

Educational homogamy and entry into first marriage: analyzing discrete-time event-history data with conditional logit models

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Educational homogamy has been long-standing interest in research on family demography and social stratification and research has consistently found strong tendencies to marry within or close to one's own educational level (Mare 1991; Kalmijn 1998; Blossfeld 2009). Most analysis carried out in this field have used cross-sectional data either from all marriages, marriages among people in some specific age range, or newly formed marriages.

Increases in divorce and decreases and postponements in marriage have made these cross-sectional approaches less tenable. Neither do these analyses take into account the dynamic process of more or less active search in the marriage market, which eventually can lead to homogamous marriage (Oppenheimer 1988; Blossfeld 2009). These considerations have led many analysts to model entry into marriage with spouses of different educational qualifications with event-history models, which additionally allow some individuals to remain unmarried (Blossfeld 2009).

A limitation of these models, however, is that analyzing homogamy and heterogamy (that is, who one marries given one's own education) is difficult or impossible. Some studies have used competing-risks event-history models to analyze marriage to spouses with different educational qualifications and used own education as an independent variable. In these analyses it becomes difficult to distinguish the role of attraction to spouses who are similar to oneself, which is a central hypothesis in the literature (Kalmijn 1998). Other studies have then used a two-step strategy, in which they first analyze entry into marriage with a regular (binary) event-history model and then separately analyzed homogamy among these newly formed marriages with log-linear models. This approach, however, violates against the idea that marriage is entered only when one finds a suitable spouse who is willing to marry the ego (Oppenheimer 1988). Finally, some studies have either used homogamy as a binary outcome variable or in a competing risks framework together with upward and downward marriage. A limitation with these models is that, due to bottom and ceiling effects, one cannot include own educational attainment as an independent variable.

In this study, we use discrete-time multinomial conditional logit event-history models to analyze entry into first marriage. Multinomial conditional logit models were introduced in social mobility research to combine the advantages of topological loglinear models with the regression framework (Dessens et al 2003). These methods have the advantage that one can include destination-specific effects in the models while controlling various other factors. In our case, one can analyze marriage to someone with a specific level of education conditional on own education. We can also take into account the marriage pattern specific to own parental background – that is, how spouse education matches with that of mother. We show that the approach can also be successfully applied in the event history framework.

Data and method

We use registry data from a cohort of Finnish women and men born 1971-80. Our data come from the Finnish Census Panel, which is a registry-based 10 % sample of the Finnish population. These data include quintannual information from year 1975, 1980, 1985, and annual information from 1987-

2007. These data include information on own and spouse's educational attainment, vital demographic events, and parental background, among other variables.

We organize our data into discrete-time event-history format with person-years as the unit of observation. We observe our cases from age 18 (the age of consent) until marriage or right-censoring (end of observation period, death, or emigration). In our competing-risks framework, our dependent variable has five categories: not married, marriage to a spouse with a) compulsory education, b) lower/middle secondary education, c) higher secondary education, or d) tertiary education. In this way, we analyze the risk of marrying someone with these levels of education at age t , conditional on not having married before.

Our independent variables are: age (dummy variables with 28 as the reference category), birth cohort (linear), sex, dummy variables for the years cohabiting, in education, mother's level of education and achieved educational attainment (with the same four categories as above). The discrete-time conditional logit event-history model is written as

$$p(y_{it} = k | k_{t-1} = 0, z_{ikt}, x_{it}) = \exp(z_{ikt}\gamma + x_{it}\delta_k) / \left[\sum_{k=0}^K \exp(z_{ikt}\gamma + x_{it}\delta_k) \right] \quad (1),$$

where y is the probability of marrying someone with an educational level k at age given that one is unmarried, one's characteristics x and the characteristics of marrying to this educational level z . Specifically, z tells us whether the educational level of the spouse is the same as (or higher or lower than) one's own. We can vary these alternative specific parameters z to test different hypotheses about educational homogamy/heterogamy.

Preliminary results

Table 1 shows discrete time event history models with either entry into marriage in general or entry to marriage according to the level of education of the spouse as the dependent variable. The first model shows that those with least education are also the least likely to marry. The chances to enter marriage are about the same for those with the secondary education, whereas the chances to marry are the highest among those with tertiary education. Thus the results are in line with the previous findings.

The second model differentiates marriages according to the education of the spouse. It can be seen that for the primary, lower secondary and tertiary education the chances to the homogamous marriages are the highest, while those marrying with a spouse with the higher secondary education are themselves the most likely to have tertiary education. The results also show that mother's tertiary as well as higher secondary education increase the chances to enter marriage not also for those with tertiary but also with the higher secondary education. The homogamy according to mother's education does not seem to contribute to the marriage risk in the same way as in the case of homogamy according to own education.

Based on these results we cannot generalize what are the chances to the homogamous marriages in general as opposed to the upward or downward marriages. We test this with four conditional multinomial logit models, reported in Table 2. Model A assumes that there is a tendency towards upward marriages both according to own and mothers education. The results show the opposite – the upward marriages occur more rarely than other marriages and that is especially the case for the upward marriages both according to ones own and mother's education. Model B assumes similar effects for downward marriages. The results show that there is a higher likelihood to marry downward related to the mother's education, but then again lower likelihood to marry downward both

according to own and mother's education. Model C shows the effects for homogamy. The marriages according to own or mother's education are particularly likely to occur, the homogamous marriages according to own education being much more important factor. However, homogamous marriages both according to own and mother's education are not likely to occur. Finally, in Model D we differentiate homogamy according to the level of education. The effect is the strongest at the level of own tertiary education and the weakest in the case the level of mother's intermediate secondary education. Having a homogamous marriage both according to own and mother's education is least likely to occur at the level of higher secondary education.

The results suggest that homogamy according to mother's education does not usually strengthen the tendency to homogamy according to own education. Rather homogamy according to background is likely to compensate the lack of it according to own education while the match according to own qualifications are considered as more important.

These results show the usefulness of using conditional logit models for the analysis of educational homogamy. These models combine the advantages of process-based event history models with log-linear modeling that allow differentiation of the marginal and relative effects of educational attainment.

Table 1. Entry Into First Marriage According Own, Spouse and Mother's Education. Discrete-Time Event-History Model (Column 1) and Competing-Risks Discrete-Time Event-History Model (Columns 2-5). Odds ratios and standard errors.

	<i>Marriage</i>	Education of partner (ref. not married)			
		Primary	Intermediate second.	Higher second.	Tertiary
<i>Mother's education</i>					
Primary	Ref	Ref	Ref	Ref	Ref
Intermediate sec.	1.007 0.02	0.860 0.043	0.991 0.03	1.049 0.042	1.140* 0.048
Higher secondary	1.067 0.027	0.848 0.062	0.854** 0.038	1.208** 0.059	1.397** 0.067
Tertiary	1.159** 0.039	0.790 0.088	0.668** 0.049	1.466** 0.087	1.590** 0.091
<i>Own education</i>					
Primary	1.112** 0.033	0.629** 0.036	1.195** 0.051	1.503** 0.102	2.092** 0.217
Intermediate sec.	1.156** 0.037	0.372** 0.026	0.859* 0.042	2.462** 0.171	4.003** 0.416
Higher secondary	1.978** 0.069	0.350** 0.034	1.04 0.06	3.149** 0.243	10.99** 1.059
Tertiary	1.112** 0.033	0.629** 0.036	1.195** 0.051	1.503** 0.102	2.092** 0.217

* p<0.01 ** p<0.001

Omitted covariates: age dummies (ref. age 28), year, gender, mother's age at birth, in education, years after finishing education, year cohabiting, years cohabiting squared.. Constants in non-exponentiated form.

Table 2. Educational homogamy and heterogamy according to own, spouse and mother's education. Discrete-time event-history analysis with conditional logit models. Odds ratios.

Type of marriage according to	Model A	Model B	Model C	Model D
<u>Own education</u>				
...upward marriage	0.679**			
...downward marriage		0.952		
...homogamy			1.902**	
...homogamy according to own level of education:				
Primary education				1.942**
Intermediate secondary				1.286**
Higher secondary education				1.493**
Tertiary				3.836**
<u>Mother's education</u>				
...upward marriage	1.038			
...downward marriage		1.175**		
...homogamy			1.302**	
...homogamy according to own level of education:				
Primary education				1.234**
Intermediate secondary				1.044
Higher secondary education				1.383**
Tertiary				1.632**
<u>Interaction</u>				
...upward marriage	0.592**			
...downward marriage		0.616**		
...homogamy			0.798**	
...homogamy according to own level of education:				
Primary education				1.011
Intermediate secondary				1.036
Higher secondary education				0.720**
Tertiary				0.856

* p<0.01 ** p<0.001

Dependent variable : education of partner

Controls (not shown): main effects for heterogamy and homogamy, age dummies (ref. age 28), year, gender, spouse's education, mother's age at birth, in education, years after finishing education, year cohabiting, years cohabiting squared.

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