

Has the Post-communist Transformation Led to an Increase in Educational Homogamy in the Czech Republic after 1989?*

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Abstract: This article analyses trends in educational homogamy in Czech society from 1988 to 2000. Two hypotheses are tested: (1) that educational homogamy strengthened as a result of growing economic uncertainty during the 1990s, and (2) that educational homogamy is higher among younger newlyweds than among people who get married after 30 years of age. The authors analyse vital statistics data on all new marriages for the years 1988, 1991, 1993, 1997 and 2000. Using a log-linear analysis the first hypothesis was refuted, as no change in the tendency towards homogamous marriages was observed during the 1990s in the Czech Republic. Stronger support was found for the second hypothesis, as educational homogamy is indeed much higher among younger than older couples. Finally, the article includes a discussion of some possible explanations for the absence of a trend towards homogamy that was detected.

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Introduction

Most people think of their choice of spouse as a decision dictated by romantic love and mutual attraction. Partner preferences, however, follow predictable empirical patterns at the societal level. Sociologists have discovered that people tend to marry partners who are similar to them with respect to family background, age, education, social class, race and religion. The preference for a partner with similar characteristics is far more common than would be expected in purely random pairing [see e.g. Ultee and Luijkx 1990; Kalmijn 1991a, 1991b; Mare 1991; Smits, Lammers and Ultee 1998a, 1998b, 2000; Raymo and Xie 2000; Schwartz and Mare 2003].

While in the first part of the 20th century sociology discovered the rule of marital homogamy and identified the factors that structure it [see e.g. Hunt 1940; Burgess and Wallin 1943; Winch 1958; Girard 1964], towards the end of the 20th century social scientists were concentrating on measuring homogamy and studying its inter-generational and spatial variability. In research studies on stratification, comparative analyses of homogamy inform comparative analyses of social mobility, and vice versa, because, like social mobility, homogamy reflects the social barriers among social strata and social groups [Ultee and Luijkx 1994; Smits, Lammers and Ultee 1998a, 1998b].

Homogamy has recently become one of the most frequently researched stratification topics [Hout and DiPrete 2003]. Many authors have been inspired by the study of intergenerational occupational mobility conducted by Erikson and Goldthorpe [1992], and strive to identify trends in the development of homogamy. Some authors have reached the conclusion that patterns of assortative mating, and especially the extent of homogamy, change over time [compare Smits, Lammers and Ultee 1998a, 1998b, 2000; Raymo and Xie 2000]. However, a number of studies have arrived at the opposite conclusion, and the research community has not yet produced any satisfactory generalised conclusion [Hout and DiPrete 2003].

The topic of homogamy has rarely been researched in the Czech Republic. The few existing comparative research studies of homogamy are the exception rather than the rule. Ultee and Luijkx [1994] included data from former Czechoslovakia in a comparative analysis of educational homogamy and mobility and tested the hypothesis that socialism had a positive influence on the openness of the social structure. Their paper revealed the unexpected effect of socialism on educational homogamy, showing that socialism contributed to the growth of educational homogamy, and, as a result, to the closing of the social structure. Boguszak [1990] also concluded that homogamy in the Czechoslovak and the Hungarian societies was higher than in the Netherlands. He suggested that the increase in homogamy was a behavioural response by people to the egalitarian measures adopted by the socialist regime. According to Boguszak, in these conditions of extreme economic equality, better-educated people tried to preserve status and cultural privileges, and therefore large numbers of them entered into marriages with equally (highly) educated people. Finally, after controlling for many economic, political and religious factors,

Smits, Lammers and Ultee [1998a] showed that Czechoslovakia had a relatively low degree of educational homogamy in comparison to other European countries.

In this article we will build upon previous analyses and study educational homogamy in Czech society, extending it here to cover the 1990s, a period of rapid economic, political and social change. Two basic research questions are posed: (1) Did educational homogamy in Czech society increase or decrease between 1988 and 2000? (2) Is the tendency of fiancés to enter into educationally homogamous marriages contingent upon their age?

The expected development of educational homogamy in Czech society after 1989 – hypotheses

Answers to the question of how educational homogamy developed in Czech society in the 1990s can be found at the macro-structural and micro-structural levels. The macro-structural answer is offered by the *modernisation theory* [Treiman 1970; Smits, Lammers and Ultee 1998a], which stresses the gradual elimination of social barriers and the gradual increase in social mobility. The micro-structural answer is offered by the *theory of marital exchange* [Elder 1969; Becker 1981; Smits 2003], which conceptualises marriage in terms of utility and the economic security of partners, and the *theory of the cultural similarity of spouses* [Kerckhoff and Davis 1962; DiMaggio and Mohr 1985; Bukodi 2002], which concentrates on the importance of education in defining the cultural status of spouses and highlights its importance for the consensus of partners in a marriage.

The *theory of modernisation* argues that increasing geographical mobility, urbanisation, and the introduction and expansion of a unified educational system [Treiman 1970] have expanded the range of potential partners from which young people can choose their spouses. Mass communication and the homogenisation of society contribute to more widespread similarities in value orientations, lifestyles, leisure time activities, language and taste; in short, to an expanding group of people with whom one shares a “common universe of discourse” [DiMaggio and Mohr 1985] and among whom one is more likely to find a mate. Therefore, we could, *ceteris paribus*, expect declining educational homogamy over time.

However, modern educational expansion also increasingly structures the marriage markets. Because people in modern societies spend, on average, more time at school than ever before, the relative importance of educationally structured marriage markets is likely to grow over time. This is likely to lead to an increased tendency toward entering into educationally homogamous marriages [Blossfeld and Timm 2003; Kalmijn and Flap 2001].

Smits, Lammers and Ultee [1998a] shows that educational homogamy increases only in the early phases of economic development; it then peaks, and begins falling at the start of the ‘post-materialistic era’, arguably in relation to the proliferation of the ideal of romantic love. They empirically demonstrate that the re-

relationship between educational homogamy and economic development takes the form of an inverted 'U' shape. They suggest that this pattern emerges because the forces leading to reduced educational homogamy prevail at higher levels of economic development, while the early stages of development augment educational homogamy.

The *theory of marital exchange* is based on the economic theory of marriage and the traditional model of calculating the benefits and costs of marriage. Gary Becker [1981], a proponent of this approach, claims that the relative advantages of marriage are the result of men specialising in paid work and women specialising in unpaid work. In traditional societies, where there is a high degree of division of labour in a marriage, a heterogamous spousal status is more advantageous than homogamous. The growing economic potential of women, however, leads to *both* partners assessing before marriage the potential economic contribution of the spouse to the family budget, and both fiancés logically prefer a partner with higher status potential [Blossfeld and Huinink 1991; Mare 1991; Sweeney 2002], a behaviour referred to as status attainment or status seeking [Smits, Lammers and Ultee 1998a, 1998b]. Under the pattern of the individual preference of both sexes, when equilibrium is achieved on the marriage market, it tends to be educationally homogamous rather than educationally heterogamous [Kalmijn 1991a, 1998].

Similarly, the *theory of cultural similarity of spouses* predicts that educational homogamy will increase over time. First, it points out that partner choice may also be driven by non-economic individual preferences. People may, for instance, have a preference for a partner with similar values and attitudes; they may, consciously or unconsciously, prefer someone with a similar language, taste or lifestyle [Kalmijn 1994, 1998; DiMaggio and Mohr 1985, 1994]. Because the idea of who is an attractive partner, as well as lifestyles, behaviours, values, attitudes and taste are all stratified in society [Birkelund and Heldal 2003; DeGraaf 1991; DiMaggio and Mohr 1985; Lamb 1989; Mohr and DiMaggio 1995; Tomlinson 2003], a preference for cultural similarity between partners will also lead to educational and status homogamy. As the relationship between education and attitudes, values, lifestyles and cultural preferences tends to increase in times of rapid social change, it is also likely to have grown during the post-socialist transition and therefore contributed to an increase in educational homogamy.

Based on the *theory of cultural similarity of spouses* and the *theory of marriage exchange* we believe that the economic, social and cultural transformation of Czech society in the 1990s led to an increase in educational homogamy, because the social transformation also resulted in an increase in social and economic insecurity and greater social and economic stratification. Since 1989, the general unemployment rate [Frýdmanová et al. 1999] and the number of long-term unemployed [Mareš, Sirovátka and Vyhliđal 2003] have increased, and the correlation between unemployment and the level of education have become more pronounced [Frýdmanová et al. 1999]. Moreover, economic returns to education have dramatically increased [Večerník 1999] and the relationship between education, economic income and em-

ployment status has become more pronounced [Matějů and Kreidl 2001]. The perceived importance of education for achieving success in life has also risen [Kreidl 2000]. Based on these facts, we expect that educational homogamy has increased in Czech society since 1989 (Hypothesis 1). This trend should be most pronounced in first marriages, where the criterion of education is a more important indicator of the future socio-economic position of a spouse than is economic income [Kalmijn 1994].

At the same time, we expect that not all segments of the Czech population will record the same degree of educational homogamy. For example, a number of authors – Mare [1991] using the American population, Bukodi [2002] using the Hungarian population, Bernardi [2003] using the Italian population, and Chan and Halpin [2000] using the British population – have shown repeatedly that the likelihood of an educationally homogamous marriage decreases as the interval between graduation and entry into marriage grows. After graduation, the likelihood increases that pairs formed at school will gradually come apart. People then start looking for new partners in other environments (for example, at work) that are far more educationally heterogamous than school [see also Kalmijn 1994]. Based on these findings we do not expect the same degree of educational homogamy among marriages formed before spouses have reached the age of thirty and among marriages formed after spouses have reached the age of thirty. We believe that in Czech society in the 1990s, educational homogamy was greater among younger couples than among couples entering marriage at later ages (Hypothesis 2).

Data, absolute measures of homogamy and analytical methods

The data we used to test our hypotheses were drawn from official statistics collected and published by the Czech Statistical Office [*Pohyb obyvatelstva* 1989, 1992, 1995, 1998, 2001]. The data are on all new marriages concluded between men (M) and women (W) according to education (elementary, vocational training, secondary and tertiary) and age (A) of entering into marriage (up to 29 years of age, and 30 and more years of age¹) in selected years (Y) (1988, 1991, 1994, 1997 and 2000). As an aggregate the data take the form of a four-way table ($M \times W \times A \times Y$), which we clustered according to marriage age and years into ten ($A \times Y = 10$) two-way tables showing marriages between men and women ($M \times W$) by education level (see Table 1). The main diagonals in these tables show educationally homogamous marriages; the figures above the main diagonals represent marriages where the woman has attained a higher educational level than the man; and the figures below the main diagonals show marriages where the man has attained a higher educational level than the woman. The greater the distance of each number in each table from the main diagonal, the greater the educational disparity between the spouses.

¹ If one of the partners in a married couple was over 29 and the other below 29, we included this marriage in the 30 and over category.

Table 1. Frequency distribution of new marriages by education and marriage age in 1988, 1991, 1994, 1997 and 2000 in the Czech Republic.

Year	Man's education level	Up to age 29					Age 30 and over				
		Woman's education level				Total	Woman's education level				Total
		EL	VC	SE	TE		EL	VC	SE	TE	
1988	EL	3 741	1 659	1 150	54	6 604	3 843	736	738	101	5 418
	VC	3 473	16 564	9 520	285	29 842	2 092	3 695	2 314	258	8 359
	SE	1 274	4 301	12 119	941	18 635	765	977	2 634	587	4 963
	TE	93	308	2 622	1 688	4 711	185	219	1 496	1 026	2 926
	Total	8 581	22 832	25 411	2 968	59 792	6 885	5 627	7 182	1 972	21 666
1991	EL	2 938	1 577	942	35	5 492	2 580	608	631	84	3 903
	VC	3 114	16 573	8 121	233	28 041	1 579	3 312	2 016	213	7 120
	SE	1 077	3 996	10 518	725	16 316	578	885	2 704	525	4 692
	TE	78	313	2 121	1 133	3 645	136	183	1 510	935	2 764
	Total	7 207	22 459	21 702	2 126	53 494	4 873	4 988	6 861	1 757	18 479
1994	EL	2 498	1 071	660	26	4 255	1 921	547	408	66	2 942
	VC	2 009	13 224	5 888	184	21 305	1 250	3 412	1 819	219	6 700
	SE	731	3 171	8 020	691	12 613	475	954	2 437	537	4 403
	TE	56	242	1 739	1 267	3 304	127	264	1 566	961	2 918
	Total	5 294	17 708	16 307	2 168	41 477	3 773	5 177	6 230	1 783	16 963
1997	EL	1 546	929	537	30	3 042	1 869	562	453	121	3 005
	VC	1 610	10 926	6 116	261	18 913	1 355	4 293	2 219	316	8 183
	SE	526	2 623	8 080	810	12 039	520	1 268	3 249	696	5 733
	TE	47	195	1 616	1 427	3 285	141	310	1 863	1 290	3 604
	Total	3 729	14 673	16 349	2 528	37 279	3 885	6 433	7 784	2 423	20 525
2000	EL	1 183	664	421	38	2 306	1 397	495	361	94	2 347
	VC	1 173	8 246	6 261	356	16 036	1 179	4 690	2 591	336	8 796
	SE	409	2 122	8 329	1 100	11 960	433	1 227	3 805	821	6 286
	TE	43	162	1 604	1 803	3 612	132	322	2 021	1 503	3 978
	Total	2 808	11 194	16 615	3 297	33 914	3 141	6 734	8 778	2 754	21 407

Note: EL means elementary school, VC means vocational school, SE means secondary school and TE means tertiary education or university.

Source: *Pohyb obyvatelstva* 1988, 1991, 1995, 1997, 2000. Prague: Czech Statistical Office 1989, 1992, 1996, 1998, 2001.

Table 2: Educational assortative mating by year and marriage age in the Czech Republic (%).

Year & Age	Homogamous marriage	Female hypogamy & male hypergamy	Female hypergamy & male hypogamy	N (100%)
1988	55.62	22.53	21.85	81 458
up to age 29	57.05	22.75	20.20	59 792
over age 30	51.68	21.86	26.46	21 666
1991	56.54	21.83	21.63	71 973
up to age 29	58.24	21.76	20.00	53 494
over age 30	51.58	22.06	26.36	18 479
1994	57.79	20.65	21.56	58 440
up to age 29	60.30	20.54	19.16	41 477
over age 30	51.47	21.20	27.33	16 963
1997	56.54	22.57	20.89	57 804
up to age 29	58.96	23.29	17.75	32 279
over age 30	52.14	21.27	26.59	20 525
2000	55.95	24.48	19.57	55 321
up to age 29	57.67	26.06	16.27	33 914
over age 30	53.23	21.95	24.82	21 407

Note: Homogamous marriage means that the man's education level is the same as the woman's education level, female hypogamy and male hypergamy means that the woman's educational level is higher than the man's educational level; female hypergamy and male hypogamy means that the woman's educational level is lower than the man's educational level.

The sum of all total frequencies on, above and below the main diagonals by marriage age and year is given in Table 2. It is possible to see that the percentage of educationally homogamous marriages did not change much in Czech society during the 1990s. In 1988 and in 2000, the education of the man corresponded to the education of the woman in more than one-half of all new marriages. With respect to marriage age, young people (up to the age of 29) were more educationally homogamous in the 1990s than older people (30 and older). The percentage of marriages in which the woman attained a higher educational level than the man and the percentage of marriages in which the woman attained a lower educational level than the man were reversed by age in individual years. Female hypogamy and male hypergamy occurred more frequently among younger married couples; female hypergamy and male hypogamy occurred more frequently among older married couples.

These figures show the absolute educational homogamy, hypergamy and hypogamy for men and women by age during the 1990s. However, they do not take into account the structural circumstances that lead men and women to enter into a certain type of marriage. For example, marriages between women with secondary education and men with vocational training are contingent upon the absolute numbers of men and women in these educational categories: there are more female secondary school graduates than male secondary school graduates, and there are more men with vocational training than women with vocational training [*Pohyb obyvatelstva*, 1989, 1992, 1995, 1998, 2001]. Thus, female hypogamy and male hypergamy are to some degree forced. The situation is similar in other educational categories. Therefore, the absolute figures are not considered here to be relevant indicators of the relationships between the selected variables. They can only be taken as illustrative in testing our hypotheses. Although they show the percentage of individual types of marriages and their variation by time and age, they do not indicate the extent to which this variation is a result of people's intentions or the extent to which it is forced by structural circumstances.

We shall test the hypotheses using log-linear and log-multiplicative analyses, which make it possible for us to describe the relationships between variables while controlling for the different numbers of men and women at individual educational levels, i.e. any association is not influenced by marginal frequencies. The goal of this analysis is to estimate a parsimonious model as well as an accurate model, which will satisfactorily explain the structure of the data [for more on this type of analysis, see Hout 1983; Xie 1992; Clogg and Shihadeh 1994; Powers and Xie 2000; Agresti 2002].

We analysed the data in two steps. In the first step, we divided Table 1 by marriage age into two three-way tables and estimated separate models for young married couples (up to 29 years of age) and for older married couples (30 and older) (Analysis I – see below). In this case, because we wanted to test Hypothesis 1 about the trends in educational homogamy of concluded marriages among young people separately from marriages among older people, marriage age became the differential criterion. There were two aims behind this step: one was to eliminate remarriage from the testing of Hypothesis 1 (up to the age of 29, repeated marital choice occurs rarely; the frequency increases after the age of 30) because we thought it might distort the test (in the case of remarriage, a person is influenced by their first choice of spouse, and will probably be partial to different partnership criteria, especially if that person has a dependent(s) from the first marriage – a child or children). The other and more important aim was to test whether the pattern of association among young fiancés and older fiancés is the same. In the second step (Analysis II), we estimated models for all the data (all of Table 1) and again tested Hypothesis 1 about the trends in educational marital choice during the 1990s, and Hypothesis 2 about the influence that the age of fiancés at the time of their marriage had on educational homogamy in Czech society in the 1990s.

Results of the analyses

At the beginning of each of the two analyses we estimated a saturated model that accurately simulated the structure of the data. Then, for both types of analyses, we estimated a model of conditional independence, which presupposes no relationship between the variables. When it was discovered in either of the analyses that the independence model fits the data very poorly, we tested the data against models that differed from the saturated model with regard to constraints in two-way interactions – within tables – and with regard to constraints in multi-way interactions – across tables.²

Analysis I

Table 3 presents the results of the models estimated for Analysis I, which tested the relationship between three variables (*M* – men, *W* – women, *Y* – years) for young married couples and older married couples separately.³ Model A1 is a conditional independence model. This model was designed to eliminate the relationship between *M* and *W* when the third variable *Y* is controlled. The differences between the expected frequencies of the model and the measured frequencies in the tables are high, both among young married couples and among older married couples. This model does not fit the data. Model A2 differs from Model A1 heterogeneously (subscript *l*), i.e. for each table separately by blocked main diagonals *B* (see Image 1, constraint *B*).⁴ Even when the difference between the model frequencies and the measured frequencies in both age categories decreased, the difference between them remained so large that this model could not be accepted.

The other four models (B1, B2, C1 and C2) are constant social fluidity models [Erikson and Goldthorpe 1992]. These models differ by heterogeneously blocked main diagonals and constraints placed on three-way interactions. Model B1 and Model B2 do not presuppose any occurrence of a three-way interaction; the relationship between *M* and *W* by *Y* is constant. The difference between Model B1 and Model B2 is that B1 was estimated without blocked main diagonals and B2 was es-

² We estimated all the models using the LEM program [Vermunt 1997]. The input data and the syntax for the calculation are freely available for downloading and replication at <http://www.fss.muni.cz/~katrnak>

³ In order to test the fit of the model, we used the log-likelihood ratio chi-square statistic (L^2), which is a deviation of the estimated frequencies from the measured frequencies (when projecting a saturated model, $L^2 = 0$). Also, we worked with the index of dissimilarity (Δ) and with the Bayesian information criterion (*BIC*) [Raftery 1986, 1995].

⁴ In mobility and similar contingency tables, frequencies in the fields along the main diagonal are, unlike the other fields in the table, usually very high because they represent the 'hereditary effect'. Therefore, it is customary to block the main diagonals in the table, whereby the hereditary effect is eliminated.

Table 3. Goodness-of-fit measures of models of educational assortative mating, calculated separately for age group (- 29) and age group (30+) in the Czech Republic in 1988, 1991, 1994, 1997 and 2000.

Model	Up to age 29				Age 30 and over		
	d.f.	L ²	Δ	BIC	L ²	Δ	BIC
A1) YM YW	45	85 101.0	24.1	84 546	41 420.5	27.2	40 904
A2) YM YW (B) ₁	25	12 045.7	4.9	11 739	7 448.9	7.9	7 161
B1) YM YW MW	36	187.5	0.9	-256	116.4	1.2	-298
B2) YM YW MW (B) ₁	20	27.1	0.2	-220	34.2	0.4	-196
C1) YM YW (MW) _u	32	127.1	0.7	-267	101.3	1.0	-267
C2) YM YW (MW) _u (B) ₁	16	25.0	0.2	-172	26.9	0.4	-157
D1) model A2 (D) _o	23	85.6	0.4	-198	163.8	0.9	-101
D2) model A2 (D) _x	19	83.4	0.4	-152	157.5	0.9	-61
E1) model A2 (D P) _o	22	69.6	0.3	-202	88.2	0.6	-165
E2) model A2 (D P) _x	18	67.9	0.3	-154	82.7	0.5	-124
F1) model A2 (D P S) _o	22	79.7	0.4	-192	78.5	0.7	-175
F2) model A2 (D P S) _x	18	77.4	0.4	-145	73.2	0.6	-134

Note: Y - years; M - men; W - women; B - blocked main diagonals; D - distance; P - effect of sex on heterogamy; S - educational status effect on entering into marriage; subscript l - heterogeneous effect among tables; subscript o - homogeneous effect among tables; subscript u - uniform effect among tables; subscript x - log-multiplicative effect among tables; L² is the log-likelihood ratio chi-square statistic; d.f. refers to the degrees of freedom; BIC is the Bayesian Information Criterion ($BIC = L^2 - (d.f.) \log(N)$), in which N is the total number of cases (for the age group up to 29 years N is 225 956; for the age group 30 and over N is 99 040); Δ is the index of dissimilarity, which indicates the proportion of cases misclassified by the model.

timated with heterogeneously blocked main diagonals. The two remaining models, Model C1 and C2, were also estimated both without blocked and with heterogeneously blocked main diagonals; what differentiates them from the two previous models is the uniform effect (subscript u) between two-way interactions by Y [Yamaguchi 1987]. This means that the two-way interaction between the education of M and W was the same in all the tables, and the three-way interaction between the tables was estimated as a sum of this two-way interaction and an estimated parameter β, which indicates the change in the strength of the two-way interaction by Y. With respect to both the younger and the older couples, Models B1 and C1 do not, according to conventional statistics, satisfactorily reproduce the data (L² is too high, and Δ is too low given the d.f.). The two remaining models, Models B2 and C2, fit the data satisfactorily. These models, however, are not very parsimonious because the two-way interaction is a full interaction (without a constraint). Because Models

Image 1. Design of factors for two-way association by constraints.

		Constraint B						Constraints B, D			
		Woman's education						Woman's education			
Man's education		EL	VT	SE	TE	EL	VT	SE	TE		
		EL	1	5	5	5	1	5	6	7	
VT	5	2	5	5	5	2	5	6			
SE	5	5	3	5	6	5	3	5			
TE	5	5	5	4	7	6	5	4			

		Constraints H, D, P						Constraints H, D, P, S			
		Woman's education						Woman's education			
Man's education		EL	VT	SE	TE	EL	VT	SE	TE		
		EL	1	6	7	8	1	6	7	8	
VT	5	2	6	7	5	2	5	7			
SE	7	5	3	6	7	6	3	6			
TE	8	7	5	4	8	7	5	4			

Note: B – blocked main diagonals; D – distance; P – effect of sex on heterogamy; S – educational status effect on entering into marriage

B2 and C2 fit the data better than Models B1 and C1, we estimated other models restricting two-way interactions, with heterogeneously blocked main diagonals.

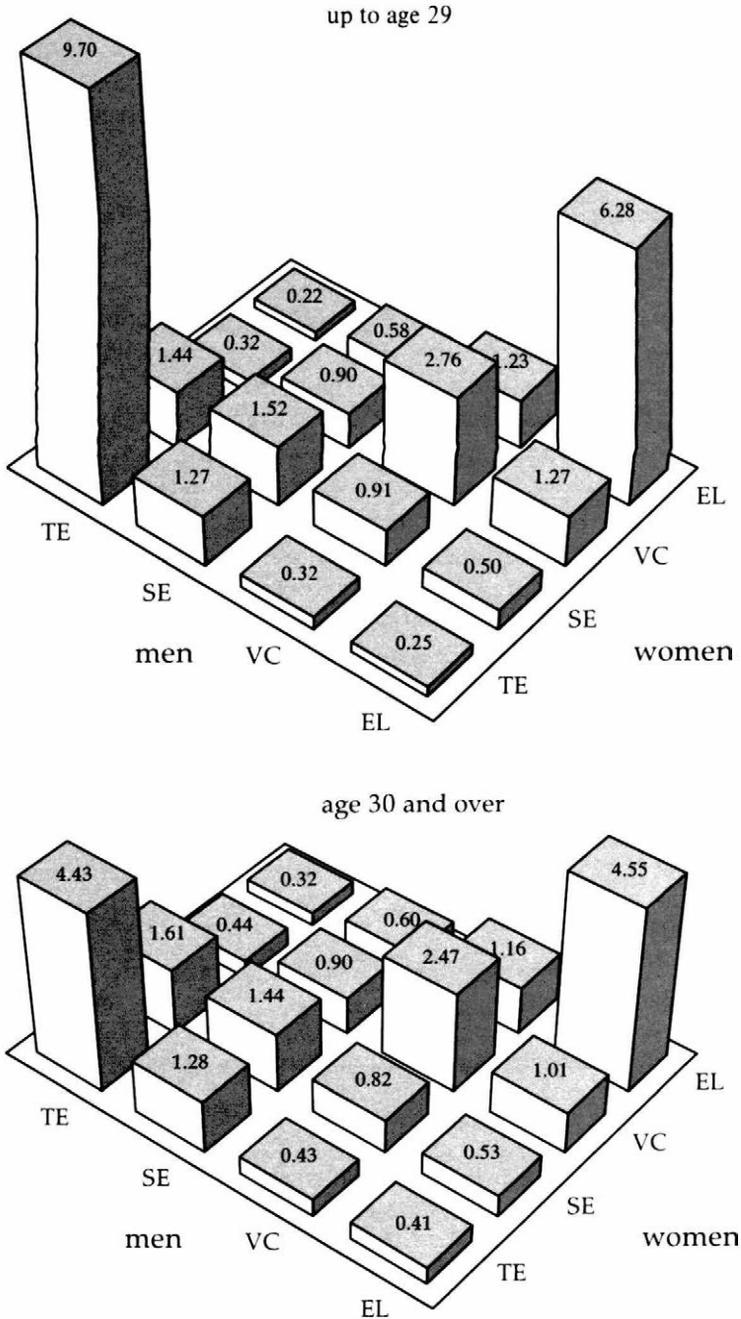
We began with the model of conditional independence, Model A2, and modelled each constraint of the two-way interaction as homogenous (subscript *o*) and as log-multiplicative (subscript *x*) between the tables. The homogenous effect means that a three-way interaction does not exist. The log-multiplicative effect was constructed on the basis of a principle similar to the uniform effect. A two-way interaction between *M* and *W* was estimated as the same for all the tables, and the three-way interaction among the tables was modelled as a factor of this two-way interaction and the estimated parameter φ/ϕ (which shows changes in the strength of the two-way interaction by *Y*). Unlike the uniform effect, however, the log-multiplicative effect does not presuppose an arrangement of rows and columns in the table and is

also more appropriate for modelling individual constraints in two-way interactions (for more on this, see Xie [1992]).

Models D1 and D2 are distance models [Goodman 1984]. In this two-way interaction there are heterogeneously blocked main diagonals (B), and three parameters (D) were estimated for each set of equally distant fields above and below the diagonal (see Image 1, constraints H, D). Studies on assortative mating in the Czech population [c.f. Možný 1983, Vlachová 1996; Katrňák 2001] show that there is a greater tendency towards hypergamy among women than men. Based on this conclusion we estimated parameter P (the effect of sex on heterogamy) in Models E1 and E2; the parameter for those fields just below the main diagonals was different from the parameter for those just above the main diagonals. The equation of the two-way interaction otherwise remained the same as in the preceding models (see Image 1, constraints H, D, P). In the last two models (F1 and F2) the number of parameters in two-way interactions does not change. We have only exchanged the parameter for a woman with vocational training and a man with secondary education for the parameter for a woman with secondary education and a man with vocational training, and defined this exchange as the educational-status effect (S) on entering into marriage (see Image 1, constraints H, D, P, S). In light of the fact that in the Czech population men with vocational training outnumber women with vocational training, and women with secondary education outnumber men with secondary education, the probability that men with vocational training and women with secondary education will enter into a heterogamous marriage differs from that for men with secondary education and women with vocational training (the situation is similar in the case of elementary and tertiary education). This heterogamy by sex and education is accompanied by the complementarity of income between male and female partners with different educational levels (the same income level for men with a lower educational level as for women with a higher educational level) and by a tendency among women with elementary education towards hypergamous marriages with men with vocational training and a tendency among women with secondary education towards hypergamous marriages with men with college education [Katrňák 2001]. Therefore, we used the same parameter for hypergamy and hypogamy among women with secondary education (in the first fields, below and above the main diagonal in each table) as for hypergamy and hypogamy among men with vocational training (in the first fields, above and below the main diagonal). Then, in the first fields above and below the main diagonal in each table we used the same parameter for women with vocational training (and their heterogamy) and for men with secondary education (and their heterogamy). Each of these six models (D1, D2, E1, E2, F1 and F2) fits the data satisfactorily; among younger married couples the difference between the modelled and measured frequencies is slightly less than among older married couples.

With the exception of the first two models (A1, A2), which tested the independence between the variables, and Models B1 and C1, which tested the constant occurrence of an interaction between M and W over time without restricting it, all

Figure 1. Standardised interaction parameters in exponential form (e^b) estimated by model C1 for entering into marriages, calculated separately for up to age 29 and age 30 and over.



the estimated models, according to conventional statistics (L^2 , Δ and $d.f.$), reproduce the table data satisfactorily. According to the *BIC* criterion, in the case of young fiancés the model that most closely corresponded to the data is Model C1; in the case of older fiancés, it is Model B1. A comparison of the two-way interaction parameters of Model C1 is shown in Figure 1.⁵ We can see that educational homogamy is generally higher among younger fiancés than among older fiancés. In both age categories, homogamy is strongest among fiancés with college education and fiancés with elementary education.⁶ Homogamy falls significantly as one approaches the center of the table along the main diagonal. This model and Models B1, B2 and C2 are full two-way interaction models. They do not restrict the structure of the data in the table. Therefore, they are not appropriate for answering the question of whether the pattern of association between men and women according to education is different between young fiancés and older fiancés.

Among the remaining models, according to the *BIC* criterion, Model E1 reproduces the structure of young fiancés slightly better, and Model F1 reproduces the structure of older fiancés slightly better. Nevertheless, differences in the fit of these models relating to younger and older fiancés are not substantively significant, and therefore we consider the pattern of association for marital educational pairing among younger and older fiancés in the Czech population to be identical.

Model E1 for young married couples and Model F1 for older married couples presuppose constant strength in the relationship between the education of *M* and *W* by *Y*. A comparison of the size of the association parameters ϕ in Models D2, E2 and F2 leads us to the same conclusion: an association between the education of the man and the woman in choosing a husband or a wife among younger or older fiancés does not change over time. The social, political and cultural changes that have been taking place in Czech society since 1989 have not had a significant impact on the educational choice of a husband or a wife. The analysis disproved Hypothesis 1, that educational homogamy increased between 1988 and 2000 in the age categories of up to age 29 years and 30 and over.

⁵ The figures are in exponential form, they can acquire values in the interval $<0; \infty>$; a figure of '1' represents an occurrence corresponding to a random occurrence (without any relationship between variants of the variables), a figure above 1 represents a factor of over-representation of the occurrence compared to the average and a figure below 1 represents the factor of under-representation of the occurrence compared to the average. These figures result from *effect coding*; in and of themselves they do not have any meaning.

⁶ Bukodi [2001] reached the same conclusion using the Hungarian population. The greatest educational homogamy in Hungarian society can be found among people with the lowest and highest educational levels.

Analysis II

In Analysis II we worked with four variables (*M* – men, *W* – women, *Y* – years, *A* – age) and again tested Hypothesis 1 (now on the total sample) and Hypothesis 2 with regard to the influence of the age of the fiancés on educational homogamy. The models estimated in this analysis are identical to the models estimated in Analysis I. First, we estimated the conditional independence model (the relationship between *M* and *W* upon entering into marriage disappears when we control for *Y* and *A*). Then we estimated the same model with heterogeneously blocked main diagonals (constraint *H* – see Image 1). As shown in Table 4 (Models A1 and A2), none of these models satisfactorily reproduce the data from the table. The other models (Models B1, B2, C1 and C2) presuppose a constant two-way interaction between *M* and *W* by *Y* and *A*. As in Analysis I, they differ by the heterogeneously blocked main diagonals and by the constraints of the four-way interactions (Models B1 and B2 do not

Table 4. Goodness-of-fit measures of models of educational assortative mating in the Czech Republic in 1988, 1991, 1994, 1997 and 2000.

Model	d.f.	L ²	Δ	BIC
A1) YAM YAW	90	126 521.5	25.0	125 379
A2) YAM YAW (B) _l	50	19 494.6	5.8	18 860
B1) YAM YAW MW	81	2 049.1	2.3	1 021
B2) YAM YAW MW (B) _l	45	268.5	0.5	-303
C1) YAM YAW (MW) _u	72	1082.5	1.8	169
C2) YAM YAW (MW) _u (B) _l	36	113.6	0.4	-343
D1) model A2 (D) _o	48	390.5	0.6	-219
D2) model A2 (D) _{x(R)}	44	387.0	0.6	-171
D3) model A2 (D) _{x(RV)}	39	241.1	0.5	-254
E1) model A2 (D P) _o	47	385.8	0.6	-211
E2) model A2 (D P) _{x(R)}	43	382.6	0.6	-163
E3) model A2 (D P) _{x(RV)}	38	238.5	0.5	-244
F1) model A2 (D P S) _o	47	316.9	0.6	-280
F2) model A2 (D P S) _{x(R)}	43	314.2	0.6	-232
F3) model A2 (D P S) _{x(RV)}	38	167.6	0.5	-315

Note: *Y* – years; *A* – age; *M* – men; *W* – women; *B* – blocked main diagonals; *D* – distance; *P* – effect of sex on heterogamy; *S* – educational status effect on concluding marriage; subscript *l* – heterogeneous effect among tables; subscript *o* – homogeneous effect among tables; subscript *u* – uniform effect among tables; subscript *x* – log-multiplicative effect among tables; L² is the log-likelihood ratio chi-square statistic; d.f. refers to the degrees of freedom; BIC is the Bayesian Information Criterion (BIC= L² – (d.f.) log (*N*)), in which *N* is the total number of cases (326 996); Δ is the index of dissimilarity, which indicates the proportion of cases misclassified by the model.

Table 5. Association parameters ϕ of model F2 (by marriage age) and of model F3 (by marriage age and year) for educational homogamy in the Czech Republic.

Model	Age	1988	1991	1994	1997	2000
F2)		0.444	0.453	0.455	0.440	0.445
F3)	up to age 29	0.480	0.476	0.490	0.498	0.491
	over age 30	0.391	0.417	0.414	0.388	0.405

Note: The ϕ parameters are normalised in the case of age (model F2) so that $\Sigma\phi^2 = 1$, and in the case of year and age (model F3) so that $\Sigma\phi^2 = 2$.

presuppose an occurrence of a four-way interaction, Models C1 and C2 model it as uniform). The fit of these models (with the exception of models with blocked main diagonals (B2, G2)) is not satisfactory. Therefore, as in Analysis I, we estimated other models with heterogeneously blocked main diagonals. Model D1 is a homogeneous distance model that presupposes an unchanging structure for the two-way interaction by Y and A (constraints H, D – see Image 1). Model D2 differs from D1 by the three-way log-multiplicative effect by Y , and Model D3 in the four-way log-multiplicative effect by Y and A . Model E1 is based on Model D1, with the addition of the effect of sex (P) on heterogamy (constraints H, D, P – see Image 1). Models E2 and E3 differ from E1 by the three-way (by Y) and four-way (by Y and A) log-multiplicative effect. The last three models (Models F1, F2 and F3) are based on Model E1; they add the educational-status effect (S) on entering into marriage to the two-way interaction (constraints H, D, P, S – see Image 1). As in the previous models, they differ by constraints in multi-way interactions (F1 does not presuppose any occurrence of a multi-way interaction, F2 models the interaction as log-multiplicative by Y , and F3 as log-multiplicative by Y and A).

According to the BIC criterion and the conventional statistics (L^2 and Δ given the *d.f.*), and with respect to parsimony and accuracy, Model F3 fits the data the most satisfactorily. The estimated parameters of association ϕ between M and W by Y and A in this model are presented in Table 5 (to help illustrate, also provided are the parameters of association ϕ between M and W only by Y in Model F2). Although the values of parameter ϕ are more volatile in specific years in the age category 30-and-over than in the younger age group, we cannot speak of a tendency or even a trend. The measure of educational homogamy among men and women remained constant among young and older Czech fiancés in the course of the 1990s. Analysis of the data contained in Table 1 does not demonstrate the validity of Hypothesis 1 relating to an increase in educational homogamy. Nevertheless, the association parameters ϕ are different in specific years between young and older married couples (on average by 18%). In Czech society, people over 30 who enter into marriage are 18% less likely than people under 30 to marry a partner with the same educational level. We were not able to disprove Hypothesis 2 relating to the occurrence of less educational homogamy among people entering into marriage at a later age.

Conclusion and discussion

Our goal in this paper was to describe the development of educational homogamy in Czech society in the 1990s. We analysed all marriages between young (up to the marriage age of 29) and older (marriage age 30 and over) people in selected years (1988, 1991, 1994, 1997, and 2000) and tested two hypotheses. According to the first hypothesis, educational homogamy (especially among young fiancés) should have increased after 1989. According to the second hypothesis, the educational homogamy of marriages where the age of the fiancés is under 30 should be higher than those marriages where fiancés were older than 30 years of age.

The analysis did not confirm our first hypothesis. The relative educational homogamy remained constant between 1988 and 2000, both among young and older fiancés. As for the second hypothesis, our analysis did not disprove it. Among people who entered into marriage before the age of 30, the relative educational homogamy is 18% higher than among people who entered marriage after the age of 30. This difference remained practically the same between 1988 and 2000.

The finding that educational homogamy in Czech society in the 1990s did not change is very surprising. It means that during the transformation from socialism to capitalism, social barriers between people did not increase. This conclusion is at odds with the findings of the most recent mobility research studies [Gerber and Hout 2002; Pollak and Müller 2002], which have dealt with the transformation of the social structure in the 1990s in the post-communist countries. Gerber and Hout [2002] examined inter-generational social mobility in Russian society between 1988 and 2000 and showed that the social structure of Russian society was closing. Pollak and Müller [2002] reached the same conclusion when they compared inter-generational mobility in West and East Germany. The social structure in East Germany was indeed more open than the social structure of West Germany, but in both cases the social structure is gradually closing and social fluidity decreasing.

We believe that there are three possible explanations for the disparity between our findings about the constant measure of educational homogamy in the Czech Republic and the examples of the closing social structure in Russian and in East Germany.

The most likely explanation seems to be the decline in the marriage rate in Czech society after 1989. When we take another look at the total number of marriages in the selected years (Table 1), we see that while in 1988, 59 792 people in the 29-and-under age group entered into marriage, in 2000 only 33 914 people did. In the 1990s there was an increase in the number of people in the 29-and-under age group who remained single. With respect to education, these young singles are to be found especially among people with tertiary education [see Katrňák 2004] or, to put it differently, among people, who only rarely choose a spouse with a different educational level; homogamy among their group far exceeds rates of occurrence in the other educational groups (see Figure 1). We believe that our findings about the constant trends in educational homogamy after 1989 in Czech society may be due

to this decrease of young female and male college graduates in the marriage market. In such a case, the social structure in the Czech Republic during the 1990s would experience changes similar to those which Gerber and Hout [2002] identified in Russian society, and Pollak and Müller [2002] in the former East Germany. The measurement of educational homogamy in Czech society does not reflect these changes because young people with college education (who are otherwise very educationally homogamous) disappeared from the marriage market after 1989. However, this explanation for the different conclusions about the development of the social structure in post-communist countries is complicated by the constant educational homogamy in the older age group of fiancés (marriage age 30 and over). In this case, the number of marriages did not fall between 1988 and 2000 (see Table 1) and therefore homogamy should have risen; nevertheless, this did not occur.

Another possible explanation is that developments in Russian and German societies and developments in Czech society are diverging. However, we do not consider this conclusion to be acceptable. First, when compared to the countries of Western Europe, the social structures of the former socialist countries are still considered to be more similar than different [see Domański 2000]. Second, the economic, political, and cultural changes that all the post-socialist countries experienced during the 1990s are the same in content, intensity, and direction, and therefore their consequences are also similar.

The last possible explanation could lie in the different focal points of the research studies: our study examines educational homogamy, while the other two research studies in Russia and Germany analysed social mobility. The question is whether the relationship between an increase in educational homogamy and a decrease in social mobility [Ultee and Luijkx 1994; Smits, Lammers and Ultee 1998a, 1998b] also applies to the transforming countries of the former Soviet bloc, and whether the social mobility research study and the educational homogamy research study indicate one and the same thing – the opening (or closing) of the social structure.

Unlike the falsification of the first hypothesis, the verification of the second hypothesis (about the lower educational homogamy of marriages between partners at a later age) is not surprising. Mare's conclusion [1991] that the fall in educational homogamy is directly proportional to the increase in the interval between graduation and the age at marriage cannot however be accepted in this case. The average age upon entering into the first marriage in Czech society increased between 1990 and 2000 (among men from 24 to 28.8 years of age, and among women from 21.4 to 26.9 years of age [*Populační vývoj* 2001]); the interval between graduation (and entry into the labour market) and entry into marriage continued to increase during the 1990s. Nevertheless, because the difference between the educational homogamy among young and older fiancés remains practically the same over time (with the exception of minor annual fluctuations) we do not believe that this difference is a result of the increasing age of partners upon entering into marriage. The difference in the educational homogamy by age tends to be influenced rather by the different ex-

pectations concerning a partner's qualities according to age [Kalmijn 1994]. Young people tend to define these qualities in terms of cultural capital (expectations about the future economic capital of a partner). Moreover, they choose from a wider circle of potential brides and grooms, and therefore it is possible to find a greater occurrence of educational homogamy among them. Conversely, older people can rely on economic capital as the main criterion in spouse selection, as the foundation of the employment career of a partner already exists; they also choose from a narrower circle of potential spouses, and thus the occurrence of educational homogamy is lower. These differences in the conditions that young and older people face over the choice of their spouse are not likely to have changed much during the transformation from socialism to capitalism. In the Czech Republic, the difference between the educational homogamy of partners who married earlier and partners who married at a later age remained practically the same throughout the 1990s.

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