Educational Homogamy of Married and Unmarried Couples in English and French Canada[1]

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ABSTRACT

This study investigates the relative similarity of educational assortative mating patterns among young married and cohabiting couples using Canadian census data from 2001. It contrasts the patterns observed in Quebec with those observed elsewhere in Canada, as these regions display very different demographic trends, especially with respect to cohabitation. First, we hypothesize that the gap between married and unmarried couples will be smaller in Quebec, as cohabitation is more common in this province. Second, we suggest that the double-selection hypothesis predicting higher educational homogamy among married couples should be more appropriate to explain the behaviours observed in Canada outside of Quebec, whereas the utilitarian theory predicting higher educational homogamy among cohabiting couples should apply better to the French province situation. The results do not support our hypotheses as difference between marriage and cohabitation is rather similar in both regions and cohabitors generally display lower educational homogamy.

The question “who marries whom” is important for documenting the existence of social barriers as well as for explaining income inequalities and their intergenerational transmission. Marriage indicates the presence of formal ties between individuals, families and social groups, and the composition of current marriages often determines the amount of economic, cultural or social resources that are available to existing households. In this respect, assortative mating patterns more or less define the family environment in which children are raised, and thus contribute to the life opportunities opened for the next generation (Esping-Andersen 2007; Mare 2000, 1991; Blossfeld and Timm 2003; Kalmijn 1998; Smits, Ultee, and Lammers 1998, 1999; Kalmijn 1991). Although many dimensions of assortative mating can be studied, we focus on selection with respect to education as schooling is a major determinant of occupational success and cultural capital in modern societies.

Past research on educational homogamy in North America has produced mixed results, which partly reflects differences in the targeted populations and used methodologies (Hou and Myles 2007). Despite this diversity, there is evidence showing that the levels of educational homogamy have been rising in this region for several decades (Qian and Preston 1993; Hou and Myles 2007; Schwartz and Mare 2005; Mare 1991; Kalmijn 1991; Qian 1998; Smits, Ultee, and Lammers 1998). This trend is observable not only for the absolute number of educationally homogamous marriages but also for relative measures of homogamy that control for the educational composition of the society. Increasing educational homogamy cannot therefore be explained solely by educational expansion, but it also indicates that increasingly selective forces of attraction are at work.

However, it should be noted that the rising levels of educational homogamy observed among spouses and the trend towards stricter marital selection are accompanied by declining marriage rates and the increasing popularity of non-marital cohabitation. Hence, while spouses are becoming more alike in terms of socioeconomic characteristics, a declining fraction of men and women are in fact marrying and marriage is being progressively replaced by cohabitation, at least among certain age and social groups. In spite of this development, we know relatively little about the assortative mating patterns of unmarried couples and about the extent to which they differ from those of married couples. Studies examining the degree of educational homogamy among cohabiting couples are rare and focus mostly on the situation observed in the United States but we do not know much about Canada in this respect. Although one of the most recent studies of educational homogamy in this country (Hou and Myles 2007) includes cohabiting couples, it does not directly compare married and unmarried unions.

This paper goes beyond prior studies conducted in North America as it focuses on Canada rather than on the United States. Moreover, it contrasts Canadian regions that represent rather different cultural contexts and display radically different demographic behaviour, especially with respect to cohabitation. More precisely, we focus on the difference between the predominantly francophone province of Quebec and the other Anglophone provinces. In the first part of the paper, we briefly summarize main results from the previous research. In the next section, we review existing theories about differences in assortative mating patterns among married and cohabiting couples; we discuss their relevance for the Canadian context and formulate specific hypotheses relevant to marital and non-marital selection in the two observed settings. In the third part, we analyze educational homogamy by applying log-linear models to the 2001 Canadian Census data.

1. Past research on differences in education homogamy among married and cohabiting couples

So far, the studies of educational homogamy in cohabitation (mainly from the United States) have produced mixed results. For example, Schoen and Weinick (1993) investigated the behaviour of couples aged 19-29 who began their relationship within the 24 months prior to the date of the interview. Using the National Survey of Families and Household conducted in 1987-88, they found that American cohabitors show a greater propensity to select a partner with a similar level of education than married couples do. In contrast, Blackwell and Lichter (2000) who analyzed couples in which the female partner was younger than 30 years, using the PUMS of the 1990 decennial census, concluded that educational homogamy was higher among married couples than among cohabitors. Similarly, Jepsen and Jepsen's (2002) analyses of the 1990 PUMS revealed higher educational homogamy among married couples compared to opposite- or same-sex cohabiting couples. Blackwell and Lichter (2004) later used the National Survey of Family Growth, a U.S. survey of non-institutionalized population of women aged 15-44 in 1995. Contrary to their previous work, they found that "cohabiting couples appear to be more homogenous at higher levels of education than dating or married couples". More recently, Hamplova (2005) compared cohabiting and married couples across three distinct welfare regimes using the European Social Survey from 2002 and 2004, and showed that the differences between married and unmarried couples largely depend upon the degree to which cohabitation is institutionalized in any given society.

2. Assortative mating in marriage and cohabitation – theoretical background

In one of the first studies on assortative mating patterns in cohabitation, Schoen and Weinick (1993) suggested that cohabitation – as a "looser bond" – lacks permanence and is less often than marriage associated with having and rearing children. As a consequence, they expected cohabiting men and women to be both more active on the labour market and to be more likely to contribute to the household finances; and thus to give a higher value to achieved status, i.e. to education. Schoen and Weinick therefore predicted that cohabiting couples would display greater educational homogamy and a lower tendency for women to 'marry up'.

Schoen and Weinick's (1993) argumentation can be further expanded with Brines and Joyner's (1999) work on principles of cohesion in marriage and cohabitation. Adopting utilitarian theory, they suggest that the degree of permanence and uncertainty regarding the future of the relationship shape the essential principles of the couple's cohesiveness. We hypothesize that this should have consequences for assortative mating. The marriage contract insures men and women against a total loss on their investments and thus facilitates specialization of human capital and division of labour within the couple, which in turn does not necessarily entail sharing a similar educational level. In contrast, cohabitors' uncertainty about the future of their relationship prescribes a more cautious approach to solidarity, financial transfers, shared ownership, and joint investment in general, and renders the risks of specialization higher (Brines and Joyner 1999). Therefore, the condition most favourable to stability of cohabitation is that of partners' equal power and status (homogamy) in terms of a series of characteristics, such as education, occupational status or income.

Furthermore, cohabitors' greater tendency towards higher educational homogamy might be also reinforced by the different set of values they hold as compared to married individuals, namely their emphasis on individualism, independence, equality, and non-traditional gender roles (Surkyn & Lesthaeghe 2006; Van de Kaa 1993; Axinn & Thornton 1992; Inglehart 1990).

Contrary to the utilitarian perspective, the double-selection approach predicts that higher educational homogamy will be found among married spouses (Blackwell & Lichter 2004; 2000). According to this perspective, the main role of cohabitation is to provide young adults with a highly selective pool of potential spouses from which they subsequently draw their future marriage partners (Blackwell & Lichter 2000). This 'winnowing process' implies that individuals entering cohabiting unions may be less selective about a partner's specific characteristics than individuals entering marriage. In short, some partners are good enough to live with, but not good enough to marry.[2] As this theory assumes that homogamy is generally the preferred status in current societies, less strict selection among cohabitors should lead to lower educational homogamy in cohabitation than in marriage.

The opposite predictions made about the level of educational homogamy in cohabitation relative to marriage apparently stem from the different assumptions about the meaning and role of cohabitation that are made in the two approaches. The utilitarian perspective views cohabitation mainly as an alternative to marriage, i.e. a long-term intimate relationship, and explains under which conditions couples will stay together in

[2] For a discussion of the differences in the selection criteria intentionally used in married and cohabiting unions, see Jayakody and Cabrera (2002).

the absence of a marriage contract. In contrast, the double-selection hypothesis assumes that cohabitation serves primarily as a trial arrangement before marriage, the good matches marry and mismatches separate.

2.1. Cohabitation in English and French Canada

Canada offers an excellent opportunity to test these theories, as cohabitation has reached very different levels of institutionalization across different regions. In Quebec, cohabitation has become the modal way to form a family. Nowadays, nearly half of children born in Quebec are born to cohabiting parents. Elsewhere in Canada, cohabitation serves mainly as a prelude to marriage with only approximately 15 percent of children who are born to an unmarried couple (Le Bourdais and Lapierre-Adamcyk 2004).

Reflecting the differences between Quebec and the rest of Canada in prevalence and respective roles of marital and cohabiting unions, we expect the observed patterns of assortative mating to vary across these regions. First, we suggest that higher levels of institutionalization and acceptance of cohabitation in Quebec should be reflected in smaller differences between married and unmarried couples with respect to assortative mating patterns.

Second, we expect that marriage will differ from cohabitation in both parts of the country in a distinct way. As a long-lasting institution in which child-bearing and child-rearing now takes place, cohabitation in Quebec has become an alternative to marriage (Le Bourdais and Lapierre-Adamcyk 2004) but without the same degree of legal protection in the case of separation. This situation suggests that the utilitarian perspective might be appropriate to predict the degree of educational homogamy among cohabitors relative to married couples in Quebec. Hence, unmarried couples in the French province are expected to be more homogamous with respect to education than married couples. In contrast, in the rest of Canada where cohabitation is still perceived as a “test before marriage”, the double selection hypothesis is more likely to apply. In this case, we would expect to find greater educational similarity among married than unmarried couples.

3. Data

To analyze partner selection with respect to education in marriage and cohabitation in Quebec and elsewhere in Canada, we use the *Public Use Microdata File (PUMF) on Families* from the 2001 Census. The 2001 PUMF data is based on approximately a 2.7 % sample of the population enumerated in the census. Yukon and the Northwestern territories are excluded from the analysis[3]. The total sample size is 190,299 couples.

The analysis is restricted to younger couples, i.e. those in which the woman is aged 25-34 and the age difference between partners is no more than 10 years. Three reasons justify this age restriction. First, cohabitation is a relatively new phenomenon which is more common among younger generations. Second, at age 25-34, the majority of individuals have already completed their education or are sufficiently advanced to provide useful information about their educational careers on the marriage and cohabitation market. Third, as women tend to partner with older men, we chose not to restrict the age range of men since it could lead to biased results due to a disproportional

[3] There were only 504 couples from the mentioned territories in the 2001 PUMF. They did not follow the general pattern typical of the Anglophone provinces and the proportion of cohabiting couples was relatively high (26.2 % in 1991, 29.7 % in 1996, and 33.9 % in 2001). This is probably due to their specific population structure, e.g. high number of individuals from the first nations or workers in specific industries.

representation of same-age couples. The age limits reduced the sample size to 34,293 couples (20,902 married and 5,419 cohabiting outside of Quebec; 3,562 married and 4,410 cohabiting in Quebec).

Table 1 presents the percentage of cohabiting couples among all couples living together across Canadian provinces. The left portion of the table displays the percentage of the unions in the unrestricted sample; the right portion shows the proportion of cohabiting couples after the age restriction was imposed. In 2001, cohabitation constituted the modal way of conjugal life among young Quebecers, as only 44.7 percent of young couples in the province were married. In contrast, the majority of young couples residing outside of Quebec lived in married unions. The highest proportion of married couples among young couples was found in the province of Saskatchewan (80.9 percent) and the lowest in New Brunswick (71.6 percent).

Table 1
PROPORTION OF COHABITING COUPLES BY PROVINCE AND YEAR

	ALL COUPLES	YOUNG COUPLES*
Newfoundland	11.3	25.3
Prince Edward Island	11.4	23.6
Nova Scotia	13.7	26.0
New Brunswick	15.4	28.4
Quebec	30.2	55.3
Ontario	11.0	18.8
Manitoba	11.7	20.8
Saskatchewan	11.3	19.1
Alberta	13.5	21.3
British Columbia	13.1	22.1
N of cohabitants	31,134	9,829
Total N of couples	190,299	34,293

Source: Census (PUMF) 1991, 1996, 2001
* Women aged 25-34 and age difference between partners no more than 10 years

In the PUMF data we were able to identify five categories of formal education:

1) No formal training: no high school certificate and no other training or trade certificate[4]

2) Some training: no high school certificate but other training or trade certificate[5]

3) High school: high school certificate but no other training

4) Some post-secondary education: post-high school training but no college diploma[6]

5) University: bachelor degree or higher.

These categories are broad enough to overcome the existing differences across the various provincial educational systems (e.g. shorter duration of high school in Quebec) but at the same time they take into account the basic milestones of the various provincial educational systems.

To analyze the educational assortative mating behaviour of married and unmarried couples in English and French Canada, the data were cross-classified into a four-way table: Man's education x Woman's education x Type of union x Region (5 x 5 x 2 x 2 – see Table 2). Man's and woman's education is classified into the five categories

[4] The category includes people without high school (secondary) certificate and without further training.

[5] The category includes individuals without high school (secondary) certificate but with some other formal education. The PUMFs 1991 and 2001 distinguished 2 sub-categories (with trades certificate or with other non-university traning). The PUMF 1996 merged these two groups into a single category "with further training".

[6] The category includes everybody who declared having some post-secondary training but not obtaining a university degree.

described above; the type of union distinguishes between married and cohabiting unions; and the region variables differentiates between Quebec and the other Canadian provinces.

3.1. Descriptive statistics

Table 2 shows the distribution of men's and women's education by region and type of union. The raw percentages presented in Table 2 suggest two findings. First, cohabitations are generally less homogamous than marriages. Second, the difference between marriage and cohabitation is smaller in the French province. For example, outside of Quebec in 2001, the proportion of married couples in which both spouses have the same education was around 6 percentage points higher than the proportion of their cohabiting counterparts (52.5 % versus 46.5%). In Quebec, the difference between married and cohabiting couples was 3.6 percentage points. The lower levels of educational homogamy among unmarried couples are driven by cohabiting men and women with higher education who tend to live in less homogamous partnerships than their married counterparts. In contrast, cohabiting couples with lower levels of education display higher levels of homogamy than married couples.

However, the descriptive statistics need to be treated with caution as they are influenced by the marginal distributions of men's and women's education. In the next section, we turn to log-linear models that control for changes in the marginal distributions and analyze the observed trends, net of differences in the educational structure.

Table 2

DISTRIBUTION (IN PERCENTAGES) OF CANADIAN COUPLES BY MEN'S AND WOMEN'S EDUCATION, UNION TYPE & REGION OF RESIDENCE

	Marriage						Cohabitation					
	Woman's education						Woman's education					
Man's education	No training	Training	High school	Post-secondary	University	Total	No training	Training	High school	Post-secondary	University	Total
Canada outside of Quebec												
No training	7.1	1.9	1.9	3.6	0.8	15.3	9.1	3.4	2.6	5.7	0.7	21.5
Training	2.0	3.8	1.1	2.9	1.2	11.0	3.0	4.4	1.1	3.7	1.4	13.5
High school	1.0	0.8	3.9	5.4	1.2	12.3	1.8	1.1	3.5	6.0	1.6	13.9
Post-sec.	1.6	1.8	4.3	21.5	7.9	37.0	2.7	2.2	3.8	18.4	7.5	34.6
University	0.4	0.8	0.9	6.0	16.2	24.4	0.2	0.4	0.6	4.2	11.1	16.5
Total	12.1	9.1	12.0	39.4	27.4	100.0	16.9	11.4	11.5	37.8	22.3	100.0
Sum of diagonals	52.5						46.5					
Quebec												
No training	6.0	1.6	2.0	4.1	0.8	14.6	7.6	2.0	2.5	6.3	1.3	19.7
Training	1.5	3.5	1.1	2.6	1.6	10.3	1.4	4.0	1.3	3.9	1.7	12.4
High school	1.4	1.2	4.1	4.8	0.8	12.3	1.5	1.3	3.0	4.9	1.3	12.0
Post-sec.	1.8	2.2	3.5	21.5	7.8	36.9	2.6	2.3	2.6	21.6	8.1	37.2
University	0.3	1.1	0.5	6.7	17.3	25.9	0.2	0.9	0.2	4.8	12.6	18.6
Total	11.1	9.7	11.2	39.6	28.4	100.0	13.4	10.5	9.7	41.4	25.1	100.0
Sum of diagonals	52.4						48.8					

Source: Census (PUMF) 2001

3.2. Method

Log-linear models are usually used to investigate homogamy patterns in marriage and cohabitation. This method distinguishes between patterns that result from the marginal distributions of male and female characteristics (as the frequency of any cell is determined by the size of its associated marginal totals, i.e. it reflects the relative size of the corresponding educational group), and those that reflect the association observed between the partners' traits, for example the tendency to partner within the same group (Powers and Xie 2000).

Specifically, this paper uses 'crossing models' (Schwartz and Mare 2005; Powers and Xie 2000; Mare 1991; Johnson 1980; Blackwell and Lichter 2004; Schwartz 2005; Kalmijn 1991). These models will allow us to differentiate between the tendency to partner within the same group, and "social distance", i.e. tendency to partner with individuals with relatively similar status comparing to those with very different status (Kalmijn 1991). In general, crossing parameters reflect the idea that people have to cross social barriers if they want to partner with somebody from a different social category. Unlike uniform association models, the crossing models assume that the different barriers separating social groups present varying degrees of difficulty for crossing. Thus, they "reveal which educational differences between prospective spouses are serious barriers to intermarriage and which differences are relatively permeable boundaries" (Mare 1991).

The parameters used in the analysis are summarized in Table 3. Homogamy parameters refer to the cells on the diagonal which represent the odds that the man and the woman have achieved the same educational level. *Homog* is a single parameter that controls whether the cell is on/off the main diagonal without distinguishing between different cells on the main diagonal. *Diag1-Diag5* differentiate the specific cells on the diagonal (*Diag1* - both partners do not have any formal education, *Diag2* - both partners have some training, *Diag3* – both partners have high school, *Diag4* – both partners have some post-secondary education, *Diag5* – both partners have university degree). The hypergamy parameter *(Hyper)* controls whether the cell lies under the main diagonal and indicates whether it is the man who has achieved a higher level of education. The parameter *Crossing 1* (Cr1) indicates the barrier that separates the educational group 1 and group 2 ("no training" and "training"), the parameter *Crossing 2* (Cr2) the barrier separating the second and the third educational categories ("training" and "high school"), the parameter *Crossing 3* (Cr3) the barrier between the third and the fourth educational groups ("high school" and "post-secondary"), and the parameter *Crossing 4* (Cr4) the barrier between the fourth and the fifth categories ("post-secondary" and "university"). The wider the gap existing between the partners' levels of education, the more barriers partners have to cross. For example, an individual with no training who marries a person with a high school diploma has to cross two barriers: the first one between "no training" and "training" (Cr1) and the second one between "training" and "high school" (Cr2).

Table 3
OVERVIEW OF ESTIMATED PARAMETERS

Man's education	Woman's education				
	No training	Training	High	Post secondary	University
No training	Homog	-	-	-	-
Training	-	Homog	-	-	-
High	-	-	Homog	-	-
Post-second	-	-	-	Homog	-
University	-	-	-	-	Homog
No training	Diag1	-	-	-	-
Training	-	Diag2	-	-	-
High	-	-	Diag3	-	-
Post-second	-	-	-	Diag4	-
University	-	-	-	-	Diag5
No training	-	cr1	cr1+cr2	cr1+cr2+cr3	cr1+cr2+cr3+cr4
Training	cr1	-	cr2	cr2+cr3	cr2+cr3+cr4
High	cr1+cr2	cr2	-	cr3	cr3+cr4
Post-second	cr1+cr2+cr3	cr2+cr3	cr3	-	cr4
University	cr1+cr2+cr3+cr4	cr2+cr3+cr4	cr3+cr4	cr4	-
No training	-	-	-	-	-
Training	Hyper	-	-	-	-
High	Hyper	Hyper	-	-	-
Post-second	Hyper	Hyper	Hyper	-	-
University	Hyper	Hyper	Hyper	Hyper	-

The estimates are based on tables standardized to 20,000 couples per region, i.e. 10,000 cohabitations and 10,000 marriages per year and region. The advantage of using the standardized numbers (Ns) of 10,000 unions is that it prevents larger data sets from having a disproportional influence on the model selection process (Ultee and Luijkx 1990; Erikson and Goldthorpe 1987). Standardized cell Ns were calculated as $N_{st} = (N_{orig} / N_{total})*10{,}000$, where N_{st} is the new standardized number of cases in the specific cell, N_{orig} is the original number of cases in this cell and N_{total} is the total number of cases in the table. The standardized cells can also be obtained by multiplying the percentages from Table 2 by 100.

3.3. Results: Log-linear Models[7]

Our analyzes uses strategy applied by Schwartz and Mare (2005). First, we saturate the overall interaction between man's and woman's education (i.e. man's education*woman's education). In the next steps, we add homogamy measures and crossing parameters. Homogamy models estimate the differences in odds of having a partner with the same education while crossing models analyze the differences in the distance between educational groups in absence of homogamy. The described strategy is appropriate if our main interest is to show trends (or differences) in the association as it allows us to focus on similarity or dissimilarity rather than overall levels (Schwartz and Mare 2005).

Table 4 provides the specification and goodness-of-fit statistics of the tested log-linear models. Model selection is based on BIC – Bayesian Information Criterion (Powers and Xie 2000; Raftery 1995) because of the large sample size[8]. Generally, the more negative BIC is, the better the fit of the model.[9]

Model 1 in Table 4 controls for the full association between man's and woman's education and serves as a baseline model. Model 2 adds an interaction term between homogamy and type of the union. This model measures homogamy by a single parameter (indicating whether the cell is on the main diagonal/ outside of the main diagonal) and assumes that spouses and cohabitors differ in the overall tendency to have a partner with

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[7] John Hendrickx's *Desmat* ado-file for Stata is used for estimations.

[8] Value of BIC for each model is counted as BIC = G^2 – [df*ln(N)]. N = 40,000.

[9] Raftery (1995) suggested the following rule of thumb for model evaluations: BIC difference (i.e. difference in BICs between two models) 0-2 is a weak evidence, difference 2-6 is a positive evidence, difference 6-10 is a strong evidence, and difference more than 10 is a very strong evidence.

the same level of education. However, Model 2 ignores differences across educational groups. The interaction term between homogamy parameter and type of the union brings about a large decrease in BIC [BIC difference = 73 (196.3-123.0 = 73.3)] which indicates that marital and cohabiting partnerships indeed significantly differ with respect to educational homogamy. Model 3 considers whether couples in English and French Canada differ in the overall tendency towards homogamy (measured by this crude single parameter) but an increase in BIC does not support this expectation. Finally, Model 4 tests whether the difference between marriage and cohabitation varies across English and French Canada. The BIC criterion indicates that this model is significantly better than Model 3 but is overspecified comparing to Model 2. This would suggest that if we consider this crude overall measure of homogamy (a simple parameter signalling on- and off-diagonal cells) cohabitors in French Canada differ from spouses as much as those in English Canada.

As this single homogamy parameter ignores important variation across educational levels, Models 5 - 10 fit the diagonal exactly, i.e. uses *Diag1-Diag5* as a measure of homogamy. Model 5 assumes that spouses and cohabitors differ in their tendency towards homogamy but that the magnitude of the differences is not the same for individuals from different educational categories and it does not allow the diagonal parameters and their interactions to vary across English and French Canada. The Model 5 that distinguishes specific cells on the main diagonal and their interactions have a considerably better overall fit than Model 2 [BIC decreased by 157 (-34.3+123.0 = 157.3)] confirming that the difference between marital and cohabiting unions depend on the level of education. The next model (Model 6 in Table 4) includes three-way interaction between the cells on the main diagonal, type of union, and regions and thus allows the gap between marriage and cohabitation with respect to homogamy to differ between Quebec and the rest of Canada. Three-way interaction does not, however, improve the fit and the increase in BIC suggests that the model is over-specified. Finally, Models 7 & 8 test the significance of the same interaction effect (i.e. Diag*type of union*region) without saturating the overall interaction between man's and woman's education, i.e. leaving out the interaction between man's education and woman's education but controlling for the number of man and women with given education. Again, the three-way interaction between cells on the main diagonal, union, and region does not seem to be significant.

Table 4
LOG-LINEAR MODELS OF THE ASSOCIATION BETWEEN MAN'S AND WOMAN'S EDUCATION

		G2	df	BIC
M1	EduM*EduF	991.04	75	196.30
M2	EduM*EduF + Homog*U	896.56	73	123.00
M3	EduM*EduF + Homog*Qc	984.73	73	211.17
M4	EduM*EduF + Homog*U*Qc	884.47	69	153.30
M5	EduM*EduF + Diag*U	696.83	69	-34.34
M6	EduM*EduF + Diag*U*Qc	625.19	57	21.18
M7	EduM + EduF + Diag*U	3291.78	80	2444.05
M8	EduM + EduF + Diag*U*Qc	3220.14	68	2499.57
M9	EduM*EduF + Diag*U + Hyper*U	624.67	68	-95.90
M10	EduM*EduF + Diag*U + Hyper*U*Qc	607.43	64	-70.75
M11	EduM*EduF + Homog*U + Hyper*U	824.40	72	61.45
M12	M11 + Cross*U	627.24	68	-93.34
M13	M11 + Cross*U*Qc	485.89	58	-128.72
M14	M13 – Cross4*U*Qc	494.68	60	-141.12

Source: Census (PUMF) 2001
EduM – man's education, EduF – woman's education, Qc – Quebec, Homog - cells on the main diagonal (1 parameter), Diag – cells on the main diagonal (5 parameters), Y – year, U – type of union, Hyper – hypergamy parameters, Cr1 – crossing parameters

In the next step, we model statistical association outside of the main diagonal. First, we relax the assumption postulating that marrying or cohabiting out of one's own educational group is symmetrical for men and women. In the following models, hypergamy parameters are added to the equation and these models control for whether it is the man who has completed a higher level of education.

Model 9 is an extension of Model 5 and allows the diagonal parameters and the hypergamy parameter to vary across unions. The union-specific hypergamy measure improves the model significantly (see the difference in BIC of Model 5 & 9), indicating that married and cohabiting women differ in their tendency to marry up (and correspondingly married and cohabiting men differ in their tendency to marry down). However, Model 9 ignores possible differences between English and French Canada and keeps the interaction term uniform across both regions. The following model (Model 10) relaxes the assumption and tests whether the gap between married and cohabiting couples is significantly different in English Canada comparing to Quebec. The three-way interaction term between hypergamy*union*region however increased BIC [-95.9 versus -70.8] and we must conclude that the difference between spouses and cohabitors is similar in both parts of the country.

Models 11 – 14 look at the off-diagonal patterns in greater details and turn to crossing parameters. Model 11 serves as a baseline model for comparison of crossing models (using a single homogamy parameter and union-specific hypergamy measures). Model 12 adds union-specific crossing parameters testing whether spouses and cohabitors significantly differ in the odds of crossing barriers separating educational groups. The interaction term considerably improves the overall model fit (BIC of Model 11 – BIC of Model 12 = 154). Thus, we must conclude that married and cohabiting couples do not face the same odds of educational inter-partnering. Model 13 adds three-way interaction terms between crossing*union*region testing whether the difference between marriage and cohabitation varies across English and French Canada. Again, this interaction terms improves the model significantly, which suggests that the gap between cohabitors and spouses depend on whether they live in Quebec or in the rest of Canada. However, inspection of the specific interaction terms suggested that the three-way interaction for the fourth crossing parameter is not significant. Therefore, Model 14 drops this term which results in significantly better fit (BIC = -141). We must therefore conclude that while the relative difference between marriage and cohabitation in the odds of crossing educational barriers varies across Canadian regions, this does not apply to the highest barrier.

Interpretation of parameters

First, we report the overall level of homogamy, i.e. the tendency to partner within the same educational group. Our estimates are based on Model 2 from Table 4 as this model shows the best fit from all the models with homogamy parameters. The estimated value for the homogamy parameter in Model 2 is 1.154 and the estimated value for the interaction term between homogamy and union type is -0.195. This estimate shows that cohabiting couples are generally less homogamous than spouses. Specifically, married couples have 3.2 times higher odds of marrying within the same educational group than outside of the group [exp(1.154) = 3.17] and cohabiting couples have 2.6 times higher odds of living with a partner who has achieved the same educational level than being with somebody with different education [exp(1.154-0.195) = 2.60]. If the interaction between homogamy parameters and union type was allowed to vary across regions, the difference between marriage and cohabitation would be weaker in Quebec by 10 percent but this difference was not statistically significant.

Even though the overall levels of homogamy points out to some general tendencies displayed by spouses and cohabitors, we should not ignore the fact that the inclination to form homogamous unions is not uniform across educational classes. In the next step, parameters for the specific cells on the main diagonal are considered. The estimates are based on Model 8 that produces parameters for each cell on the main diagonal separately for married and cohabiting couples in English and French Canada. Model 8 does not include the overall association between men's and women's education.

Figure 1 reports estimated odds of homogamy, i.e. of partnering within the same educational level, and figure 2 shows the estimated odds ratio of homogamy for spouses and cohabitors. These figures document three findings. First, it is evident that individuals with the lowest and especially those with the highest education form the most homogamous groups (see figure 1). Second, the biggest difference between marriage and cohabitation is among university graduates (see figure 1 & 2). Third, the effect of the union type is relatively similar in English and French Canada (differences are not statistically significant, see figure 2 & fit statistics of Models 7 and 8 in Table 4).

Figure 1: Odds of homogamy for married and cohabiting couples in English and French Canada

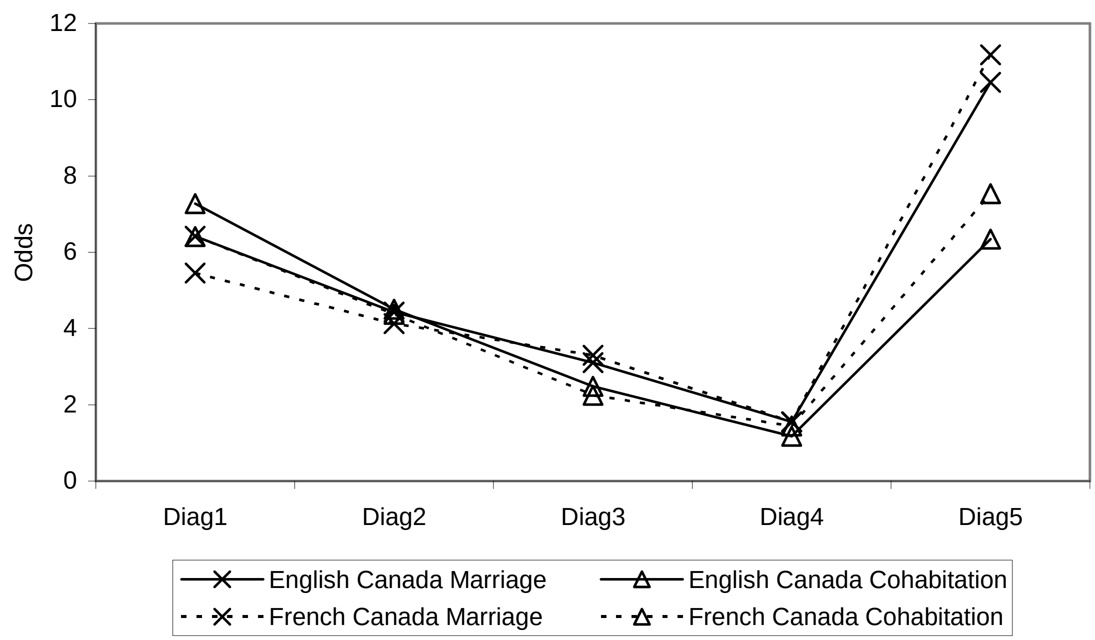
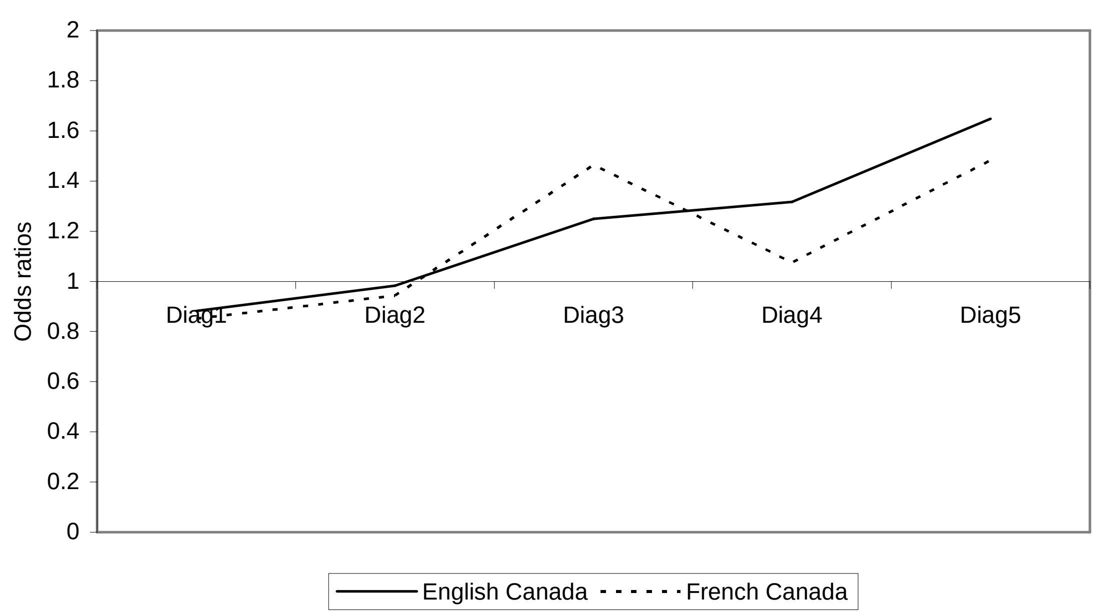


Figure 2: Odds ratios of homogamy for marriage and cohabitation in English and French Canada



Crossing parameters

The homogamy parameters are informative as they describe the odds of living in a homogamous partnership, net of the marginal distribution of men's and women's level of education. However, as argued above, one should note that homogamy parameters cannot fully capture the patterns of educational assortative mating since they ignore the relative proximity of the educational groups. In this section, we turn to the interpretation of the crossing parameters that indicate how likely it is – in the absence of homogamy - to marry or cohabit with someone from a different educational group.

Because our model is asymmetrical with respect to sex, i.e. men and women are not expected to have the same odds of partnering up or down the educational ladder, crossing parameters under and above the main diagonal must be adjusted for the hypergamy. The estimated hypergamy parameters vary across union type (hypergamy parameter = 0.435 for marriage and 0.195 for cohabitation; see lower part of Table 5) and cohabiting women have lower chances for upward mobility than married women. The conversion of the hypergamy parameters into odds indicates that married women have 54 percent higher odds to marry up than to have a husband with lower education [exp (0.435) = 1.54]. Cohabiting women have 21 percent higher odds to partner down [exp (0.195) = 1.21] than to live with a man who has achieved a higher level of education.

We expected that the difference between marriage and cohabitation will be smaller in Quebec. However, the interaction effect between union type, hypergamy parameter, and region was not found to be significant (see Models 9 & 10 in Table 4) and we thus must conclude that difference between marriage and cohabitation with respect to hypergamy is not significantly different in Quebec in comparison to the rest of Canada. This result does not support our initial hypothesis predicting that smaller differences between married and unmarried couples would be found in Quebec as compared to those living in the rest of Canada.

The hypergamy parameters are added to crossing parameters under the main diagonal in the following manner. The value of the first crossing parameter *Crossing 1* for married couples in English Canada is equal to -0.340. If the man has achieved a higher educational level than the woman, the hypergamy parameter is added to the crossing parameter (-0.340 + 0.435 = 0.095). Thus, this couple's odds of crossing the first educational barrier are 1.10 [exp (0.095) = 1.10; see the upper panel of Table 5]. If the woman has obtained more education than the man, the hypergamy parameters equal 0 (-0.340 + 0 = -0.340). Hence, the second couple's odds of crossing the first educational barrier are 0.71 [exp (-0.340) = 0.71].

Table 5 reports the estimated odds of crossing educational barriers adjusted for hypergamy parameters. The table clearly shows that the fourth barrier, i.e. the barrier between post-secondary education and a university degree, is the most difficult to cross in both regions and in both types of union. This result is in line with previous research (for example Mare 1991; Schwartz and Mare 2005) that shows that university graduates tend to be the most selective and closed group on the marriage – and in this case also on the cohabitation – market. In English Canada, spouses have 1.8 times higher and cohabitors 2.1 times higher odds of crossing the third barrier than the fourth (0.54/0.30 = 1.8; 0.53/0.25 = 2.1). In French Canada, married couples have 2.8 times higher and cohabiting unions 3.7 times higher odds of crossing the third barrier than the fourth (0.72/0.25 = 2.81; 0.80/0.21 = 3,74).

Table 5

ODDS OF CROSSING EDUCATIONAL BARRIERS BY SEX, REGION, AND TYPE OF UNION

Canada outside of Quebec					
	Woman's education				
Man's education	No training	Training	High School	Post-secondary	University
Marriage					
No Training	-	0.71	0.34	0.18	0.05
Training	1.10	-	0.47	0.25	0.08
High School	0.52	0.73	-	0.54	0.16
Post-secondary	0.28	0.39	0.83	-	0.30
University	0.08	0.12	0.25	0.47	-
Cohabitation					
No Training	-	1.03	0.51	0.27	0.07
Training	1.25	-	0.50	0.27	0.07
High School	0.62	0.61	-	0.53	0.13
Post-secondary	0.33	0.32	0.65	-	0.25
University	0.11	0.08	0.16	0.31	-
Quebec					
Marriage					
No Training	-	0.65	0.41	0.18	0.06
Training	1.00	-	0.63	0.29	0.09
High School	0.63	0.98	-	0.45	0.14
Post-secondary	0.29	0.44	0.70	-	0.30
University	0.09	0.13	0.21	0.47	-
Cohabitation					
No Training	-	0.71	0.53	0.24	0.06
Training	0.87	-	0.75	0.34	0.09
High School	0.65	0.91	-	0.45	0.11
Post-secondary	0.29	0.41	0.55	-	0.25
University	0.07	0.10	0.14	0.31	-
Hypergamy parameter				0.435	
Hypergamy parameter*cohabitation				-0.240	

Source: Census (PUMF) 2001

To facilitate the interpretation, the odds of crossing an educational barrier are plotted in Figure 3 & 4. As the crossing parameters are asymmetrical between sexes, gender-specific chances to marry or cohabit up the educational hierarchy are presented here. Technically, this means that the men's odds of crossing an educational barrier are derived from the portion of the table above the main diagonal and that the women's odds are derived from the portion under the main diagonal.

The figures suggest four major findings. First, married women in both English and French Canada have the highest odds of upward educational mobility, i.e. highest odds of marrying a man with higher education than they achieved themselves (the lowest educational barrier is an exception). Second, the married men have the lowest odds of upward educational mobility. Third, cohabiting men and women are more alike than spouses in terms of the upward mobility, i.e. cohabiting women have lower odds of upward mobility then married women, while cohabiting men have higher odds of partnering up then married men. Fourth, we cannot conclude that Quebec cohabitors are more similar to spouses than those in English Canada. Even though the three-way interaction effects between crossing*union*region were significant for the first three barriers, the relative differences, their size, and direction were different for each barrier. For example, the difference between marriage and cohabitation in odds of crossing the first educational barrier is much larger in English than in French Canada. The Quebec cohabitors have 10 percent higher odds of crossing this barrier than their married counterparts (0.71/0.65 = 1.10), whereas cohabitors in the rest of Canada have 44 percent higher odds of doing so than married couples (1.03/0.71 = 1.44). This result would support our initial hypothesis about relative similarity of married and cohabiting couples in the French province. However, the finding is opposite for the second barrier (married and cohabiting couples are more similar in odds of overcoming the second educational barrier in English Canada than in Quebec).

Figure 3: Odds of crossing educational barrier up in marriage and cohabitation, men and women in English Canada

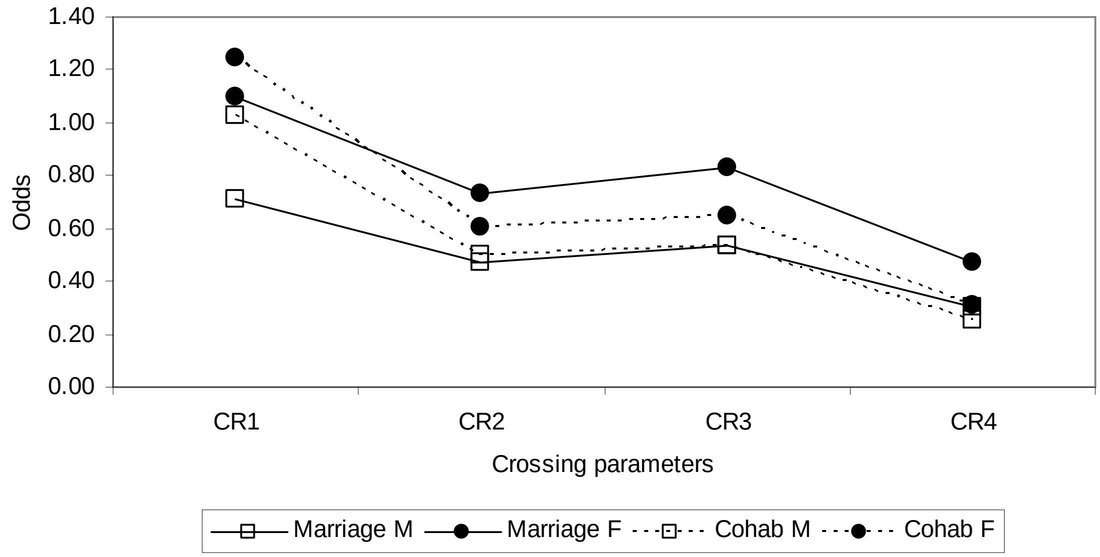
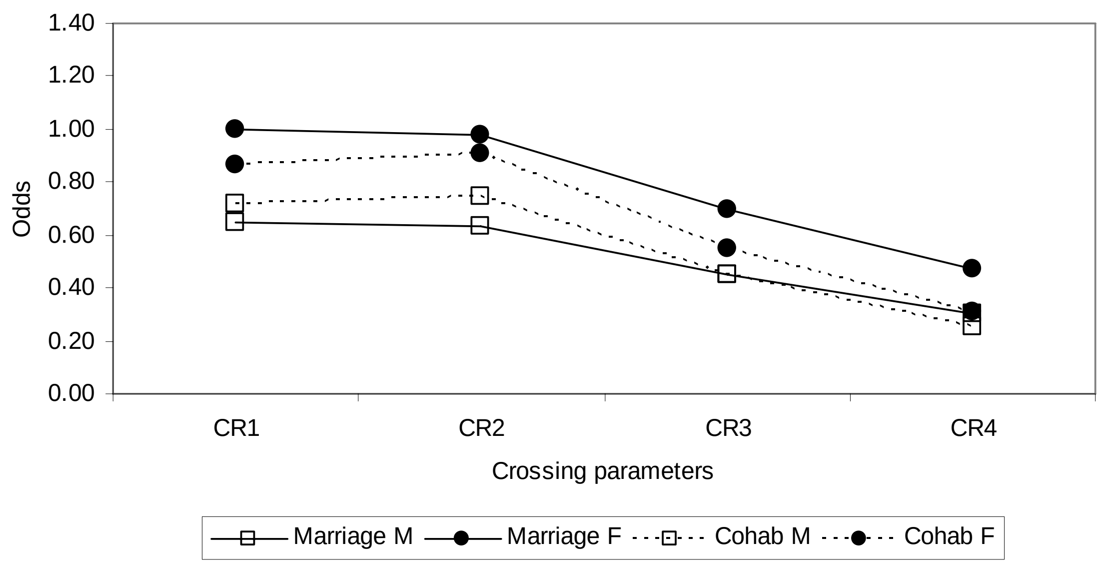


Figure 4: Odds of crossing educational barrier up in marriage and cohabitation, men and women in French Canada



As for other findings, we must note that the curves for married and unmarried couples have relatively similar shapes (compare Figures 3 & 4). The men and women become more selective as they achieve higher education and the odds of crossing a barrier then decline as we move up through the educational ladder. Crossing the first educational barrier that separates individuals having no formal training and those having some formal training but not a high school degree constitutes by far the easiest transition and this finding applies to both types of union. The analysis of the estimated crossing parameters thus does not support our first hypothesis predicting a relative similarity of educational assortative mating patterns of married and unmarried couples in Quebec, as opposed to those living in the rest of Canada.

6. Conclusions

The goal of this article was to contribute to research on educational assortative mating and evaluate the relative differences between marriage and cohabitation. Most of current research on the assortative mating patterns of married and unmarried couples comes from the United States, and little is known about these patterns in Canada. This is true despite the fact that educational homogamy in part determines the amount of resources available to families and households and thus contributes to the overall levels of social inequality within societies and the life opportunities open to the next generations. This study aimed to fill this gap in research and investigated the relative similarity (or dissimilarity) of educational assortative mating patterns of young married and cohabiting Canadian couples in 2001.

Our research was informed by two theoretical perspectives that make distinct predictions about relative differences in educational homogamy among married and unmarried couples. The double-selection hypothesis views cohabitation as a trial period before marriage and thus predicts higher educational homogamy among married rather than unmarried couples. The utilitarian theory (or “looser bond” approach) views cohabitation mainly as an alternative to marriage and explains under which conditions couples are likely to stay together without a marriage contract. In contrast to the former approach, it predicts higher educational homogamy among unmarried couples.

We hypothesized that the demographic differences separating Quebec and the rest of Canada should be reflected in distinct patterns of assortative mating. First, we expected to find smaller gap between married and unmarried couples in Quebec than in the rest of Canada (Hypothesis 1). Second, given the distinct roles that cohabitation plays in English and French Canada, we suggested that the double-selection hypothesis should be an appropriate theoretical perspective for Canada outside of Quebec and the utilitarian perspective a useful one for the French province. Specifically, we predicted that married couples would display relatively higher levels of educational homogamy in English Canada and lower levels of homogamy in Quebec (Hypothesis 2).

These hypotheses were tested with the *Public Use Microdata File (PUMF) on Families* from the 2001 Census using log-linear models. The analysis was restricted to young couples, i.e. those in which the woman is aged 25-34 and the age difference between partners is no more than 10 years.

The results of the analysis do not support the first prediction about the relative similarity of married and unmarried couples in Quebec in terms of educational assortative mating. Hence, our findings show that even though married and unmarried couples display different mating patterns, the relative gap separating them is rather similar in both Canadian regions. This result holds true whether we measure homogamy (i.e. tendency to marry and cohabit within one's own educational group) or relative social distance (i.e. probability of partnering outside one's own educational group).

The analyses also do not unambiguously confirm our second hypothesis concerning the direction of the differences. We found that married couples living in both English and French Canada generally display higher levels of educational homogamy than cohabiting partners (the only exception concerns individuals with no formal education). This result corroborates the plausibility of the double-selection hypothesis for English Canada in which cohabitation is viewed primarily as a trial phase before marriage. However, contrary to our prediction, we observed a similar trend in Quebec, where we predicted higher educational homogamy among cohabiting couples.

Further, we inspected the relative distance separating the various educational groups. Our analysis suggested that while married and unmarried couples differ in odds of overcoming an educational barrier in their partnership, we did not find that the differences between married and unmarried couples would systematically vary across French and English Canada. In both parts of the country, married men have the lowest odds of marrying up while married women have the highest odds of doing so.

In the future, we would like to expand our analysis and test additional conditions. First, we would like to study a longer time-window to investigate whether and in what direction the differences between married and unmarried couples have evolved over time. Second, we would like to test our results by using different age groups in order to see whether our results were influenced by the imposed age restrictions. Third, we would like to compare couples living with and without children as the relationships involving children are likely to be longer-term and more stable than those without children. This approach could also shed some light on the issue of whether cohabitation has or not become an alternative to marriage. Furthermore, we would like to introduce an ethnic dimension in the analysis of assortative mating. Here, we are interested in studying the evolution of barriers between ethnic groups and the extent to which this dimension interacts with other features of assortative mating process, such as education.

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