analyses were meant to establish the baseline minimum level of union context of birth heterogeneity across key dimensions of partnering. It considered the individual's point of view but not the partner's union or reproductive partner history. In additional analyses, we discriminated birth events by the other partners union and reproductive partner history. Because we were interested in the total cohort fertility, we focused our study on all births and their respective birth context, rather than analyzing parity specific birth. However, in supplementary analyses we reiterated equation 1 for first and higher-order births, separately.

We performed the same exercise for separate educational groups. We used the highest level of education attained by age 45 and dichotomized it into one group with tertiary education and one group without, using the 2012 ISCED schema (UNESCO, 2012). We used educational level as a stratifying variable instead of income because women's educational levels at age 45 were not sensitive to yearly fluctuations and did not change due to childbearing. At the same time, it was a valuable resource as human capital. Previous research have shown substantive differences in partnering, fertility, and other demographic behaviors across educational levels (Dronkers & Härkönen, 2008; Hoem, 1997; Jalovaara et al., 2021; Kalmijn, 2013; Perelli-

Harris et al., 2010; Sandström & Karlsson, 2019; Testa & Stephany, 2017; Van Bavel, 2014; Wood et al., 2014).

$$CTF = \sum_{n=1}^{k} f_{nx} \cdot p_{nx}$$

Equation 1

Results

Main results

Figure 2 describes the CFR of women as the sum of age and union-specific fertility rates (ASFR) from age 18 to 45. CFR was calculated as 1.86. About three-thirds of this fertility is derived from births in union, which is also the first entered union, and to a first reproductive partner. Thus, for a large majority in Finland today, births take place under the circumstances often associated with a traditional partnership context of birth. However, a substantive minority, about one-third of CFR, are from other types of partnership contexts. This means that births either occurred outside of a union, in higher-order unions, or with a higher-order reproductive partner.

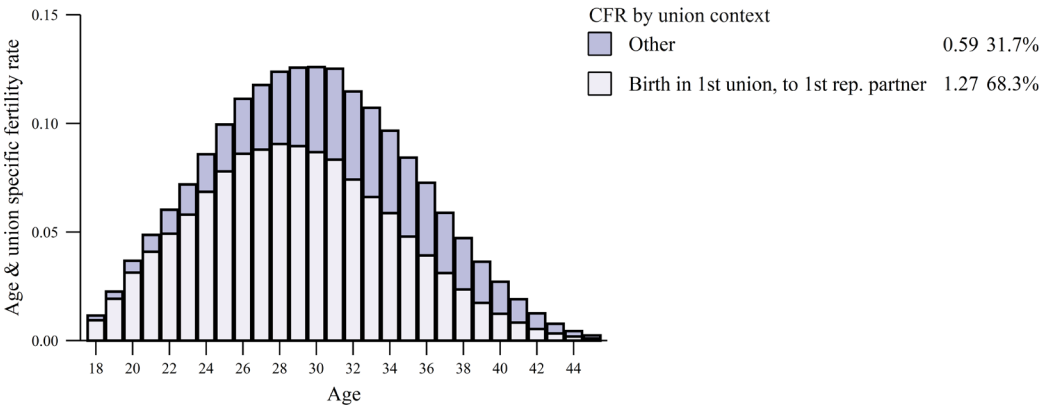


Figure 2. CFR by birth in different union context: births in first union to first reproductive partner versus all other union contexts. Finnish women born 1969-1976.

In Figure 3, we more closely analyze the separate partnering dimensions of union status (a), union order (b), and reproductive partner order (c). Single births account for 4.4% of CFR, while births after a first union dissolution account for almost one-third. Birth to higher reproductive partners, in other words, multi-partner fertility, accounts for roughly 7% of CFR. Each of these dimensions can overlap. For example, the majority of births outside of unions may also be births to higher-order reproductive partners. Accordingly, what share of births after first union dissolution, a large category, are within re-partnered unions? It is possible that a significant proportion of births in higher-order unions may be due to higher-order reproductive partners.

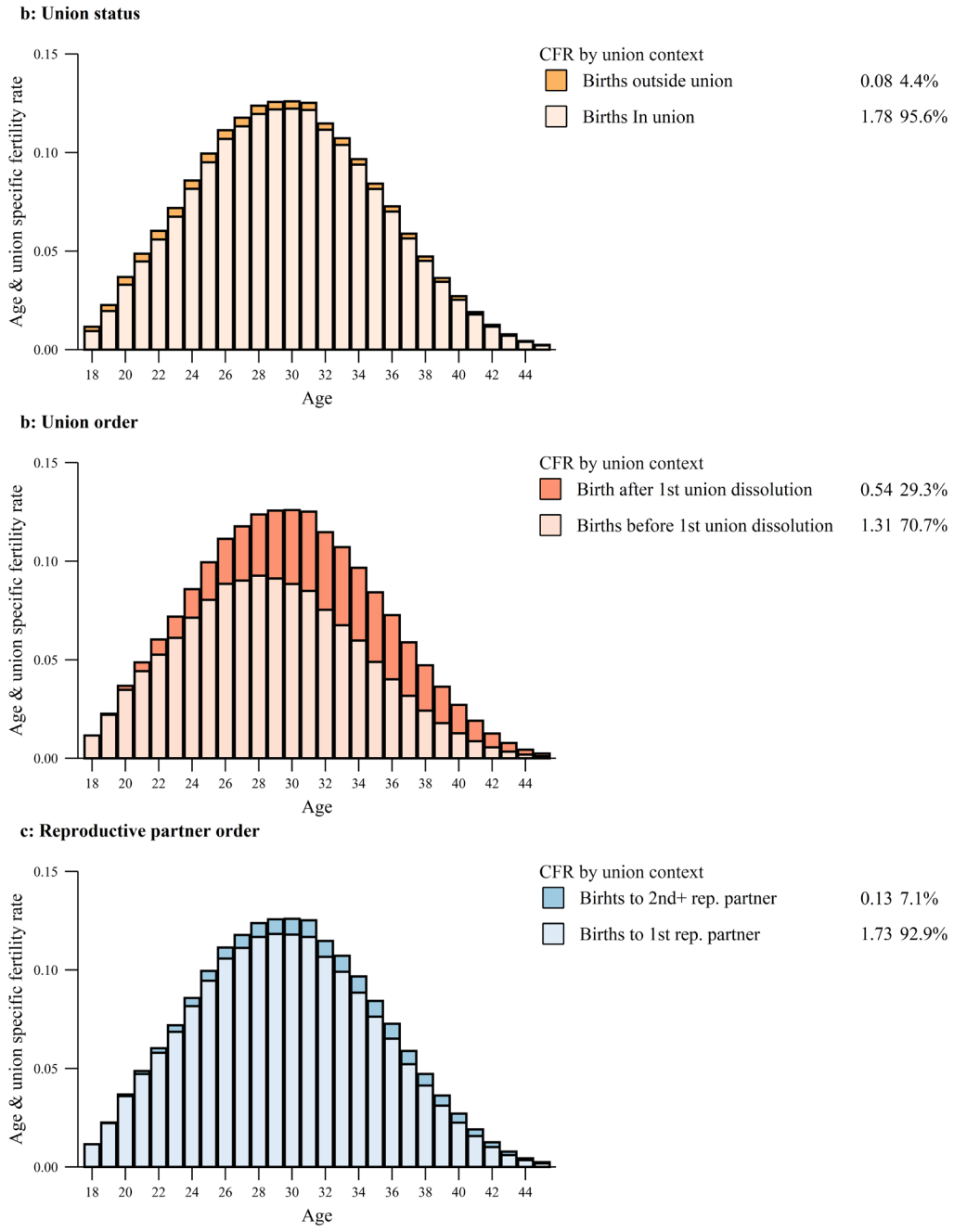


Figure 3. CFR by birth in different union context: births inside versus outside a union, births before versus after a first union dissolution, births to first versus higher-order reproductive partner. Finnish women born 1969-1976.

Figure 4 analyzes the overlap of partnering dimensions**.** Please note that Figure 4 separately displays the specific fraction of CFR contributed by single births only (a), births after union dissolution only (b), and births to higher-order partners (c). The rates on the right-hand side of the legend refer to total contribution to CFR, while the percentages refer to shares of specific birth contexts. For example, Fig 4a show that out of the total contribution of single births to CFR, 39.5% are due to births after first union dissolution and to a higher-order reproductive partner. Fig 4b show that 76.3% of the impact of births after first union dissolution comes from births to a first reproductive partner within a higher-order union: In other words, from a trajectory of dissolution of non-childbearing unions followed by re-partnering and childbearing. We can calculate the share of this union context in total fertility by dividing the rate sum with the CFR (0.42 / 1.86 = 22.5%). Fig 4c analyzes births to higher-order reproductive partners. Within the MPF contribution to CFR, the largest portion (61.1%) comes from births within a higher-order union. However, a large fraction within MPF is also due to single births, occurring either before or after a first union dissolution (24.3% + 6.3% = 30.6%).

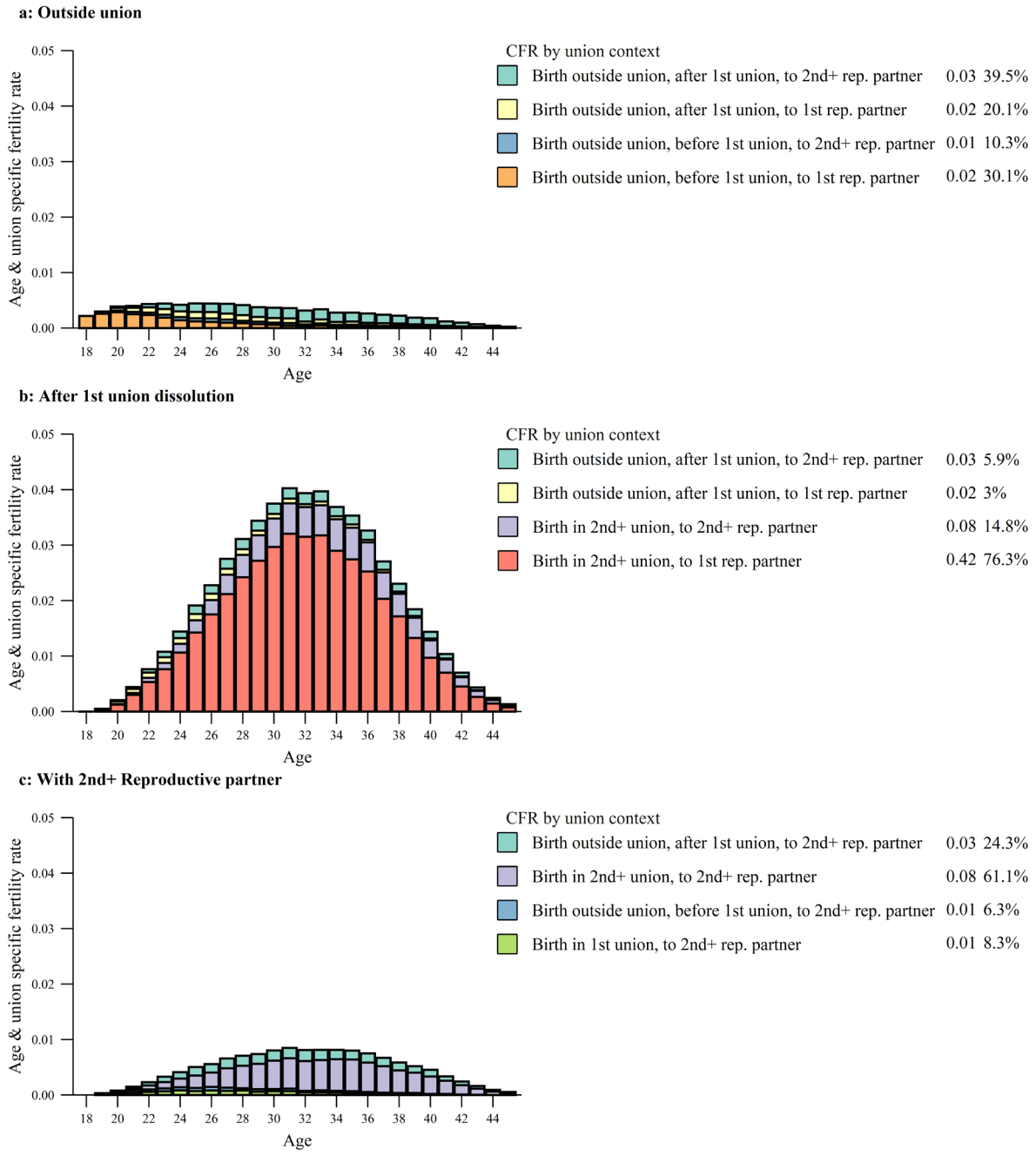


Figure 4. ASFR contributed to CFR of specific birth context: Births outside a union, births after a first union dissolution, births to higher-order reproductive partner. Finnish women born 1969-1976.

To better summarize the findings presented so far, Figure 5 shows ASFR from all union contexts but excluding the majority context, i.e., those within a first union with a first reproductive partner. Again, we see substantive heterogeneity across the studied behaviors. We also see, however, that the set is dominated (71.4%) by individuals who have children within a union with a first reproductive partner but who have dissolved one or more previous (childless) unions. In other words, the product of serial monogamy on aggregate fertility to a large extent reflects sequential transitions of childless unions.

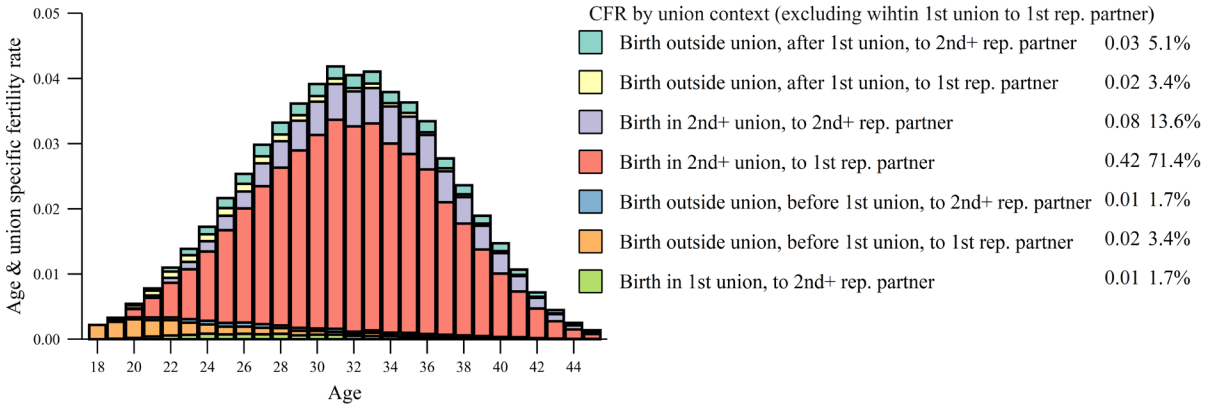


Figure 5. ASFR contributed to CFR of all birth context, excluding first births to first reproductive partners. Finnish women born 1969-1976.

Differences across sex and education

After establishing the size and the character of non-standard birth contexts in the full female population, we analyze how these aggregate statistics differ across educational level. To this end, we compare women with and without a tertiary degree. Table 1 describes female cohort fertility separately for those with and without tertiary education, decomposed into our eight partnership contexts of birth. Extensive literature has shown higher family complexity and more unstable partnering trajectories among the non-tertiary educated. A similar pattern is found in our measures, where CFR of the highly educated is a result of birth in the "traditional"

union context. The share of the CFR attributable to non-standard births differs by seven percentage points (35.4% among non-tertiary educated and 28.6% among tertiary educated).

Non-tertiary educated women have more heterogeneous birth contexts (35.4 % non-modal). There are substantial educational discrepancies within non-modal births contexts. The union context that we found to be the modal state for the full population (births in second unions to first reproductive partners) accounts for 59.7 % of the non-tertiary educated but about 81.6 % for the tertiary educated. Birth outside unions has a particularly small influence on the fertility of tertiary educated, whereas it adds up to almost a fifth of non-traditional ASFR among the non-tertiary educated. Overall, while men have lower CFR, the proportional contribution to CFR is very similar to that of women, and the educational gradient is somewhat more pronounced than in women. Age specific statistics are reported in appendix figures A1, A2, A12 and A13.

To summarize, educational differences in the total influence of non-standard births to CFR were salient, and there are large qualitative differences within non-traditional birth contexts. For the male population, and the educationally stratified population, all the results presented thus far are found expressed in age-specific birth rates in the appendix. There we can see that the well-established educational gradient in age-specific fertility rates is clearly reflected, with births at earlier ages being more common among the non-tertiary educated than the tertiary educated.

	Non-tertiary		Tertiary	
	Men	Women	Men	Women
Percent of CFR due to other than modal birth context (Not birth in first union, to first reproductive partner)	33.5 (1.63)	35.4 (1.94)	26.4 (1.82)	28.6 (1.79)
Percent of non-modal CFR due to:				
Birth outside union, after 1st union, to 2nd+ reproductive partner.	5.6	8.7	2.1	1.9
Birth outside union, after 1st union, to 1st reproductive partner.	3.7	2.9	2.1	1.9
Birth within union, in 2nd + union, to 2nd reproductive partner.	16.7	17.5	10.4	9.7
Birth within union, in 2nd + union, to 1st reproductive partner.	66.9	59.7	81.4	81.6
Birth outside union, before 1st union, to 2nd+ reproductive partner.	1.9	1.5	<0.1	<0.1
Birth outside union, before 1st union, to 1st reproductive partner.	5.6	5.8	2.1	1.9
Birth within union, in 1st + union, to 2nd+ reproductive partner.	1.9	2.9	2.1	1.9

Table 1: Female cohort fertility (measured until age 45) and male cohort fertility (measured until age 50) by attainment of tertiary education.

Supplementary analyses

Our analyses have to this point considered partnership context of birth from the individual's perspective. Birth context can of course also be analyzed from a dyadic perspective, taking into account both partner's union or reproductive partner history. In Figures A3 and A4, we

discriminate birth context by both partners union order history and reproductive partner order history. The "modal" context decreases substantively, now accounting for only 58% of tertiary educated female CFR and about half of non-tertiary educated female CFR. It is worth noting that, in the dyadic approach, we under-count the non-modal contribution to CFR, as some of the partner's previous unions occurred prior to 1987. Finally, appendix Figures A5 & A6 present the relative union context contribution to CFR by parental status.

Discussion and Conclusions

Demographers have applied a multitude of approaches to describe the relationship between partnership and fertility. However, few directly relate specific partnership states to completed fertility. We have argued that such a measure would add to understanding the overall partnering and fertility behavior of contemporary societies, characterized by union dissolution and re-partnering.

Drawing on Thomson et al. (2021), we have provided the first cohort study analysis in which cohort fertility is decomposed by partner contexts at risk of birth. We decomposed total cohort fertility into age and union-context-specific births rates and used a schema that accounts for the combination of overlapping dimensions, namely (i) before versus after a first union dissolution, (ii) within versus outside of unions, and (iii) while at risk of birth to a first versus a higher-order reproductive partner.

We find that roughly three-quarters of completed fertility is due to births that occur within a union, which is the individual's first union, with a partner who is their first reproductive partner. Of the remaining quarter of cohort fertility from births in other types of partner contexts, between 60 and 70 percent is due to birth in a second or higher-order union to a first reproductive partner, while multi-partner fertility and single births together account for the

remaining share. Single birth and MPF account for less than 13 percent of CFR, corroborating earlier results on the topic using synthetic cohorts (Thomson et al., 2021). We observe clear disparities between the population with and without tertiary education. Non-tertiary educated women had six percentage points higher share of births that were not in first unions to first reproductive partner. Out of this quantity, three-quarters were either births outside of union or multi-partner fertility, compared to about half in the tertiary educated group. These patterns are largely repeated in the male population. However, when we consider both index person's and its partner's union and reproductive partner history, we find that the non-modal birth contexts approach half of births among non-tertiary educated women.

To what extent does this description support the notions of standard and non-standard partnership conditions for childbearing? On the one hand, we demonstrate that—to the extent that moving in with a first partner and having children within that union can be considered one aspect of a standard model—the Finnish population is reproduced mostly via a single, homogenous pattern of partnering and childbearing of individuals. This result complements the often purported picture of transient relationships preceding childbearing in Finland. Proponents of various life course de-standardization theses will, at any rate, have to acknowledge that the behavior of moving in with a first partner and having children with this person displays enough "deep roots" (cf. Wu & Li 2005) to remain the main mode of reproduction also in a contemporary society that is fairly uncommitted to the institution of marriage and life-long unions. Yet, a sizable part of cohort fertility stems from births (to a first reproductive partner) in people's second or higher-order unions. This speaks towards the relevance of the concept of serial monogamy as a ubiquitous partnering regime in Finland (De La Croix & Doepke, 2003; Lichter & Qian, 2008): People find a reproductive partner for life and have children within this union but transit between sequences of unions before (or after) this period of life. The influence of serial monogamy on CFR is particularly brought to bear when measured from a dyadic

perspective rather than the results of an individual's trajectory (although we think both viewpoints have merit). Finally, it is worth noting that the partnering behavior dimensions which are most often associated with risk factors in terms of wellbeing (Reproductive partner order and union status) are small partnership contexts of birth: MPF and single parenthood can be salient features of the life course without this being reflected in the conditions of childbirth.

Our findings can also be seen as a different perspective to view the diverging destinies framework at a population level. High and low educated individuals CFR in terms of partnership context of birth show a palpable discrepancy. The later see much more heterogeneity, and higher contribution of single births and births higher order reproductive partners.

Ultimately, a concept such as "standard" or non-standard" are qualitative constructs that cannot be defined from our data alone (Liefbroer, 1999; Thomson et al., 2013). Rather than concluding whether contemporary family dynamics are heterogeneous or uniform, this study are best used to show which aspects display uniformity and which aspects display heterogeneity. To this end, by describing partnering and childbearing through the left of cohort fertility rates, our findings provide a new empirical perspective to assess variation of the life course and the role of union formation and dissolution for fertility (Esping-Andersen & Billari, 2015; Goldscheider et al., 2015).

It is worth noting that we do not argue that single parenthood and family complexity, including half-siblingship and step-relations, are rare occurrences. Instead, we stress that a variety of family conditions develop across the life course, while, at the same time, the bulk of childbearing mainly occurs within the most common one—in unions with first reproductive partners. This distinction between life course experiences, on the one hand, and states where

births take place, on the other hand, is important and underexplored in considerations of fundamental underpinnings of fertility.

The fact that CFR is dominated by modal a partner context of birth associated with the "traditional" conditions of childbearing prevails in particularly the Finnish context speaks to the importance of first unions as reproductive contexts. First, in comparison to other industrialized countries, Finnish fertility is high, reaching close to replacement fertility in the most recent cohorts with completed childbearing. Fertility is high partially because of higher-order births, which means that there is ample space for births to higher-order reproductive partners or births after childbearing union dissolution. In a European context, the mean age at first birth is moderately high, another factor which favor non-modal birth contexts. Second, Finland and the Nordic countries have a long history of union dissolution and re-partnering, which generate opportunities for "non-standard" birth contexts (Thomson et al., 2012). Finally, the institutional context is one of high FLMP, socialization of childcare, and social transfers, such as affordable daycare, parental leave, and welfare coverage. Hence, the necessity for establishing and maintaining two-headed households, which promotes a standard partnering birth context, is lower in Finland relative to many other countries. In summary, many factors promoting the non-modal partnership contexts of birth are present in Finland, possibly suggesting that our estimates are among the upper bounds in a comparative perspective.

The limitations in data and scope of this study set several challenges ahead for future research to produce stylized facts on the contribution of partner context to fertility rates. This study has taken an individual perspective, and family structures on the partner's side and the influence of births in step-family contexts is yet to be studied. We also lack in identifying qualitative aspects of union contexts. MPF births, for example, may be the result of unintentional pregnancies or the result of family planning of individuals in LAT relationships with co-residing children from previous unions. Yet, the usefulness of relatively crude aggregate

metrics such as the ones used in this study, is that it facilitate future cross-comparative work and comparison, as shown by recent work using the gender and generations study (Thomson et al., 2021). Particularly, expanding the scope of comparative research to a global scale, such as contrasting low- and middle-income countries or culturally distinct regions, appears a fruitful venue for future research. Finally, our cohort perspective does not allow us to explore the pattern of more recent cohorts who have yet to complete their reproductive careers (Rahu & Jalovaara, 2022). Partnership behaviors have changed rapidly in the past, and this may very well be reflected in the partnership contexts of births of future generations.

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Data availability statement

Access to the population registers on which the study is built is restricted, and can be achieved via Statistics Finland upon purchase, research application and ethics approval.

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Appendix

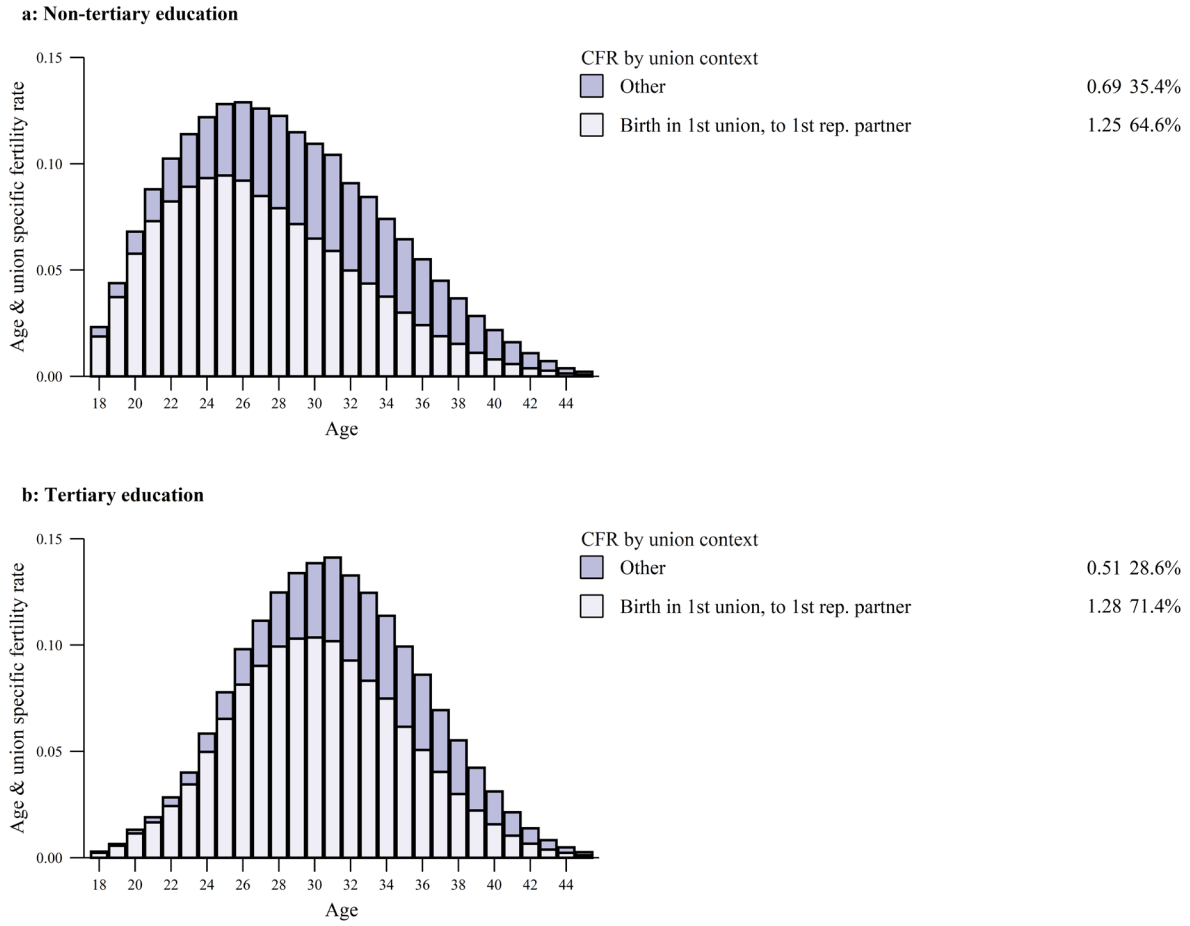


Figure A1. CFR by birth in different union context: births in first union to first reproductive partner versus all other union contexts. Finnish women born 1969-1975 with and without tertiary education.

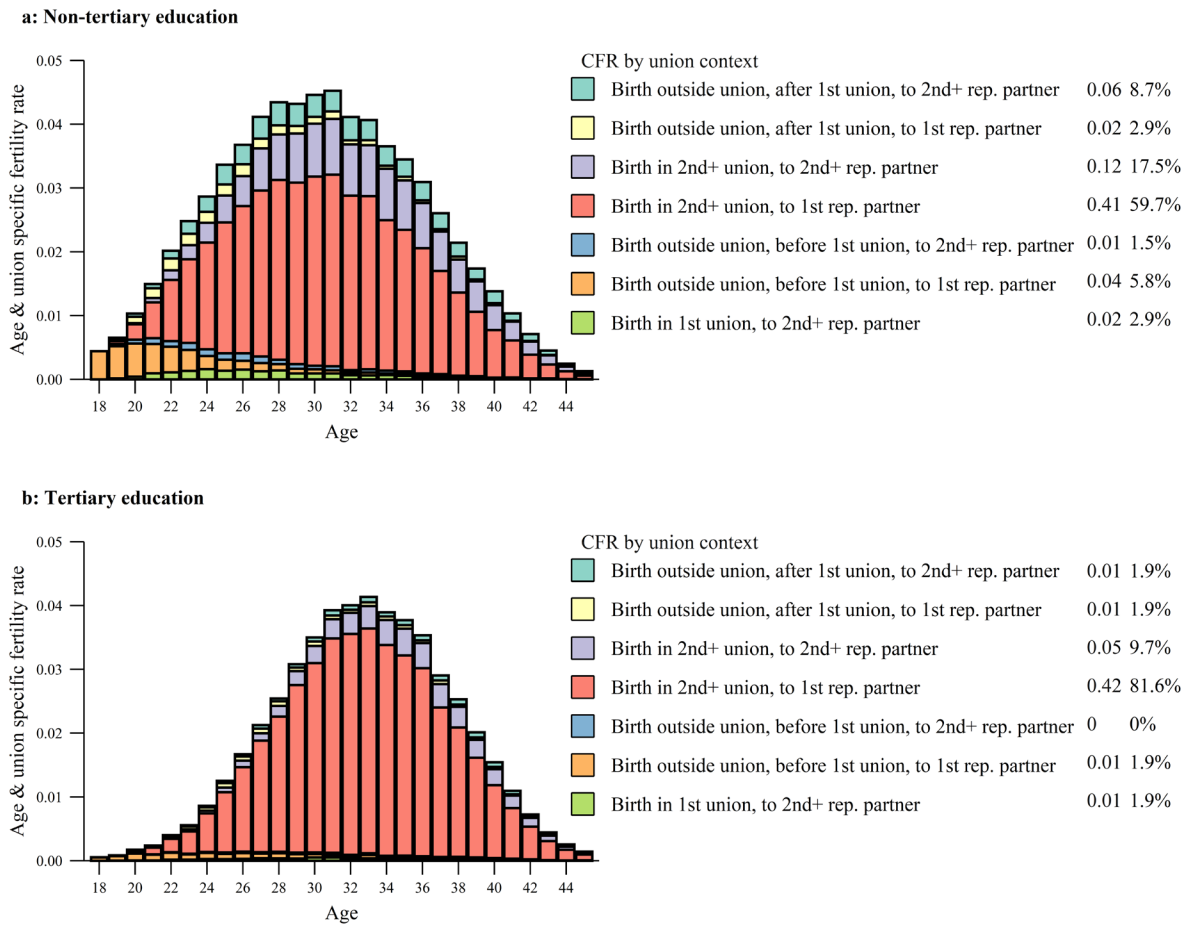


Figure A2. ASFR contributed to CFR of all birth context, excluding first births to first reproductive partners. Finnish women born 1969-1975 with and without tertiary education.

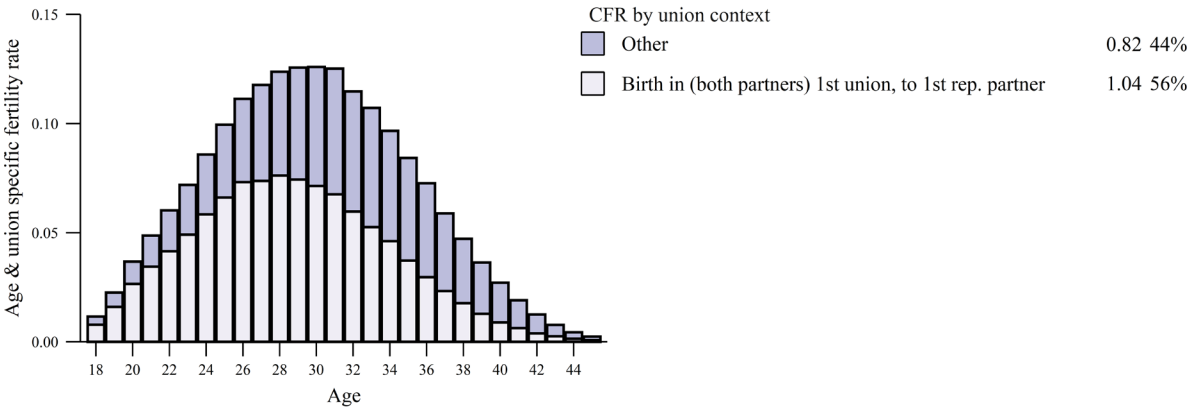


Figure A3. CFR by birth in different union context: births in first union to (both partners) first reproductive partner versus all other union contexts. Finnish women born 1969-1975.

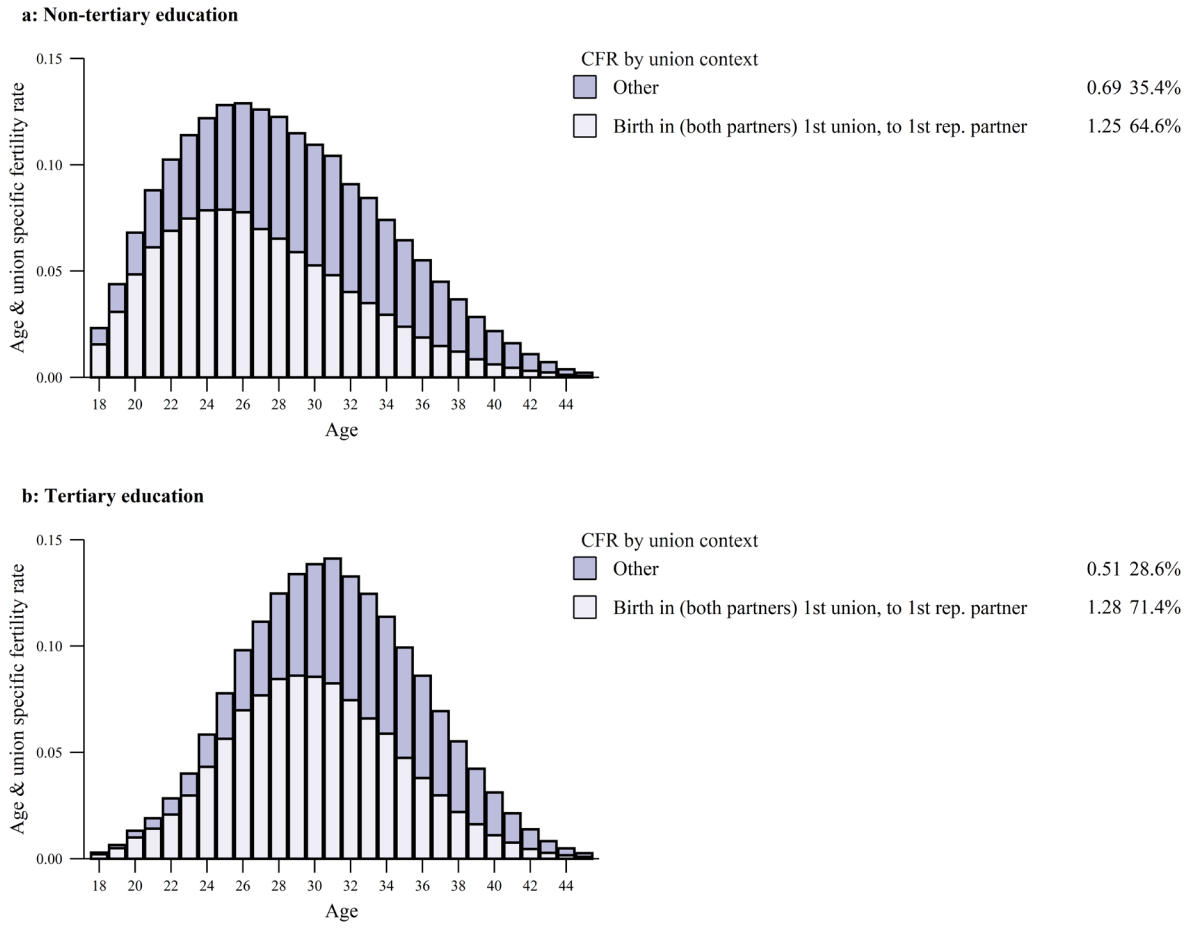


Figure A4. CFR by birth in different union context: births in (both partners) first union to first reproductive partner versus all other union contexts. Finnish women born 1969-1975 with and without tertiary education.

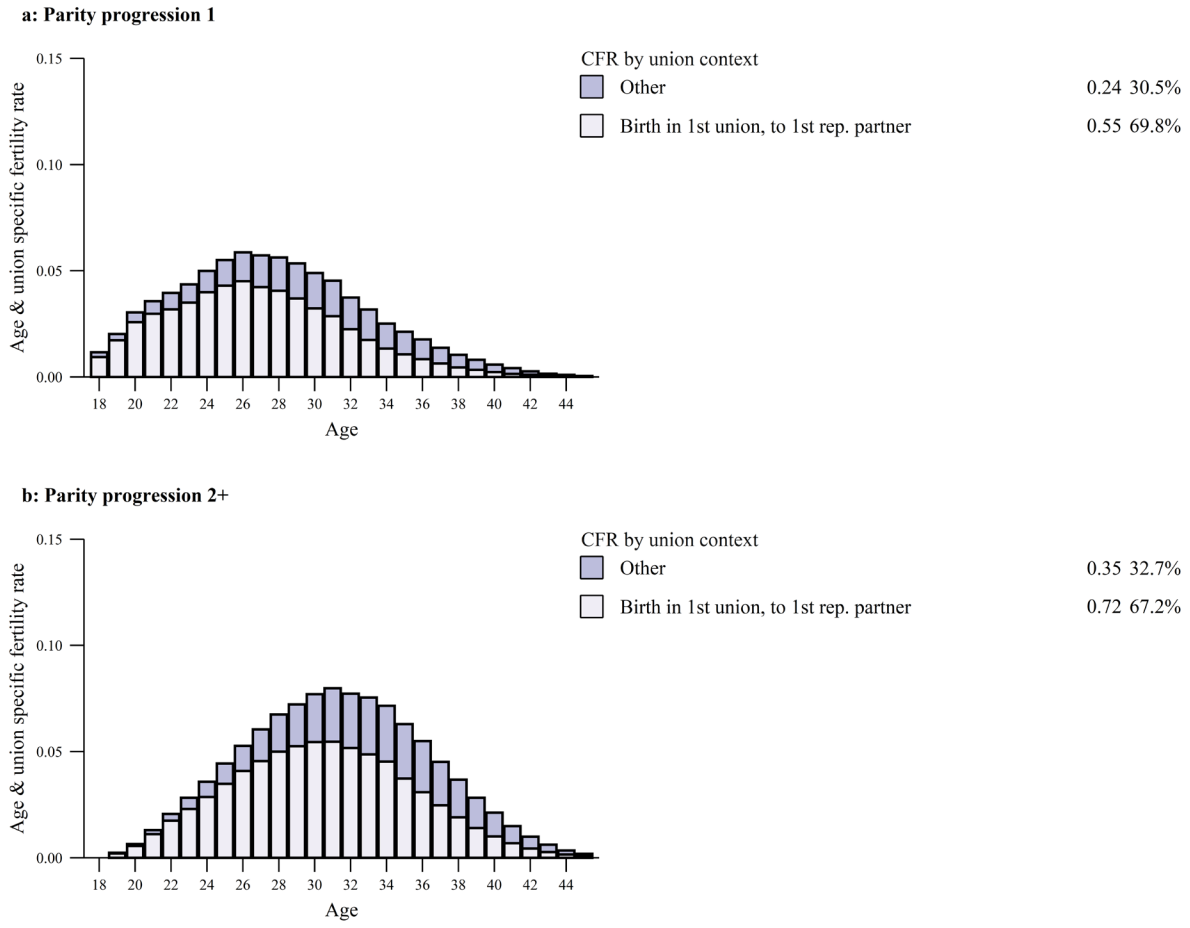


Figure A5. CFR by birth in different union context by parental status: births in first union to first reproductive partner versus all other union contexts. Finnish women born 1969-1975.

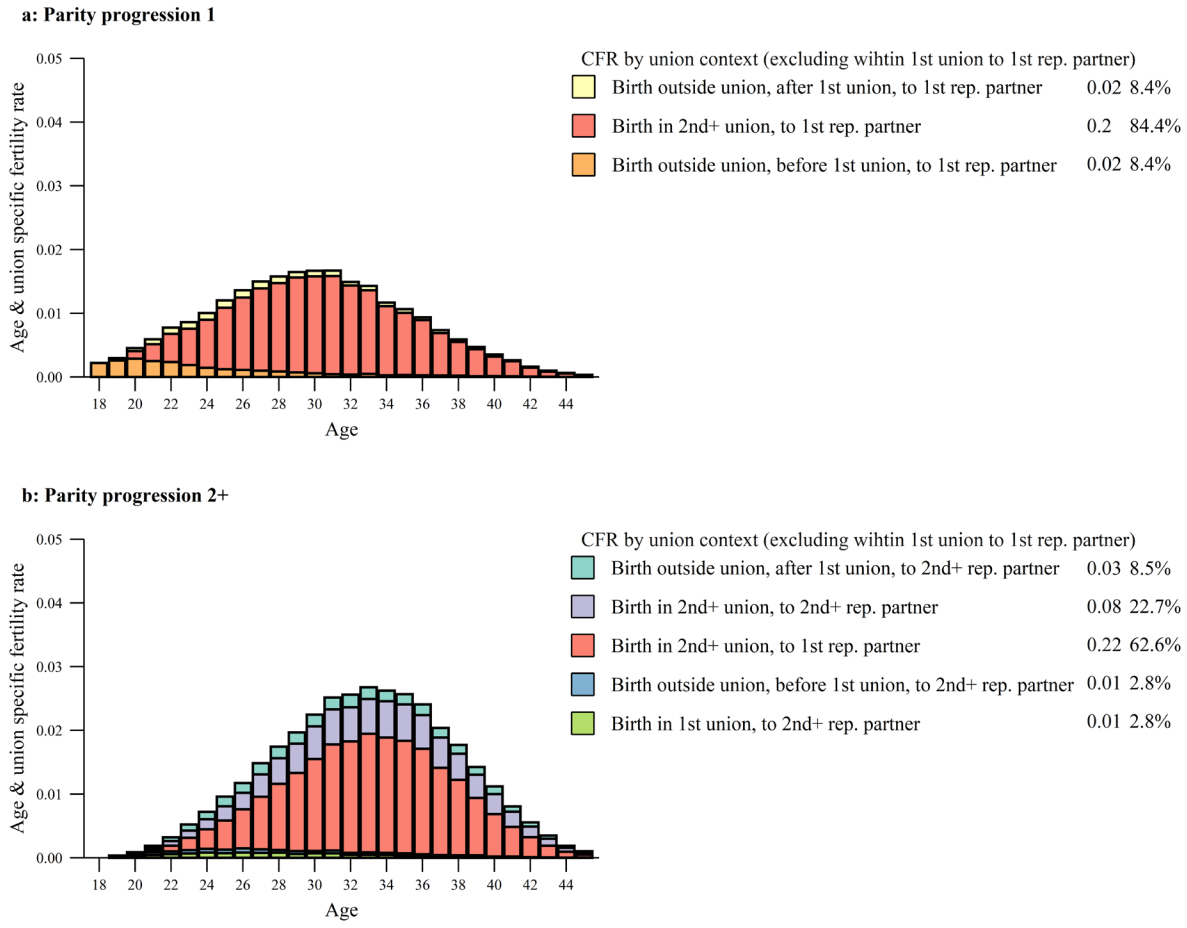


Figure A6. ASFR contributed to CFR of all birth context by parental status, excluding first births to first reproductive partners. Finnish women born 1969-1975.

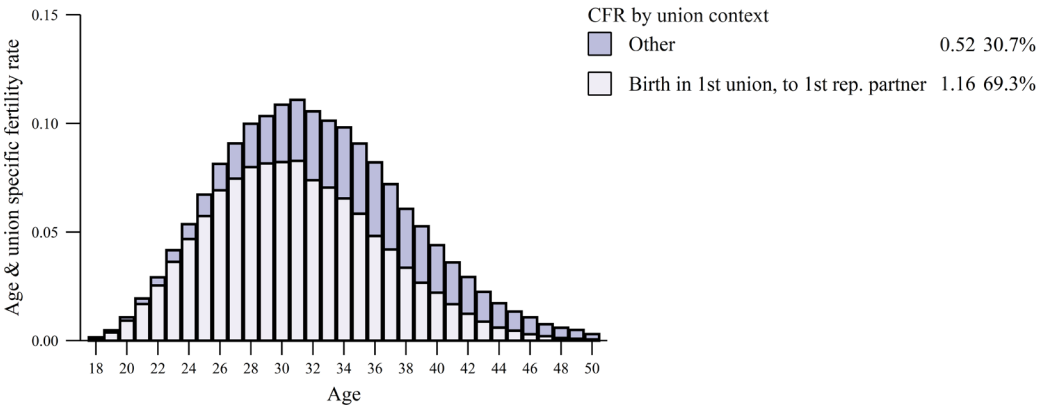


Figure A8. CFR by birth in different union context: births in first union to first reproductive partner versus all other union contexts. Finnish men born 1969-1970.

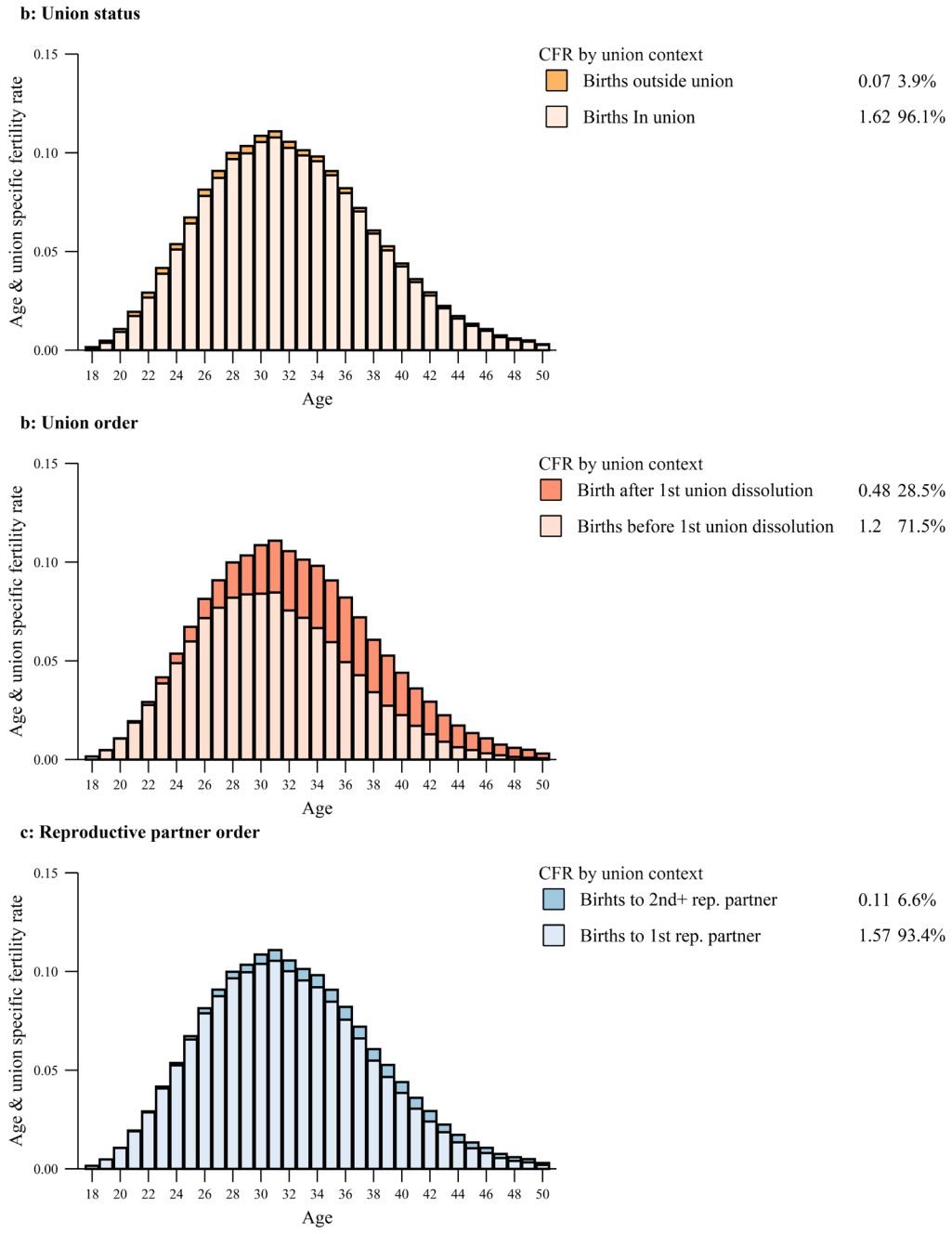


Figure A9. CFR by birth in different union context: births inside versus outside a union, births before versus after a first union dissolution, births to first versus higher-order reproductive partner. Finnish men born 1969-1970.

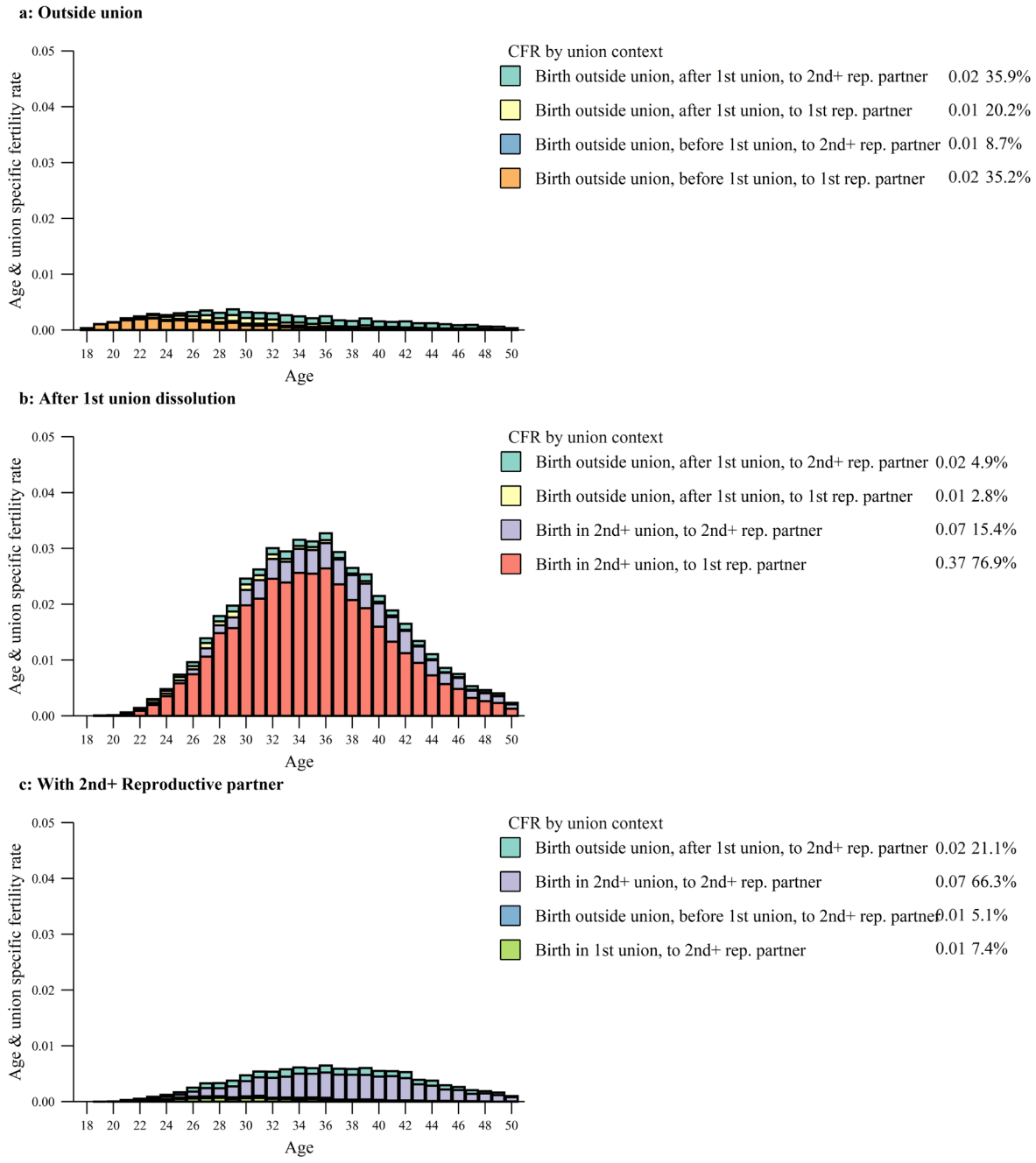


Figure A10. ASFR contributed to CFR of specific birth context: Births outside a union, births after a first union dissolution, births to higher-order reproductive partner. Finnish men born 1969-1970.

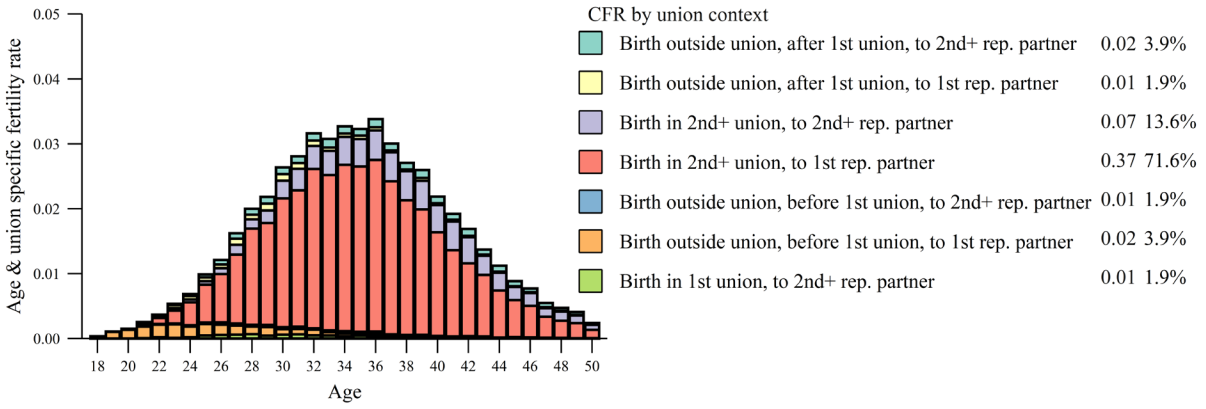


Figure A11. ASFR contributed to CFR of all birth context, excluding first births to first reproductive partners. Finnish men born 1969-1970.

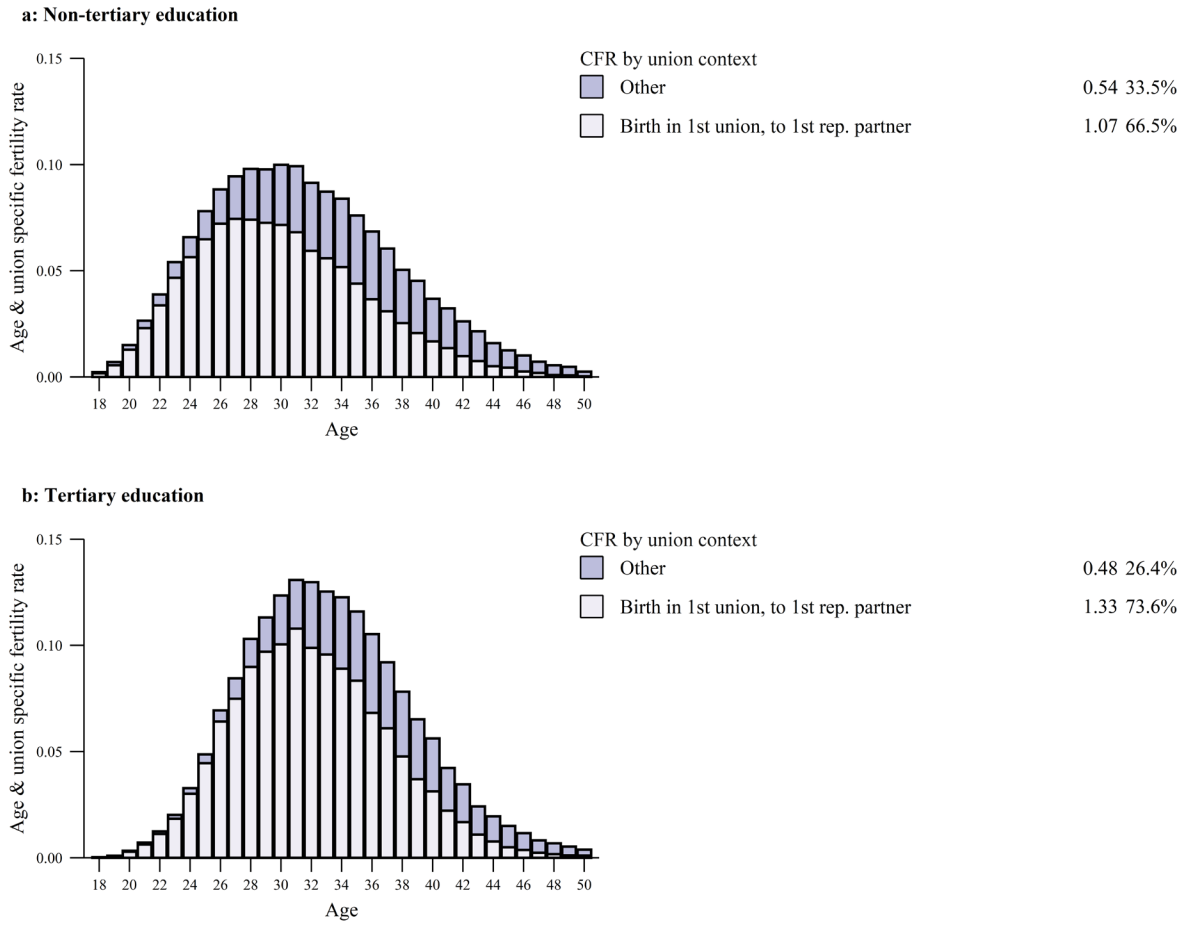


Figure A12. CFR by birth in different union context: births in first union to first reproductive partner versus all other union contexts. Finnish men born 1969-1970, by tertiary educational attainment.

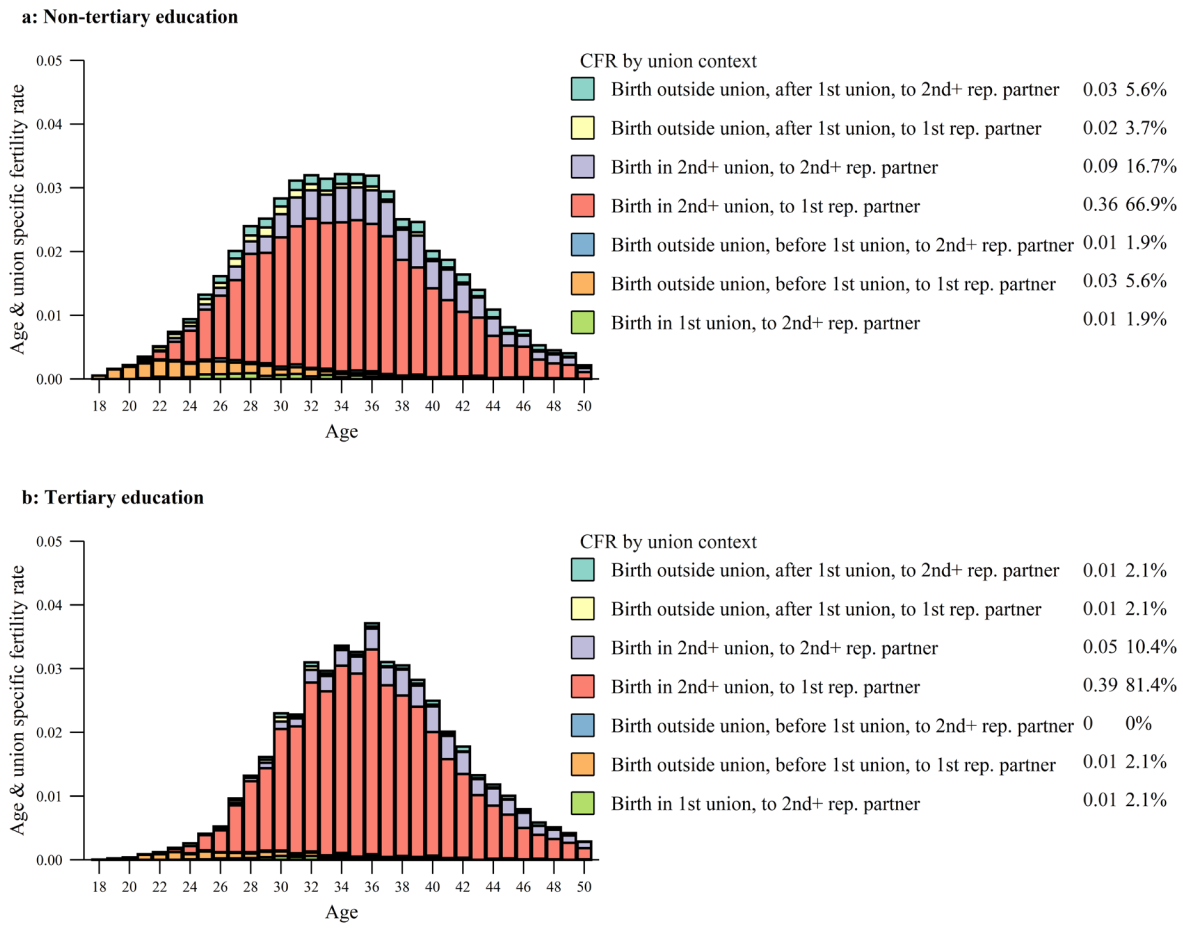
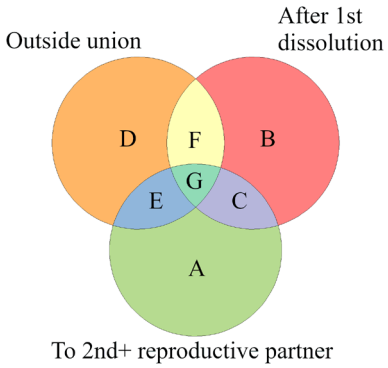
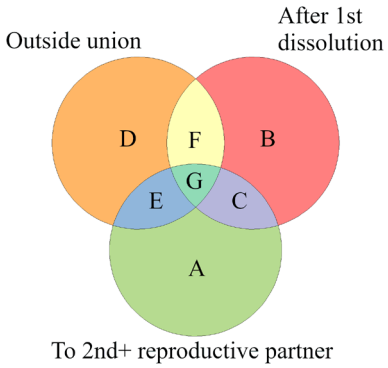


Figure A13. ASFR contributed to CFR of all birth context, excluding first births to first reproductive partners. Finnish men born 1969-1970, by tertiary educational attainment.



Risk of birth states	PY	births
X (Excluded in Venn diagram): Birth in first union, to first reproductive partner.	2,614,548	276,919
A: Birth in first union, to higher-order reproductive partner.	102,240	7,882
B: Birth in higher-order union, to first reproductive partner.	874,965	874,965
C: Birth in higher-order union, to higher-order reproductive partner.	197,220	16,954
D: Birth outside union, before first union dissolution, to first reproductive partner.	1,786095	7,503
E: Birth outside union, before first union dissolution, to higher-order reproductive partner.	160,504	3,385
F: Birth outside union, after first union dissolution, to first reproductive partner.	540,136	3,460
G: Birth outside union, after first union dissolution, to higher-order reproductive partner.	510,356	7,356

Table A1. Union contexts at risk of birth. Person-years and births of women born from 1969 to 1975.



Risk of birth states	PY	births
X (Excluded in Venn diagram): Birth in first union, to first reproductive partner.	725,624	66,703
A: Birth in first union, to higher-order reproductive partner.	8,588	480
B: Birth in higher-order union, to first reproductive partner.	247,412	21,437
C: Birth in higher-order union, to higher-order reproductive partner.	71,552	4,298
D: Birth outside union, before first union dissolution, to first reproductive partner.	597,503	1.340
E: Birth outside union, before first union dissolution, to higher-order reproductive partner.	10,047	332
F: Birth outside union, after first union dissolution, to first reproductive partner.	127,846	768
G: Birth outside union, after first union dissolution, to higher-order reproductive partner.	129,472	1,368

Table A2. Union contexts at risk of birth. Person-years and births of men born 1969 to 1970.

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106 91 Stockholm,
Sweden
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