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Descriptive Finding

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Abstract

BACKGROUND
Education is positively associated with completed fertility rate (CFR) among men in Nordic countries, but the age patterns of fertility by educational level are poorly documented. Moreover, it is not known what parities contribute to the higher CFR among more highly educated men.

OBJECTIVE
To describe men's fertility by age, parity, and education in Finland.

METHODS
The study is based on register data covering the male cohort born in 1940–1950 (N=38,838). Education was measured at ages 30–34 and classified as basic, lower secondary, upper secondary, and tertiary. Fertility was measured until ages 59–69. We calculated completed and age-specific fertility rates, and decomposed the educational gradient in CFR into parity-specific contributions.

RESULTS
The more highly educated men had more children (CFR: basic 1.71 and tertiary 2.06), had them later (mean age at having the first child: basic 26.1 and tertiary 28.1), and had them within a shorter interval (interquartile range of age at having the first child: basic 5.8 and tertiary 5.2). The educational gradient in the cumulative fertility rate was negative at young ages but turned positive by the early thirties. High levels of

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childlessness among those with a basic education explained three-quarters of the CFR difference between the lowest and highest educational groups. Fertility at ages above 45 was low and did not widen the educational gradient in CFR.

CONCLUSIONS
The fact that highly educated men have more children than their counterparts with less education is largely attributable to higher fertility levels at older ages and the lower probability of remaining childless. Variation in fertility timing and quantity is wider among men with a low level of education.

1. Introduction

Education plays a central role in shaping the life courses of men and women (Thomson, Winkler-Dworak, and Kennedy 2013). There has been long-standing interest in educational differences in fertility among women, but less attention has been paid to men in this respect. Men who acquire higher levels of education become fathers at older ages than their peers with less education (Liefbroer and Corijn 1999; Corijn and Klijzing 2001; Kneale and Joshi 2008; Zhang 2011). At older ages, however, having a higher education may promote family formation and fertility e.g. through greater success in the marriage market and better abilities of affording children (Becker 1981; Oppenheimer 1988). Consequently, educational differences in fertility rates probably vary across different stages of the male life course.

Evidence from the Nordic countries indicates that highly educated men, at least in younger birth cohorts, have lower levels of childlessness and higher average completed fertility than their counterparts with less education (Nikander 1995; Fieder and Huber 2007; Kravdal and Rindfuss 2008; Goodman and Koupil 2010; Rønsen and Skrede 2010; Lappegård, Rønsen, and Skrede 2011). Outside the Nordic countries the association between education and fertility varies from positive through flat to negative (Kiernan 1989; Toulemon 2000; Weeden et al. 2006; Keizer, Dykstra, and Jansen 2008; Nettle and Pollet 2008; Toulemon, Pailhé, and Rossier 2008; Parr 2009; Kneale and Joshi 2008; Barthold, Myrskylä, and Jones 2012; Thomson, Winkler-Dworak, and Kennedy 2013). Relatively little is known about how men's educational level relates to higher-order parity transitions (Toulemon 2000; Oláh 2003; Kravdal 2007; Lappegård and Rønsen 2013), but the transition to parenthood is likely to dominate the educational gradient in fertility (Fieder and Huber 2007). The discrepancies in the studies may reflect differences in data quality and fertility measurements (Rendall et al. 1999; Juby and Le Bourdais 1999), or true contextual differences between countries.

We analyse a Finnish cohort born in 1940-1950 and provide a detailed description of men's fertility by age, parity, and educational level. Our aim is to enhance understanding of the role of age in men's education–fertility gradient. Our specific study questions are:

- How does fertility vary by age and educational group?
- What parities drive the educational differences in completed fertility?
- Until what age does fertility need to be measured to fully capture the educational gradient in completed fertility?

We stratify the analysis by marital history because fertility is higher among married men (Goodman and Koupil 2010) and education is a significant determinant of marital status (Lyngstad and Jalovaara 2010; Jalovaara 2012). In addition, we make comparisons with Finnish women comprising the respective birth cohort in order to contextualize our findings.

2. Data and methods

The data were based on a 10% sample of households drawn from the 1950 Finnish Census of Population (Statistics Finland 1997). These data have subsequently been linked to quinquennial census information in 1970–1995, and to birth records up to 2009. Of the 48,460 men in the original sample who were born in 1940–1950 and belonged to the household population in 1950, 91% could be linked to other sources of information via personal identification codes. Of these, 41,226 were present in the census at the age of 30–34 (1970/75/80), and information on the level of education was thus available. Those not present in the census at the age of 45-49 were excluded from the dataset (N=2,386). Two observations were further dropped due to the unrealistic value of age at having the first child. The final sample consisted of 38,838 men. Loss to follow-up was mainly attributable to emigration, in particular to Sweden in the late 1960s and early 1970s, and to a lesser extent to mortality between 1950 and the year of reaching the age of 45–49. The data on women were derived from the original dataset with the same criterion as for the men (N=36,806).

Monthly information on biological children born alive was linked to data on birth records from 1970 to 2009. Children born before 1970 were included except for those who did not live with their fathers at the time of the population census in 1970, when personal identification codes were in use. This may introduce selective bias in our fertility measurement (see Nelson 2004). With regard to the 1970 census, among women born in the early 1940s in these data, those with a low level of education were

more likely to be living alone with children. According to a survey of women, however, only 5% of children were born out of wedlock in the period 1966-1970 (Finnäs 1993). The study participants were 59–69 years old at the end of the follow-up. In our sample, completed fertility rate (CFR) was similar among men (1.81) and women (1.86), thus we expect any bias attributable to unknown paternity to be small.

The level of education was measured at the age of 30–34 and categorized as basic (45%), lower secondary (28%), upper secondary (14%), and tertiary (14%). The basic level refers to nine years or less of general education; lower secondary education refers to a brief period of vocational training (<3 years) in addition to general education; upper secondary education refers to either further general studies (the matriculation examination) or vocational training (≥3 years) in addition to general education; and tertiary education refers to a university degree or vocational training at the highest level.

Marital history was categorized as never-married (18%), intact-married (first marriage not dissolved due to divorce or the partner's death: 52%), divorced/widowed (20%), and remarried (11%), based on longitudinal information on the formation and dissolution of marital unions. Marriages that were formed and dissolved before 1970 were not observed. Longitudinal information on cohabitation was not available, but it was still relatively uncommon in the birth cohort under study, becoming more common in Finland from the early 1970s (Finnäs 1993). According to a survey of men born in 1943-1947, around 5% were cohabiting when their first child was born, and a similar proportion were neither cohabiting nor married (Nikander 1995). Having the first child in a cohabiting union was more common among men with a lower level of education.

Age-specific fertility rates were calculated for each one-year age group and educational group separately. Given that we were calculating fertility for a cohort surviving to the age of 45–49, for all ages in the denominator we used a constant number of person years at risk, the number of men in the sample who were alive and resident in Finland at the age of 45–49. The results were robust for men who were present in the data at the age of 30–34 but not at 45–49 (N=2,386). We used arithmetic means and interquartile ranges (IQR) for location and variation in fertility. We also calculated standard deviations, the results of which were similar to those of the IQRs.

Educational gradient in CFR was decomposed into differences in progress to parities one, two, three, and four or higher. Those with a basic education comprised the reference group. The decomposition was based on deriving the cohort's completed fertility rate from its parity progression ratios:

$$CFR = P_0 + P_0P_1 + P_0P_1P_2 + \cdots = \sum_{i=0}^{\infty} \prod_{j=0}^{i} P_j$$

where P_i expresses the probability of progressing from parity i to parity $i+1$ conditional on having progressed to parity i. The contribution of each P_i to the total difference in *CFR* between the two educational groups was approximated by

$$\Delta CFR = \sum_i \left(\frac{\partial CFR}{\partial P_i}\right) \Delta P_i$$

where each partial derivative $\frac{\partial CFR}{\partial P_i}$ was calculated as an average between the reference group and the other educational group, and ΔP_i is the difference in parity progression ratio i between the educational groups (Pullum, Tedrow, and Herting 1989). Stata version 11 (StataCorp 2009) was used for the data analysis.

3. Results

The level of education in the Finnish male cohort born in 1940–1950 was low: almost half of the men (45%) were educated only to the basic level. Completed fertility rate (CFR) was 1.81 children. The CFR in the group with a tertiary education was 20% higher than among those with a basic education (over two at 2.06 and well under two at 1.71 respectively: see Table 1).

The average number of children among those who had any (80.6%) was 2.24. The mean age at having the first child was 26.6, as opposed to 30.1 and 34.0 for the second and third children respectively. The mean age at having a child of any parity was 29.6.

Figures 1a–b show men's age-specific fertility by education and in contrast to that of women. Men made the transition to parenthood later than women (mean age at having the first child: 26.6 and 24.5 respectively) and had higher fertility levels at older ages. Men reached 90% (95%, 99%) of their cumulative fertility rate at age 38.3 (41.6, 48.4), whereas women reached this percentile at the age of 35.1 (37.6, 41.6). In general, fertility was slightly less concentrated around the mean childbearing age among men than among women (the IQR of having a child of any parity was 7.9 years for women and 8.4 for men).

The fertility rate peaked later in the more highly educated groups of men: namely at the age of 24 among those with a basic education compared with 28 among those with a tertiary education (Figure 1a). Men in their late teens and early twenties with a lower level of education had higher fertility levels than their more highly educated counterparts. The difference narrowed in their mid-twenties, and by their late twenties the positions had reversed: from the age of 26 onwards those with a tertiary education had higher fertility rates than their counterparts with a basic education (except for a few older age groups registering very few births).

Table 1: Completed fertility rate (CFR) and fertility timing, Finnish male cohort born in 1940–1950, N=38,838

	N	Mean	SE[1]	N	Mean	SE[1]
		CFR		CFR of children born after the first one[2]		
Basic	17,422	1.71	0.01	13,250	1.25	0.01
Lower secondary	10,778	1.80	0.01	8,845	1.19	0.01
Upper secondary	5,271	1.90	0.02	4,511	1.22	0.02
Tertiary	5,367	2.06	0.02	4,716	1.35	0.02
Total	38,838	1.81	0.01	31,322	1.24	0.01

	N	Mean	SE[1]	IQR	Lower quart.	Upper quart.
Age at having a child of any parity						
Basic	29,817	29.0	0.05	8.7	24.2	32.9
Lower secondary	19,401	29.3	0.06	8.5	24.5	33.0
Upper secondary	10,001	30.3	0.08	7.9	25.8	33.7
Tertiary	11,071	31.1	0.07	7.2	27.0	34.2
Total	70,290	29.6	0.03	8.4	24.9	33.3
Age at having the 1st child						
Basic	13,250	26.1	0.05	5.8	22.6	28.4
Lower secondary	8,845	26.3	0.05	5.8	22.8	28.6
Upper secondary	4,511	27.2	0.07	5.8	23.8	29.6
Tertiary	4,716	28.1	0.07	5.2	25.1	30.3
Total	31,322	26.6	0.03	5.9	23.1	29.0
Age at having the 2nd child						
Basic	9,987	29.4	0.06	7.1	25.5	32.6
Lower secondary	6,721	30.0	0.07	6.8	26.1	32.9
Upper secondary	3,573	30.9	0.09	6.2	27.4	33.6
Tertiary	3,919	31.4	0.08	5.5	28.2	33.7
Total	24,200	30.1	0.04	6.7	26.4	33.1
Age at having the 3rd child						
Basic	4,177	33.2	0.10	8.5	28.6	37.1
Lower secondary	2,585	33.9	0.11	7.5	29.9	37.4
Upper secondary	1,305	35.0	0.16	7.4	31.1	38.5
Tertiary	1,665	35.3	0.14	6.6	31.5	38.1
Total	9,732	34.0	0.06	7.7	29.8	37.5

[1] In the calculation of standard errors of means the clustering of the dataset (the data include brothers who lived in the same households in 1950 as children) was taken into account by Taylor-linearized variance estimation (which slightly increases the SE estimates).

[2] Among fathers only.

Figure 1a: Age-specific fertility rate by level of education, Finnish male cohort born in 1940-1950, N=38,838

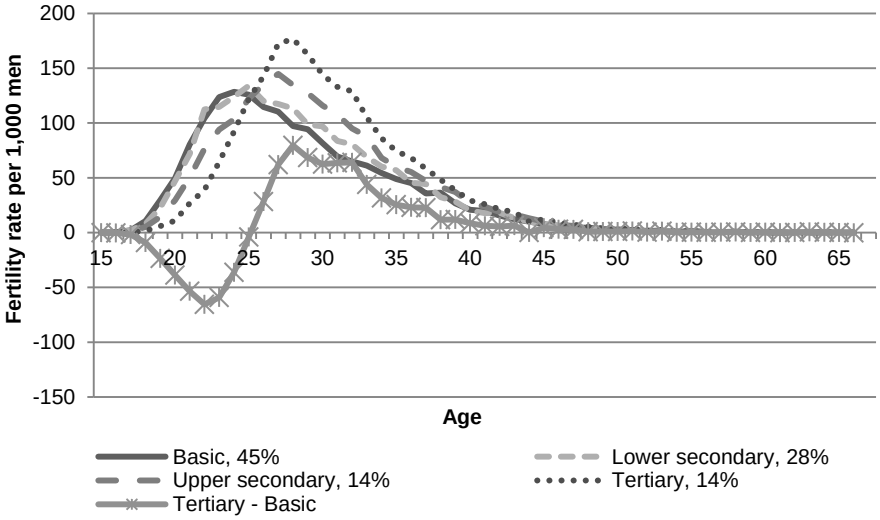
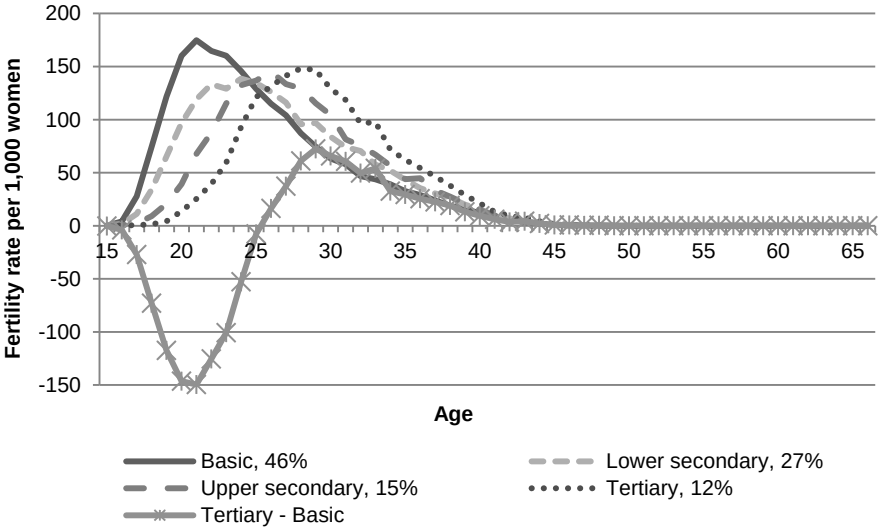


Figure 1b: Age-specific fertility rate by level of education, Finnish female cohort born in 1940–1950, N=36,806



The pattern was qualitatively similar among women (Figure 1b), although the differences between educational groups in their late teens and early twenties were much larger than among the men. Although men had higher fertility rates than women in their late thirties and early forties (23 vs. 14 per 1,000 respectively at the age of 40), the absolute differences between men with a tertiary and a basic education were of the same magnitude as those among women at these ages (8 vs. 9 per 1,000 respectively at the age of 40).

Fertility timing among the men with a higher level of education was characterized by both a later start and less dispersion compared with their less highly educated counterparts (Table 1). The IQR of the age at having a child of any parity was 8.7 years among those with a basic education and 7.2 years among those with a tertiary education. This pattern of lower variance among the more highly educated was also present for the first, second, and third parities. With regard to the timing of the first child, men with a tertiary education had the smallest IQR (5.2), but there were no differences between the other educational groups (5.8 for each).

Figure 2a: Cumulative fertility rate by level of education, Finnish male cohort born in 1940–1950, N=38,838

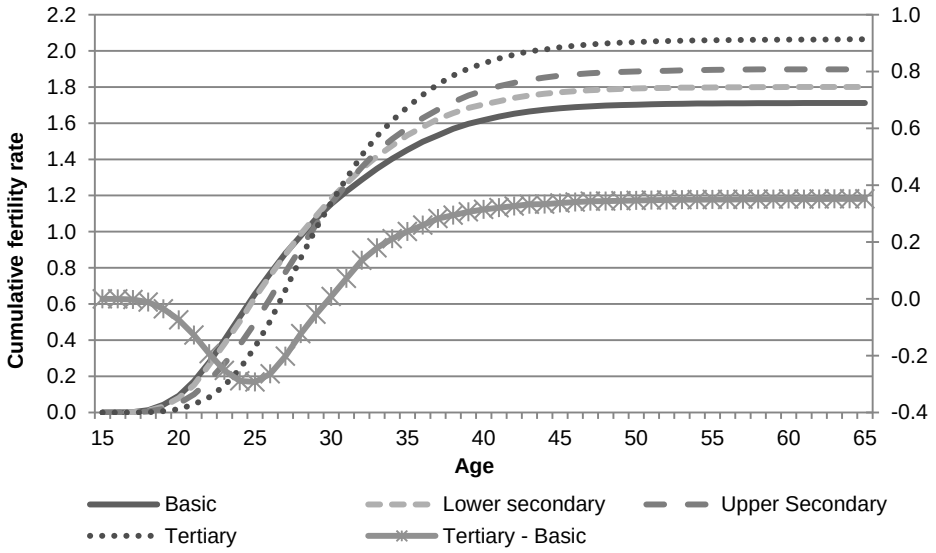
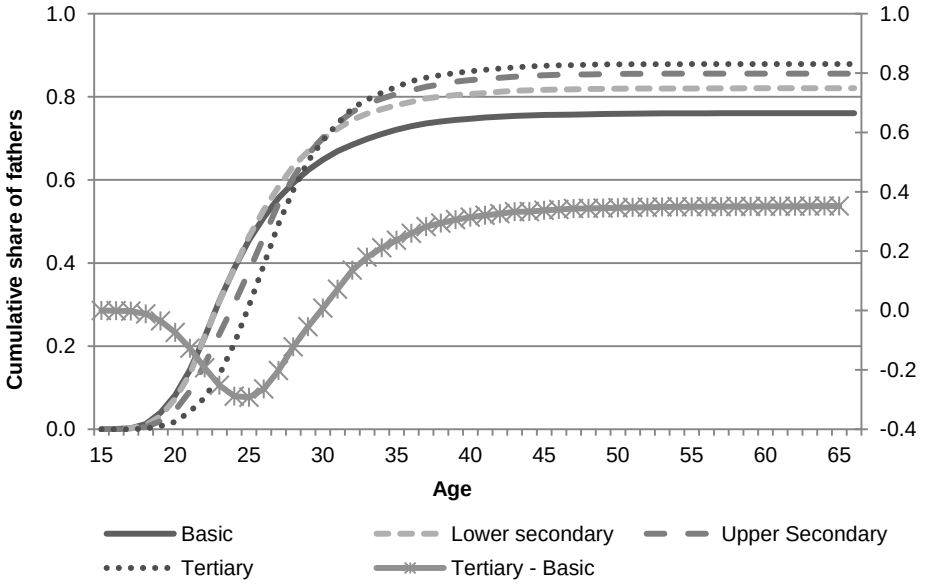


Figure 2b: Cumulative share of fathers by level of education, Finnish male cohort born in 1940–1950, N=38,838



The positive gradient of cumulative fertility emerged in the early thirties, being higher in the group with a tertiary education than among those with a basic education from the age of 30 (Figure 2a). The difference widened thereafter until the early forties, after which the gap increased only moderately. Of the difference in CFR between men with a tertiary and a basic education (0.35) 90% was achieved by the age of 41 and 95% by the age of 45. The 95% level was reached in all educational groups by the age of 41–42.

On the cumulative level (Figure 2b), by the age of 29 those with a tertiary education had overtaken those with lower levels of education in terms of fatherhood. This positive educational gradient emerged in the early thirties, and 95% of the final proportional difference between those with a tertiary and a basic education was evident by the age of 39.

Table 2 shows the differences between educational groups in CFR decomposed into differences in progress to parities one, two, and three or higher. Men with a basic education comprised the reference group. Progression to the first parity accounted for most of the positive gradient (>77%), and progression to the second parity also

contributed positively to the differences (9–30%), whereas progression from the second to the third and higher parities diminished them somewhat.

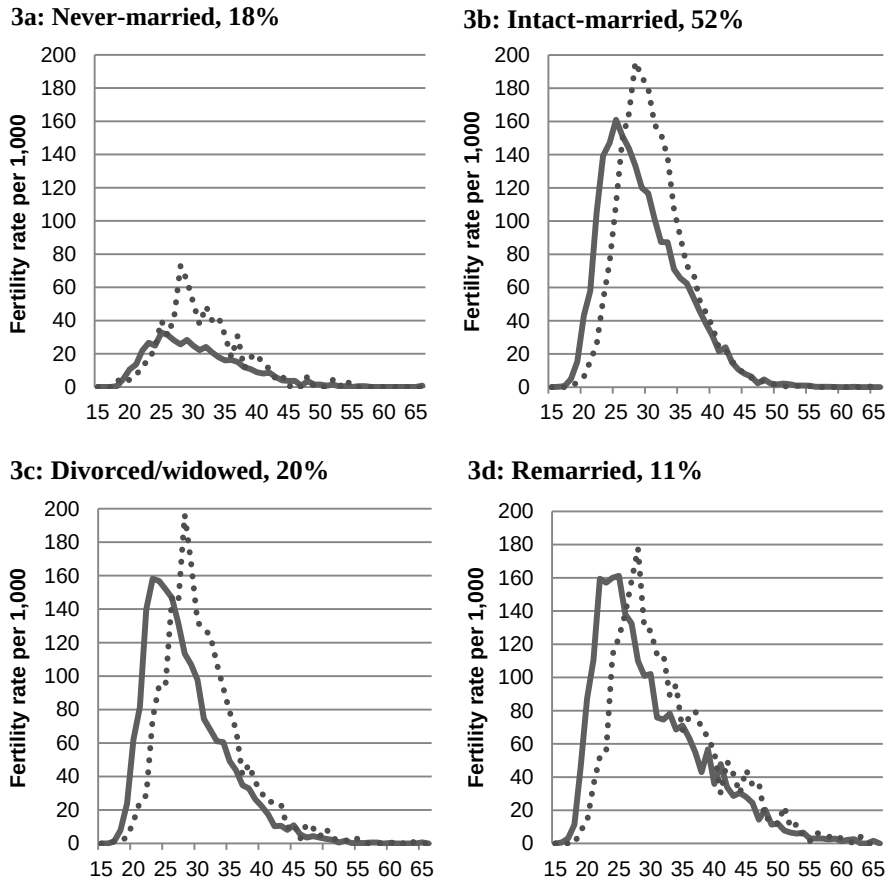
Table 2: Decomposition of completed fertility rate (CFR) by parity (%), Finnish male cohort born in 1940–1950, N=38,838

	Level of education			
	Basic	**Lower secondary**	**Upper secondary**	**Tertiary**
CFR	1.71	1.80	1.90	2.06
Parity contribution		Δ %	Δ %	Δ %
0[1]	ref.	151	114	77
1	ref.	9	27	30
2	ref.	-35	-27	2
3+[2]	ref.	-25	-14	-9
Total	ref.	100	100	100
Δ CFR	ref.	0.09	0.19	0.35
N	17,422	10,778	5,271	5,367

[1] Refers to the contribution of progression ratio out from parity 0 to parity 1.
[2] Refers to the sum of the contributions of progression ratio out of parity 3 to parity 4 and correspondingly to higher-order parities.

The more highly educated men were more likely to be either intact-married (tertiary 63%, basic 46%) or remarried (tertiary 14%, basic 10%), and less likely to have never married (tertiary 8%, basic 23%) or to have been divorced or widowed (tertiary 14%, basic 21%). CFR was highest among the remarried (2.37). The intact-married (2.09) had higher fertility levels than the divorced or widowed (1.92), and the never-married men had the lowest levels (0.53). Educational differences in CFR by marital history were generally small: among the intact-married men, for example, those with a basic education had 2.09 children as opposed to 2.19 among those with a tertiary education.

Figure 3: Age-specific fertility rate by marital history and level of education, Finnish male cohort born in 1940–1950, N=38,838.



Note: Only the rates for men with a basic (continuous line) and a tertiary (dotted line) education are shown.

Figures 3a–d show age-specific fertility rates separately for groups of men with a varying marital history. With the exception of the never-married, the more highly educated men also had later fertility timing within the marital groups. The pattern of less dispersed timing among the more highly educated in general held among the intact-married and never-married, whereas among the groups of divorced or widowed men no such pattern was observed. Age at having a child of any parity was the least dispersed

in the intact-married group and the most widely spread in the remarried group (IQR: 7.9 vs. 11.3 years).

We considered cohort trends by stratifying the analysis to the 1940–1944 and 1945–1950 birth cohorts, but the results were largely similar for both.

4. Conclusion

Among Finnish men born in the 1940s, those who acquired higher education showed later, higher, and more concentrated fertility. Educational differences in fertility rates crucially depended on age: the more highly educated had higher fertility rates from the age of 26 onwards and higher cumulative fertility in their early thirties. Most of the differences in completed fertility between the educational groups were shown by the age of 45. Staying childless accounted for more than three-quarters of the educational gradient in completed fertility, and only small differences by educational level were found within the different marital groups.

Educational differences in age-specific fertility varied the most between men and women in early adulthood. As reported elsewhere (Kiernan and Diamond 1983), educational differences in fertility were larger among women than men in their late teens and early twenties, the patterns becoming more similar as ages increased. In the case of cumulative fertility, however, the educational gradients remained divergent between men and women in this birth cohort, the more highly educated women ending up having fewer children (see Nisén et al. 2014). Finland is a relatively gender-neutral and egalitarian society, with income differentials that are modest on the international level and similar levels of labour-market participation among men and women (Rønsen and Sundström 2002; Jäntti, Saari, and Vartiainen 2006). Thus fertility differentials between men and women by educational level may be closer in Finland than in other countries.

Variation in the number of children among men with a basic education compared to other educational groups (Toulemon 2000) is likely to contribute to their higher overall variance in fertility timing. Relatively large numbers of the men with a low level of education in the birth cohort under investigation remained childless or had one child only – or went on to have three or more children. Given that the timing of the different parities (especially the second and third) was more dispersed in the groups with lower levels of education, we suggest that the differences in parity composition are not the only reason for the pattern. The lower likelihood of men with a lower level of education having an intact marriage seemed to be relevant to their more dispersed fertility timing. These results support previous suggestions that fertility may be relatively heterogeneous among men with a low educational level: both childlessness and having children with

multiple partners were found to be relatively common among such men in Norway (Lappegård, Rønsen, and Skrede 2011; Lappegård and Rønsen 2013).

Overall, this article summarizes and details the current picture of men's fertility in the Nordic countries with respect to education (Kravdal 2007; Kravdal and Rindfuss 2008; Rønsen and Skrede 2010; Lappegård, Rønsen, and Skrede 2011; Lappegård and Rønsen 2013). Methodological issues, such as response bias in surveys, may have contributed to the fact that a positive educational gradient in fertility is not a standard finding in the literature outside the Nordic countries. Differences due to contextual factors such as family–work reconciliation or the ethnic composition of the population are also possible. A positive gradient in completed fertility among men may be more likely in contexts in which it is more common for both women and men to have children alongside other interests: this possibility is reflected in previously reported cohort differences in educational gradients (Kravdal and Rindfuss 2008). The results of this study emphasize the importance of life course in the occurrence of educational differences in fertility among men.

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