Educational assortative mating and mortality in Finland: a couple perspective, 1987–2020

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Women's educational expansion and massive entry into the labour market in the second part of the twentieth century is one of the major socioeconomic changes in modern societies (Blossfeld 2009; Van Bavel 2012). In Europe, for instance, women's participation rate in tertiary education has increased and excelled men's since the 1970s (De Hauw et al. 2017). One major change following this educational shift is the progressive increase of educational assortative mating in the marriage market (Hou and Myles 2008), i.e. "the heightened tendency to mate individuals with similar levels of education more frequently that would be expected under random circumstances" (Permanyer et al. 2019). Consequently, over the last fifty years, the normative couple type changed from hypergamous, in which male partners were more educated than female ones, to homogamous, in which both partners were equally educated (De Hauw et al. 2017). Meanwhile, hypogamous couples, in which women are more educated than men, have become more prevalent (Esteve et al. 2016).

The most straightforward explanation for this change is structural, as the decrease in those without academic qualifications led to fewer intermarriages between those achieving a college education and those without any degree (Schwartz and Mare 2005). Another explanation is a change in preferences, as highly educated individuals may be more likely to appraise achieved characteristics (e.g. own education and occupation) than ascribed ones (e.g. parental SES) (Blossfeld 2009; Kalmijn 1994; Rosenfeld 2008; Rosenfeld and Thomas 2012; Schwartz 2013). The literature so far has largely focused on how different educational or occupational pairings predict family transitions, such as the transition to a coresidential partnership, marriage or cohabitation, or childbirth (e.g. Mäenpää and Jalovaara 2013, 2014; Nitsche et al. 2018; Trimarchi and Van Bavel 2020). However, assortative mating itself may be a predictor of deep societal changes.

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One unexplored aspect is how assortative mating influences health inequalities at the individual level. Exceptions are Stauder et al. (2019), who examined the relationship between educational homogamy and individual health in Germany, and Fan and Quian (2019), who used a simulation approach to understand the impact of educational homogamy on mortality inequalities. Both studies include only education and found no or little effects. We aim to extend the literature in this field by exploring whether couples' achieved socioeconomic characteristics relate to individuals' mortality in the Finnish context. Achieved characteristics are measured by their own education.

We draw on two theoretical frameworks that could help us understand this relationship: resource substitution and resource multiplication (Ross and Mirowsky 2006). The resource substitution theory hypothesises the existence of compensative effects: the presence of another resource compensates for the absence of a resource. Resource multiplication supposes that additional resources create a multiplicative effect on the benefits derived from those resources. Therefore, on the one hand, if the resource substitution theory applies, heterogamous couples might have a health advantage since the partner with more education might compensate for the lower education. On the other hand, if resource multiplication is verified, then homogamous couples will have higher health benefits.

Data & methods

We use survival analysis to explore whether an individual's risk of death differs according to the educational homogamy with his or her partner. Specifically, we examine whether the risk varies when the individual a partner with the same education or one partner is more or less educated than the other. We perform a more detailed analysis focusing on whether specific educational pairings are associated differently with the individual's mortality risk.

The analyses use Finnish full population register data from 1987 to 2020. The population sub-group under analysis consists of married and cohabiting individuals aged above 50 (birth cohorts 1932–1970), who were exposed to the risk of death during the observation period. The final analyses comprise 1,837,527, of which 50.3% are males and 201,478 died. We fixed the beginning of the follow-up period on 1/1/1987 and included in the analysis both individuals who were married before this date and those who married afterward. The analytical models used for the survival analysis are Cox regressions, whose baseline function is represented by the time elapsed from the beginning of the follow-up until the exit of the study, which may occur due to death or the end of

the follow-up period, dated 31/12/2020. However, individuals could be right-censored also due to divorce or outmigration (in both cases, the exit time refers to the last observation available).

The key covariates of the analysis are the main effects of the individuals' own education and their partners'. Education is operationalized using three hierarchical categories: basic (low education), secondary, and tertiary (higher education). Control variables include a time-varying categorical variable for age, consisting of two groups (51–64; 65 and above). All the models are stratified by sex and current marital status, which is defined as a time-varying variable indicating whether individuals were married or cohabiting for each year they were considered as part of the population.

Results

Table 1 presents the hazard ratios for the full population estimates. Higher education of individuals and partners are associated with a lower risk of death than the lower educated ones. Moreover, there is a significant interaction of own education and partner's education (we reject the joint hypothesis that the effect of education is the same for each partner's education group). We also calculate the HR also for the interaction coefficients. For example, among women the HR for tertiary education is 0.57 when the partner has only basic education, this decreases to 0.42 when the partner has tertiary education. For men we observe coefficient similar patterns but a stronger association of their partner's education with their mortality risk (e.g. for men with basic education we obtain a HR 0.57 for tertiary educated partner and for women with basic education HR 0.71 for tertiary educated partner). We carried out this analysis also for cohabitation obtaining a similar picture with some difference in the magnitude of the coefficients. Also, in this case we find that we reject the null hypothesis that the joint interactions are 0.

Table 1: Hazard ratios of the association between homogamy and mortality among Finnish married individuals aged above 50, 1987–2020

	Women			Men		
	HR	**L95**	**U95**	**HR**	**L95**	**U95**
Own education (ref. basic)						
Secondary	0.65	0.63	0.68	0.62	0.60	0.64
Tertiary	0.58	0.55	0.60	0.57	0.56	0.59
Partner's education (ref. basic)						
Secondary	0.76	0.73	0.80	0.66	0.65	0.68
Tertiary	0.71	0.68	0.73	0.58	0.56	0.59
Own education × Partner's education						
Secondary × Secondary	0.92	0.86	0.99	1.00	0.96	1.05
Tertiary × Secondary	0.81	0.74	0.89	0.89	0.85	0.94
Secondary×Tertiary	0.88	0.81	0.96	0.87	0.82	0.92
Tertiary× Tertiary	1.04	0.97	1.11	1.00	0.96	1.05
Age category (ref. 50-64)						

65 or above	2.58	2.53	2.64	2.75	2.71	2.79

Source: Own computations from Statistics Finland register data (1987–2020)

Table 2: Hazard ratios of the association between homogamy and mortality among Finnish cohabiting individuals aged above 50, 1987–2020

	Women			Men		
	HR	**L95**	**U95**	**HR**	**L95**	**U95**
Own education (ref. basic)						
Secondary	0.70	0.64	0.77	0.72	0.67	0.77
Tertiary	0.52	0.45	0.60	0.58	0.53	0.65
Partner's education (ref. basic)						
Secondary	0.87	0.80	0.95	0.69	0.65	0.73
Tertiary	0.64	0.56	0.73	0.59	0.55	0.64
Own education × Partner's education						
Secondary × Secondary	0.78	0.67	0.91	0.86	0.77	0.97
Tertiary × Secondary	0.69	0.55	0.87	0.94	0.80	1.10
Secondary×Tertiary	0.89	0.71	1.12	0.82	0.71	0.95
Tertiary× Tertiary	0.93	0.73	1.19	0.84	0.72	0.99
Age category (ref. 50-64)						
65 or above	2.27	2.13	2.43	2.41	2.30	2.52

Source: Own computations from Statistics Finland register data (1987–2020)

The first of our analyses supports the resource multiplication theory, which argues that the presence of another resource (partner's education) reinforces another resource (own education). However, it still provides a partial view of the mechanisms within couples, as it does not focus on the simultaneous effect of individual and partner's education on mortality. For this reason, we now explore the probability of survival for men and women according to their own education and one of their spouses. shows the survival curves of the least and the most educated individuals and partners, i.e., basic and tertiary educated. Both the graphs of men and women display that the survival probabilities of the lowest and the highest-educated couples diverge greatly, especially for men's survival. At the latest observation time of the study, the lowest educated men partnered with the lowest educated women present a survival probability below 80%, whereas the highest educated men partnered with the highest educated women have a probability roughly fifteen percentage points above. also shows that heterogamous couples have a survival probability in-between the one of the lowest and the highest educated couples. This second set of results also supports the presence of a multiplication mechanism underlying couples' education and mortality, as highly educated couples present a multiplicative advantage in terms of survival probability and the low-educated a cumulative disadvantage. Further, this latter analysis demonstrates that performing studies on assortative mating using a higher degree of granularity – when possible – and considering the joint effect of partners' education offers a greater understanding of partnering dynamics and their outcomes. Figure 2 presents the survival curves for cohabiting couples. We observe similar trends as the one among married couples.

Figure 1: Survival curves for married men and women, by individual own education and partner's education

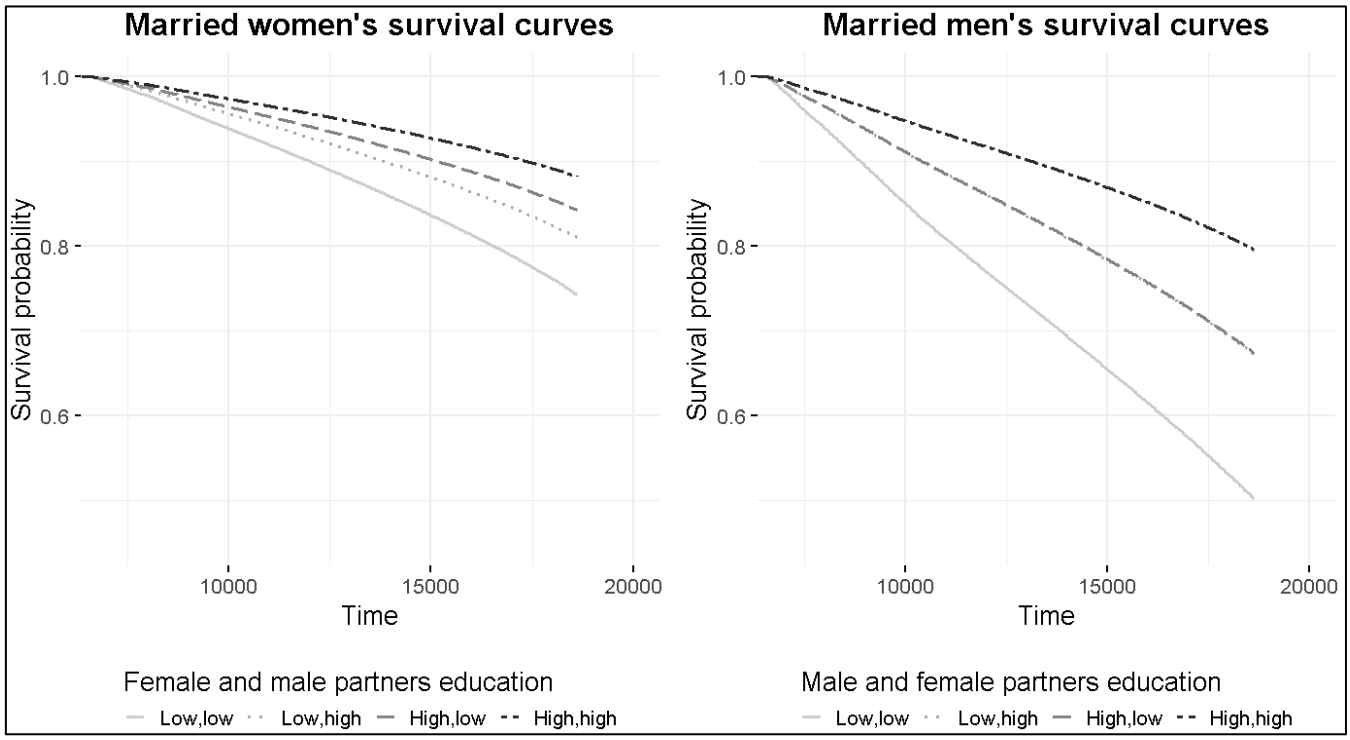
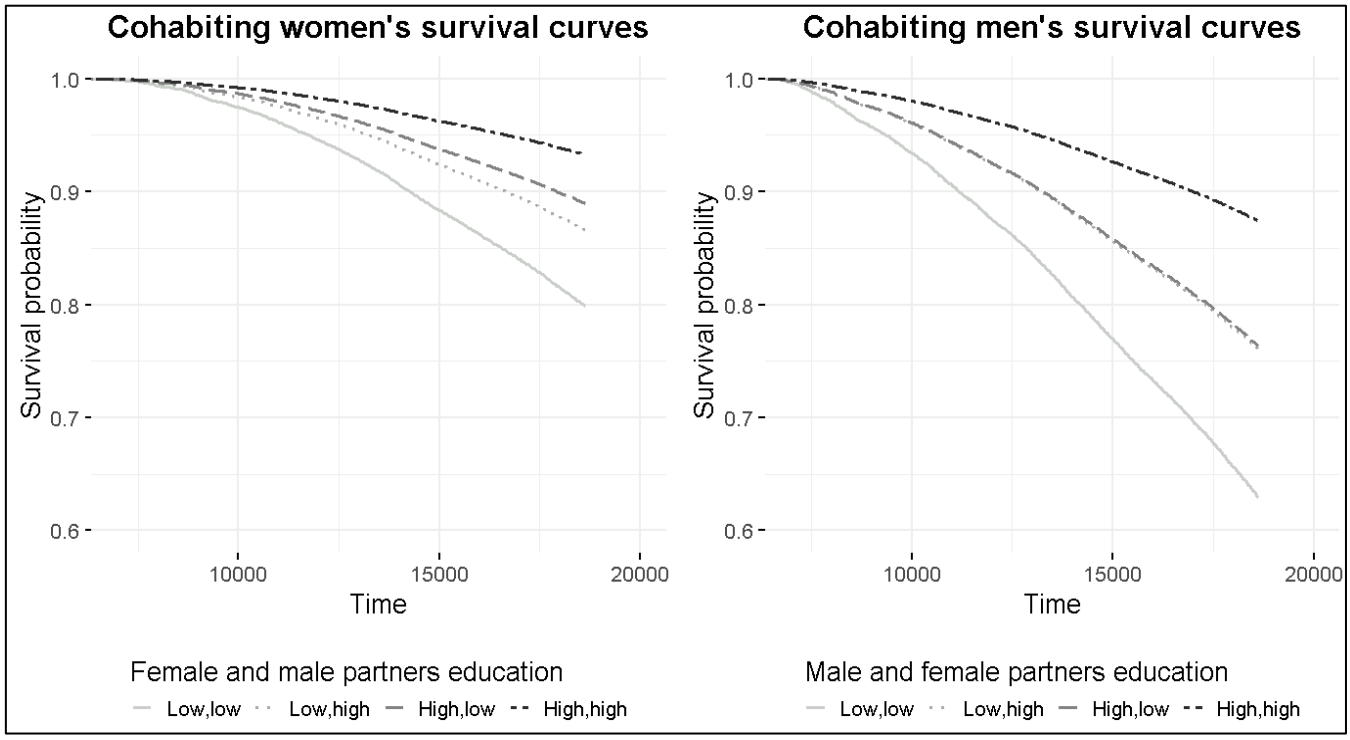


Figure 2: Survival curves for cohabiting men and women, by individual own education and partner's education



Source: Own computations from Statistics Finland register data (1987-2020)

[1] Estimates derived from a sex and marital status-stratified Cox regression model specified as follows: individual and partner's education, their interaction, and categorical age. [2] We only present estimates for individual low (basic) and high (tertiary) education to highlight major contrasts. [3] For the estimation of the curves, age is fixed at the age interval 65 or above.

Next steps

Further work will extend the analyses to the mechanisms through which these inequalities develop whether there are psychosocial pathways or income/wealth effects driving these results. Further, so far, we have only focused on a selected population, that is couples. In the next analyses, it could be of interest to explore whether there is a partnership advantage and under which conditions it exists.

Acknowledgments

The authors wish to thank Linus Andersson for the helpful suggestions, and Statistics Finland for granting permission (No. TK/1521/07.03.00/2023) to use the Finnish Register data

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