Pathways to First Birth and the Changing Role of Education in Europe and the United States

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Abstract

This paper applies multistate event history models to study the educational gradient of five pathways to first birth for women born between 1950 and 1969 using harmonised retrospective union and fertility histories ("Harmonized Histories") from 13 European countries and the United States. Controlling for educational enrolment and birth cohort, we find a persistent negative educational gradient of first birth within cohabitation which remains negative even in countries where the transition into cohabitation has a positive educational gradient. Similarly, having a first birth while being never partnered is associated with low education in all countries. Moreover, on the pathway to first birth within marriage that was preceded by cohabitation, what seems to matter is that the more educated women have a higher risk to marry their cohabiting partner. Once they do so, they are, however, more likely to delay having a first child than their lower educated counterparts. Although the educational gradient of direct marriage shows less consistent results, the timing pattern of the transition to first birth within direct marriage resembles that of the transition to first birth within marriage preceded by cohabitation. All in all, the findings suggest that the meaning of cohabitation by socio-economic status is universal across the examined countries; for women from more advantaged background it is likely to be a temporary stage or a "prelude to marriage" whereas for the more disadvantaged, it seems to be a permanent stage or an "alternative to marriage" which is likely to be a context for childbearing.

Introduction

Union and family formation behaviours have changed considerably in the last few decades in Europe and the US. An extensive body of research examined which societal groups (usually approximated by educational attainment) are the most likely to experience different partnership transitions (Berrington & Diamond, 2000; Wiik, 2011; Berrington, 2001; Berrington, 2003; Berrington & Diamond, 2000; Lyngstad & Jalovaara, 2010; Poortman & Kalmijn, 2002; Vignoli & Ferro, 2009) and the transition to parenthood within different union types (Perelli-Harris & Gerber, 2011; Perelli-Harris, Sigle-Rushton, et al., 2010).

Although these studies showed that education plays an important role in partnership formation and in the transition to parenthood, what is not clear from this literature is whether the role of education is important for entering partnerships (i.e. marriage, cohabitation, and union dissolution) or for the transition to parenthood within these partnerships. In other words, the literature does not provide an answer for *where* in the childbearing process education plays a crucial role. Examining at what point of the partnership pathways leading to a first birth the influence of education is important sheds new light on the meaning of cohabitation, marriage, and union dissolution in the transition to parenthood for people with different socio-economic status.

Therefore, this paper examines the educational gradient (as a proxy for socio-economic status) of changes in women's partnership status on the way to a first birth in Europe and the United States. More specifically, we address the following research questions: What is the role of education on the entry into and exit from cohabitation, marriage, and union dissolution? And how does education influence the transition to parenthood once women have entered these partnerships? Are these patterns universal across Europe and the United States?

To answer these questions, we study women born between 1950 and 1969 using data from the Harmonized Histories, a comparative database of extensive retrospective union and fertility histories. Multistate even history models are utilised to explore the influence of education on each transition on the path to a first birth in a cross-national context. This innovative approach enables us to pinpoint the transitions in the path to a first birth where education plays a crucial role. We focus on the influence of education on partnership transitions leading to a first birth because the transition to higher order births is likely to be driven by different processes. Additionally, we compare findings across several European countries and the United States to understand whether there are universal patterns in the educational gradient of partnership transitions on the pathway to a first birth.

Background and Theory

Several possible partnership pathways can lead to a first birth. Women can experience a first birth (1) while being never partnered, (2) within nonmarital cohabitation, (3) within marriage that was preceded by cohabitation, (4) within direct marriage, and (5) following union dissolution and possibly, repartnering. Pathways 2 to 3 are the outcomes of several consecutive transitions. For example, the transition to first birth within marriage that was preceded by cohabitation includes the transition from being never partnered to cohabitation, from cohabitation to marrying the same partner and finally, the transition to a marital first birth. As previous research typically focused on the influence of education on one element or a set of competing elements of these pathways, we first review the theoretical arguments and previous findings relating to these transitions. These arguments and the empirical evidence are then combined to understand their implications for the educational gradient of the different partnership transitions leading to a first birth.

Education and the Transition to First Union

There are competing expectations on how educational attainment influences whether a never partnered woman enters cohabitation or direct marriage as a first union. First, it is possible that women with higher education are more likely to directly marry (and thus less likely to cohabit) than the lower educated. They might be more attractive on the marriage market not only because they usually have higher earnings (Aassve, 2003; Lichter & Qian, 2008) and a better financial ability to marry (Thornton, Axinn, & Teachman, 1995) but also because their increased labour force participation provides access to more attractive partners (Oppenheimer, 1997, 2000).

On the contrary, the theory of the Second Demographic Transition (SDT) suggests that it is the higher educated, more liberal, more egalitarian and more individualistic women who would be the forerunners of 'new' demographic behaviours such as nonmarital cohabitation (Lesthaeghe & van de Kaa, 1986). Additionally, as women become economically more independent, due to their increased labour force participation and earnings, they have less to gain from marrying (Becker, 1981). This is especially true for higher educated women who usually have higher earnings and are thus more economically independent. Thus, highly educated women are expected to be more likely to cohabit and less likely to marry than lower educated women. It is important to mention that the above mentioned arguments do not specifically distinguish between the transition to direct marriage and to marriage that was preceded by cohabitation.

Previous research studied the antecedents of the transition to first union formation in different ways and settings. Most studies examined the relationship between education and entry into first union without differentiating between entry into cohabitation and marriage and found that higher education was associated with a lower rate of entry into first union in Europe (Aassve, Burgess, Propper, & Dickson, 2006; Billari & Philipov, 2004; Liefbroer &

Corijn, 1999) and the US (Aassve et al., 2006; Billari & Philipov, 2004; Liefbroer & Corijn, 1999). Studies that investigated the entry into either cohabitation or marriage showed that higher educated women were less likely to enter marriage in the US (Aassve, 2003) and in Spain (Baizán, Aassve, & Billari, 2003; Dominguez-Folgueras & Castro-Martin, 2013) and more likely to enter cohabitation in Norway (Wiik, 2011). Education did not have a significant influence on the transition to first cohabitation in Spain (Baizán et al., 2003). To summarise, the available evidence on the role of education in the entry into cohabitation or direct marriage is mixed.

Education and the Transition from Premarital Cohabitation to Marriage

Cohabiting women who do not stay in cohabitation might experience two types of partnership transitions: they either marry their partner or dissolve their union. Women with higher education have more resources and therefore more favourable marriage prospects than lower educated women from poorer social backgrounds (Lichter & Qian, 2008; Lichter, Qian, & Mellott, 2006). Furthermore, lower educated women might cohabit with partners who have fewer resources themselves and thus are less attractive marriage partners (Upchurch, Lillard, & Panis, 2002). If this is the case, lower educated women are expected to remain within cohabitation or to dissolve their union and higher educated women are expected to have higher marriage risks.

Most previous research focused on the transition from cohabitation to marriage and found that education did not influence cohabiting women's marriage risks in the US (Lichter et al., 2006). Only a few studies investigated the competing transitions from cohabitation to either marriage or divorce. For example, Berrington (2001) found that the level of education did not have a significant influence on cohabiting women's entry rate into marriage or into

separation in Britain for women born in 1958 when controlling for other factors, such as age at first marriage.

Education and the Transition to a Single, Cohabiting or Marital First Birth

Women can experience a first birth while being never partnered, within cohabitation, or within marriage. As mentioned earlier, according to the theory of the Second Demographic Transition, higher educated, more liberal and more individualistic women are more likely to experience 'new' types of family behaviours such as nonmarital cohabitation or nonmarital childbearing (Lesthaeghe & Surkyn, 2002). Following from this, more educated women are expected to have higher nonmarital first birth risks and lower marital first birth risks than women with lower education.

On the contrary, the Pattern of Disadvantage (POD) argument proposes that it is the more disadvantaged groups in the society (i.e. those with low education and fewer resources) who are more likely to experience these 'new' types of demographic behaviours (Hobcraft & Kiernan, 2001; Perelli-Harris & Gerber, 2011; Perelli-Harris, Sigle-Rushton, et al., 2010). Also, Upchurch et al. (2002) suggest that nonmarital childbearing is a more common strategy among economically disadvantaged women because the economic benefits of a potential marriage provided by the father are few. In other words, lower educated women are argued to be more likely to bear a child within cohabitation or while being single and less likely to have a first child within marriage than higher educated women.

Previous studies found consistent results; higher education was associated with a lower rate of entry into nonmarital first birth in the US (Aassve, 2003; Upchurch et al., 2002), the UK (Berrington, 2001, 2003; Steele, Joshi, Kallis, & Goldstein, 2006), and in many European countries (Perelli-Harris & Gerber, 2011; Perelli-Harris, Sigle-Rushton, et al., 2010). However, previous work did not differentiate between the transition rates to a first

marital birth from direct marriage or a marriage that was preceded by cohabitation. Additionally, only some of these studies distinguished between a cohabiting and a single nonmarital first birth.

Education and the Transition to First Birth after Union Dissolution

Following union dissolution (i.e. the dissolution of a cohabiting or a marital union), women might not experience a first birth, find a new partner with whom they have a first baby, or they might experience a first birth outside of a coresidential union. One could argue that having a first birth following union dissolution and without having formed a new partnership is similar to the experience of a single first birth. Thus, it may be that lower educated, more disadvantaged women are more likely to experience such a transition. On the contrary, some studies argued that women who were once attractive in the marriage market (i.e. higher educated women) probably have more favourable characteristics and thus they are more likely to get married again (Upchurch et al., 2002). If more educated women select themselves into repartnering, they might also be more likely to experience a first birth within such a union compared to lower educated women.

Literature on the transition to first birth following union dissolution is scarce as most studies focused on the formation of new families where at least one child is present from a previous union (Prskawetz, Vikat, Philipov, & Engelhardt, 2003; Thomson, 2004; Thomson, Winkler-Dworak, Spielauer, & Prskawetz, 2012) rather than examining the occurrence of a first birth within higher order unions or after union dissolution but without having formed a new partnership.

A New Perspective on Understanding the Meaning of Cohabitation by Education

To reiterate, the transitions that were described above constitute five possible partnership pathways to a first birth. As different arguments in the literature lead to contradictory expectations, it is not clear where in the different partnership pathways education plays an important role. However, examining the influence of education across the entire pathway to a first birth enables us to better understand whether and how the meaning of partnership experiences (cohabitation, marriage, and union dissolution) in the transition to parenthood differs for women with different educational backgrounds.

Literature that examines the meaning of cohabitation in a cross-national context usually focuses on classifying countries according to the most prevalent type of cohabitation within a country (Heuveline & Timberlake, 2004; Hiekel, Liefbroer, & Poortman, 2012). This typology assumes that the examined countries represent different developmental stages in the diffusion of 'new' family behaviours. However, it is possible that in the childbearing process the meaning and role of cohabitation, marriage, and union dissolution does not primarily depend on the country's developmental stage and on the prevalence of cohabitation in a given country but rather it differs by individuals' socio-economic status.

For example, if highly educated women are more likely to be able to afford to marry their (cohabiting) partners, we would expect that they would be less likely to remain in cohabitation than the lower educated. Thus, for these women, cohabitation would only be a temporary state which precedes marriage ("prelude to marriage") but which does not play a role in childbearing. Consequently, lower educated women would be more likely to slide into and remain in cohabitation as they would not be able to afford to marry or would not find their partner attractive enough for marriage. If this is the case, cohabitation is most likely to be a more permanent union for lower educated women which could also be a context for childbearing. In this sense, cohabitation would be an "alternative to marriage" or "poor man's marriage" because of economic circumstances.

However, if it is the more educated who are more likely to cohabit because they reject the institution of marriage, they are more likely to experience cohabitation as a permanent union which can involve childbearing ("alternative to marriage" - if these women do not marry following a first birth). Then, among the lower educated, cohabitation would be less prevalent while marriage would be more likely. Furthermore, women with lower education would be more likely to have children within marriage. Thus, for these women cohabitation would be "marginal" or a "prelude to marriage".

Variation across Countries

The impact of educational attainment on the different partnership transitions and the transition to parenthood might vary across countries due to cultural, historical and institutional differences (Esping-Andersen, 1990; Mayer, 2001). Indeed, previous studies suggest that there is cross-national variation in the influence of education on the different family transitions (e.g. Billari & Liefbroer, 2010; Elzinga & Liefbroer, 2007; Kalmijn, 2007; Perelli-Harris, Sigle-Rushton, et al., 2010). Additionally, there is heterogeneity within societies (e.g. with respect to education) which leads to multiple types of cohabitation in each country. However, we do not group countries or aim to find country-specific explanations because the primary focus of this paper is to understand whether the role of cohabitation, marriage, and union dissolution in the transition to parenthood by education is universal across countries.

Data and Methods

This study analyses data from the Harmonized Histories (Perelli-Harris, Kreyenfeld, & Kubisch, 2010), a set of nationally representative surveys which include retrospective monthly information on union formation and childbearing. The data primarily come from the

first wave of the Generations and Gender Surveys (collected between 2004 and 2010) except for the Netherlands (Fertility and Family Survey, 2003), Spain (Spanish Fertility Survey, 2006), the UK (British Household Panel Study, 2005/06), and the United States (National Survey of Family Growth, 2007). This study examines data from Austria, Belgium, Bulgaria, Estonia, France, Italy[1], Lithuania, the Netherlands, Norway, Romania, Russia, Spain, the UK, and the US. Retrospective data might be subject to recall errors, especially in case of the start and end date of cohabiting unions. This might result in an underestimation of cohabiting unions and/or cohabiting first births.

Although cross-sectional weights are available in most surveys, the multivariate analyses do not present weighted estimates because cross-sectional weights are only representative of the population structure of each country in the year of the survey. In other words, estimating the models using these weights would assume that the weights are constant across transitions and over time. Additionally, this study aims to explore the relationship between educational attainment and the possible pathways to first birth rather than to provide population estimates of the influence of education.

The influence of education on the hazard of each examined partnership and parenthood transition is estimated using a multistate event history model. These models are widely used in biomedical sciences (e.g. Al Mamun, 2003; Beyersmann, Schumacher, & Allignol, 2012; de Wreede, Fiocco, & Putter, 2011; Putter, 2011a; Putter, 2011b; Putter, van der Hage, de Bock, Elgalta, & van de Velde, 2006) but their application in demography is limited (Bonetti, Piccarreta, & Salford, 2013). Figure 1 defines the discrete state space, where

[1] In the Italian GGS, the month of birth of the respondents is not available due to data protection. Therefore, a uniform distributed random variable was used to create this variable. Furthermore, the Italian GGS was based on a household sample as opposed to the other GGS surveys which sampled individuals.

the rectangular boxes represent the examined partnership and parenthood states and the arrows indicate the possible transitions between these states.

[Figure 1 about here]

Over time individuals move between the different partnership and parenthood states: being never partnered (S), cohabitation (C), direct marriage (M), marriage preceded by cohabitation with the same partner (CM), the dissolution of both a cohabiting and a marital union (D+), and the birth of a first child (B). These relationships are embedded in a cross-national and historical context.

This model differentiates between direct marriage and marriage that was preceded by cohabitation allowing for the influence of education on the transition hazards to first birth to differ for direct marriage and for marriage that was preceded by cohabitation. Previous studies typically assumed no differences in the influence of education on the transition to first birth from a direct marriage and from marriage that was preceded by cohabitation. By differentiating between these transitions one can learn more about the role of premarital cohabitation in the early family life course.

Note that due to the small number of cases who experience the transition to union dissolution (D+), we do not distinguish between the dissolution of a cohabiting and a marital relationship. Additionally, although union dissolution could be followed by repartnering (as indicated by the '+' sign), this paper does not investigate the influence of education on the transition to repartnering as only very few women experience repartnering before the birth of a first child.

A multistate event history model has two basic assumptions. First, it assumes that the observed events are generated by a stochastic process (Rajulton, 2001) and that the

movements between the different states are stochastic (Andersen & Keiding, 2002; Hougaard, 1999). Second, it assumes the Markov property which means that the transition from the origin state to the destination state only depends on the occurrence of the origin state (Rajulton, 2001). In other words, the present behaviour of an individual is enough to predict its future behaviour (Andersen & Keiding, 2002; Hougaard, 1999) and it does not matter through which path the individual arrived at the destination state. The above defined model is an extension to the Markov model; by defining the multistate model to include the state 'marriage preceded by cohabitation' (CM), the exact pathway that women followed until the occurrence of a union dissolution is known. As explained earlier, after the occurrence of a union dissolution, it is not possible to trace which states women came from.

The multistate event history model is estimated by fitting a continuous-time stratified Cox regression where each transition is represented by a different stratum. Covariates are incorporated as transition-specific covariates allowing for the effect of each variable to differ across transitions. The transition hazards for individual k are given by:

$$\lambda_{ij}(t|\boldsymbol{Z}) = \lambda_{ij,0}(t)\exp\left(\boldsymbol{\beta}^T\boldsymbol{Z}_{ij}\right) \qquad (1)$$

where ij indicates a transition from state i to state j, $\lambda_{ij,0}(t)$ is the baseline hazard of this transition, $\boldsymbol{Z}$ is the vector of covariates at baseline and $\boldsymbol{Z}_{ij}$ is the vector of transition-specific covariates. This model allows for the covariate effects to differ across transitions as well as for a separate baseline hazard for each transition.

In principle, estimating a Cox model stratified by transitions is analogous to fitting several Cox regressions for each transition separately on an augmented dataset where each line represents a possible transition that the individuals are at risk of (Putter et al., 2006). However, it has been argued that separate models fail to reveal the relations between different types of events (Putter et al., 2006) and that estimating a single stratified Cox model using data in long format makes further calculations easier (Putter, 2011b).

The estimates $\widehat{\boldsymbol{\beta}}$ and $\widehat{\Lambda}_{ij,0}(t)$ can be found by maximising the partial likelihood

$$L(\boldsymbol{\beta}) = \prod_{\substack{transition \\ i \to j}} \prod_{\substack{k=1 \\ d_{ij,k}=1}}^{n} \frac{\exp(\beta^T Z_{ij,k})}{\sum_{l \epsilon R_i(t_{ij,k})} \exp(\beta^T Z_{ij,l})} \qquad (2)$$

where $t_{ij,k}$ is the event or censoring time of individual k for transition $i \to j$, $d_{ij,k} = 1$ if individual k has an event for transition $i \to j$, 0 otherwise, and where $R_i(t)$ is the risk set of state i at time t, i.e. the set of individuals who are in state i at time t. The estimate of the cumulative baseline hazard of transition $i \to j$ is the Nelson-Aalen estimate of:

$$\widehat{\Lambda}_{ij,0}(t) = \sum_{\substack{k=1 \\ t_{ij,k} \leq t}}^{n} \frac{d_{ij,k}}{\sum_{l \epsilon R_i(t_{ij,k})} \exp(\beta^T Z_{ij,l})} \qquad (3)$$

The stratified Cox model is estimated separately for each country. In the analyses, women are observed from age 15 until age 45, the time of the survey or the time of first birth, whichever happens earlier. Time t is measured in months since age 15.

Variables

Level of Education. The highest level of education is measured at the time of the survey and is classified into six categories based on the International Standard Classification of Education (ISCED, 1997). This study compares low (ISCED 0, ISCED 1, and ISCED 2) and highly educated (ISCED 5 and ISECD 6) women to their medium educated (ISCED 3 and ISCED 4) counterparts. A time-varying indicator is created using information on the year and month of reaching the highest level of education, assuming continuous education from age 15 and that attaining medium level of education takes on average 4 years while obtaining high education takes 3 additional years on average. In most countries, some information (less than 2.5%) is missing on the year and/or month of reaching the highest level of education. However, in some countries, the proportion of missing information is somewhat larger (7.9%

in Norway and 6.3% in the United Kingdom) or substantially larger (57% in the US and 62% in Spain). For all countries except the United States, the missing values are imputed using information on the median age of finishing education by educational level, birth cohort and country. In the United States, the year and month of reaching the highest education is missing for all respondents who have a higher than college education. Therefore, external information on the length of completing each educational level is used to estimate the age at leaving school (Snyder, Dillow, & Hoffman, 2008). Nonetheless, the dataset used provides unique and comparable information for studying the educational gradient of partnership and family formation in a cross-national context. However, the influence of educational attainment on the examined transitions should not be interpreted as causal because several unobserved or unmeasured factors, which are not accounted for in this study, could potentially explain some of these relationships.

Educational enrolment. Previous research showed that women who are enrolled in school are less likely to become mothers and to form a first marital or co-residential union than those who already left school (Kravdal, 1994; Rindfuss, Morgan, & Swicegood, 1988). Therefore, the analyses are controlled for a time-varying educational enrolment variable which takes the value 1 for each period when the respondents are enrolled in education and 0 otherwise (reference category). As the data are retrospective, no information is available on possible interruptions of the educational career. This means that this variable is 1 for periods before the respondent has reached her highest educational level and 0 afterwards. Controlling for educational enrolment is especially important in younger ages when respondents are more likely to be enrolled in education. As union dissolution and transitions thereafter are more likely to occur at somewhat later ages, educational enrolment is not controlled for when examining transitions into and out of union dissolution.

Birth cohort. Respondents are grouped into two birth cohorts: women born between 1950 and 1958 (reference) and those born between 1959 and 1969. Note that in the United States and Austria, only respondents born after 1961 and 1963, respectively, were interviewed. Thus, in these countries all respondents belong to the second birth cohort. Therefore, In the United States and Austria, the analyses were not controlled for birth cohort.

Descriptive Results

Table 1 shows the proportion of first births to unpartnered (SB), cohabiting (CB), and married (MB) mothers of different educational levels born between 1950 and 1969 for the examined countries. The table presents a common measure of the prevalence of nonmarital childbearing, which has previously been used to provide insights into the role of cohabitation in childbearing (Perelli-Harris et al., 2010).

[Table 1 about here]

For unpartnered women, we find a clear and consistent negative educational gradient in all countries except in Estonia and Bulgaria. In other words, the proportion of unpartnered births is larger among low educated women than among medium or high educated women. In Estonia, both low and high educated women have a lower proportion of unpartnered births than medium educated women while in Bulgaria this is the other way around. Only Bulgaria and Romania show a clear negative educational gradient of cohabiting first births and we find indication of a somewhat negative gradient in Estonia, Lithuania, Russia, and the US. For the other countries the gradient is either flat or somewhat positive. However, from these results we cannot tell whether these educational differences are significant. Moreover, we find a

positive educational gradient for marital first births, that is, the proportion of women who have a marital first birth is higher among higher educated women than among the lower educated in most countries. However, this gradient is not very steep in most countries, it is less consistent in Estonia, France, Italy, and Spain and it is negative in the Netherlands.

While it is interesting to examine the relationship between education and childbearing within different union types, it is also important to investigate how education influences partnership transitions prior to the transition to first birth. For example, births to unpartnered women also include those who had a child following union dissolution but without having formed a new partnership. Furthermore, marital first births can happen within direct marriage, marriage that was preceded by cohabitation and it can also be a second or higher order marriage. Similarly, cohabitation is not necessarily a first union or a first cohabitation.

To provide an indication of the level of cohabitation, marriage, and union dissolution and the possible role that they plays in family formation in the examined countries, Table 2 describes the percentage of women born between 1950 and 1969 who experienced each transition between age 15 and 45. The total number of women at risk of each transition is shown following each set of transitions. Note that the proportion of women who experienced each set of transitions does not add up to a 100% because some women do not experience any transitions but stay in the state of origin.

[Table 2 about here]

Cohabitation is the most widespread in Austria and Norway, where the first union of more than 60% of women is a cohabiting union. On the contrary, this proportion is less than 20% in Spain, Italy, Lithuania, and Romania and it is between 20-40% in the UK and Russia. In all other countries, 40-60% of never partnered women form a cohabiting union. In line

with these findings, where cohabitation is less common, direct marriage is more prevalent; the proportion of never partnered women who marry directly is between 70% and 80% in Spain, Italy, and Romania. Additionally, the proportion of women who have a first child while being never partnered is below 10% in all countries except in the United States (16%).

When examining women whose first union is cohabitation (column 5 to 7 in Table 2), we find that in Austria, France, Italy, Norway, Spain, the UK, and the US, around 45-55% of cohabitations transition to marriage while 15-25% of them ends with dissolution (this proportion is smaller in Spain). This finding indicates that in these countries cohabitation might be less stable than in the other countries where the proportion of cohabiting unions that end with dissolution remains below 10%. In countries where cohabitation is more widespread, cohabiting women constitute less of a selective group than in countries where cohabitation is less common. For example, while in Belgium, Bulgaria, the Netherlands, the UK and the US, a large share of never partnered women experienced cohabitation as a first union, the proportion of those who have a first child within cohabitation is relatively small. Interestingly, in Spain, Italy, Lithuania, and Romania, only a small proportion of never partnered women experienced cohabitation but a relatively large share of these women went on to have a child within cohabitation. This might indicate that cohabiting women are a more select group in these countries, who are also more likely to have children within these unions. In all countries, most cohabiting women marry their partner.

The majority (more than 80%) of directly married women (column 9 and 10 in Table 2) have a child within such a union while in most countries only 2-7% of direct marriages end with a divorce (higher proportions in the UK and the US). Dissolution is somewhat more prevalent in case of marriages that were preceded by cohabitation and, in turn, a somewhat smaller proportion of women have a first child within a marital union that was preceded by cohabitation (column 12 and 13 in Table 2).

In most countries, the majority (50-67%) of women who experienced the dissolution of a cohabitation or marriage will eventually have a child. This proportion is somewhat lower in Romania and Spain (44% and 41%, respectively) and much smaller in Italy (29%). Caution is needed when interpreting these numbers as in some countries the number of women who experienced union dissolution is small.

Multivariate Results

To examine how education impacts on the decision to marry or cohabit, or to have a marital or cohabiting birth, we study the influence of educational attainment on five pathways from being never partnered and childless at age 15 to a first birth. These pathways are the following: transition to first birth while (1) being never partnered (S → B), (2) within nonmarital cohabitation (S → C → B), (3) within marriage that was preceded by cohabitation (S → C → CM → B), (4) within direct marriage (S → M → B), and (5) after union dissolution (D+ → B). As explained earlier, although women might have experienced repartnering following union dissolution (indicated by '+'), due to the small number of cases, we are unable to examine the educational gradient of repartnering.

In the following sections, the results of the stratified Cox models are presented for each pathway to first birth. Two sets of models are estimated (Table 3). We first investigate the influence of educational attainment on the risk of the examined family life transitions controlling for educational enrolment (where relevant) and birth cohort. Second, to take into account that educational attainment might not only influence the overall likelihood of these transitions but also their timing, interaction terms between educational attainment and age are added to the models. Table 3 shows only the results of these interaction models for countries where there is a significant interaction between educational attainment and age. Then, to examine the influence of educational attainment on the five pathways to first birth, results of

the no-interaction models and the interaction models are combined in Table 4. Where no significant interaction between educational attainment and age is found, we interpret hazard ratios from the no-interaction models. Where a significant interaction term is found, we interpret results of the interaction models. Finally, as explained earlier, due to small sample size, once women arrive at the union dissolution state, we are unable to tell which partnership state they came from. Therefore, the estimates of the educational gradient of transitions into union dissolution (C → D+, M → D+, and CM → D+) will not be reported in Table 3. However, these results are summarised in Table 5 together with the educational gradient of the transition to first birth following union dissolution.

For categorical variables, hazard ratios (i.e. the exponential of the regression coefficients) are interpreted as relative risks, that is, a hazard ratio larger than 1 indicates that the risk of the given transition is higher for this group of women than for the reference group while a hazard ratio smaller than 1 means that this group of women have a smaller risk of experiencing that particular transition compared to women in the reference group.

Transition to First Birth while being Never Partnered

In all countries (except Lithuania), the transition to first birth while being never partnered has a negative educational gradient; never partnered low educated women have a higher risk than their medium educated counterparts to have a first birth. However, no significant educational differences could be detected in Belgium, Romania, and Lithuania (Table 3, panel a).

In Italy, Norway, the UK, and the US, the influence of educational attainment on the risk of a first birth while being never partnered changes over age as indicated by the significant interaction effects between educational attainment and age. In Norway and the UK, higher educated women are less likely to have a single first birth than the medium educated at younger ages, but over time (after age 30 in Norway and age 32 in the UK), they become

more likely to do so. Additionally, in Italy, low educated women are more likely than medium educated women to have a first birth while being single before age 35 after which their risk of a single birth becomes smaller compared to the medium educated. This means that in these countries, we find a negative educational gradient at younger ages but this gradient becomes positive as women get older. We also find a significant interaction in the US, indicating a negative educational gradient which becomes stronger over time. In the other countries, the influence of education on the risk of a first birth while being never partnered does not change over age.

Transition to First Birth within Nonmarital Cohabitation

The pathway to first birth within nonmarital cohabitation has two elements: the transition from being childless and never partnered to nonmarital cohabitation, and the transition to first birth within this cohabiting union. Overall, the transition into cohabitation has a negative educational gradient in post-socialist countries while it has a positive educational gradient in the other countries (except the Netherlands) although significant differences between low and/or high and medium educated women are only detected in France, Belgium, Bulgaria, and Romania (Table 3, panel b). Additionally, the educational gradient of a first birth within cohabitation is generally negative in all examined countries.

In Estonia, Italy, Russia, and the US, the influence of education on the risk of a transition from being never partnered to cohabitation changes over age. In Estonia and Italy, low educated women are more likely to cohabit than medium educated women at young ages but after age 25-26 they have a smaller risk to do so. This means that in these countries, education has a negative gradient on the transition to cohabitation at younger ages and a positive gradient at older ages. In Russia and the US we find the opposite. At younger ages low educated women are less likely to cohabit (up to age 19 in Russia and age 23 in the US)

compared to their medium educated counterparts (positive gradient) but then they become more likely to do so (negative gradient).

We also found significant interactions between education and age on the risk of a cohabiting first birth in France, Belgium, Estonia, and Norway. In these countries, while at younger ages education has a negative gradient on the risk of a cohabiting first birth, this gradient becomes positive after age 33 in Belgium and Estonia, and after age 37 in France. In Norway, significant interactions were found both between low and high education and age indicating that higher educated women are less likely to experience a cohabiting first birth than their medium educated counterparts until age 28 after which they are more likely to do so. Furthermore, low educated women are less likely to have a cohabiting first birth than the medium educated up to age 31 after which they are more likely to do so.

Transition to First Birth within Marriage that was preceded by Cohabitation

The pathway to first birth within marriage that was preceded by cohabitation has three components: the transition to first cohabitation (discussed in the previous section), the transition from cohabitation to marrying the same partner, and the transition to first birth within this marital union. In Estonia, Norway, Spain, and the US, highly educated women had higher transition rates into marrying their cohabiting partner than their medium educated counterparts when holding other variables in the model constant (Table 3, panel d). In Romania, low educated cohabiting women were significantly less likely to marry their partner than the medium educated. Additionally, in Bulgaria, significant educational differences were found between low/high and medium educated women. To sum up, in these countries, educational attainment had a positive gradient on the transition from premarital cohabitation to marriage. In the other countries, no significant differences between low/high and medium educated cohabiting women's risk to marry their partner were detected.

Additionally, we find that in Lithuania and the Netherlands the relationship between education and the risk of marrying one's cohabiting partner changes over age. In Lithuania, lower educated women have a higher risk of marrying their cohabiting partner at younger ages than their medium educated counterparts but after age 21, their risk becomes smaller. Additionally, in the Netherlands, cohabiting women with high education have a lower risk of marrying their partner than medium educated women but this risk increases over time and these women will have a higher risk after age 29 to marry their partners than medium educated women. In other words, in Lithuania and the Netherlands, the negative educational gradient of the transition from marriage to cohabitation becomes positive over age.

We find a positive educational gradient of the transition to first birth within marriage that was preceded by cohabitation in Norway and Romania (Table 3, panel e). Interestingly, this relationship pointed in the opposite direction in Austria and the UK. In the other countries, education does not have a significant influence on this transition. Additionally, when including interactions between educational attainment and age, we find that the influence of education on the risk of a first birth within a marital union that was preceded by cohabitation changes over age in some countries. In general, in France, the Netherlands, Belgium, and Lithuania education has a negative gradient on the transition from marriage that was preceded by cohabitation to first birth only at younger ages (up to age 24 in Belgium and Lithuania) after which this gradient becomes positive. More specifically, in France and the Netherlands, both interactions between low and high education and age are significant; highly educated women within these unions are less likely to have a child than the medium educated (until age 26 in France and 28 in the Netherlands) and lower educated women are more likely to have a child than medium educated women (until age 28 in France and 32 in the Netherlands).

Transition to First Birth within Direct Marriage

The transition to first birth via direct marriage involves two consecutive transitions: the transition to direct marriage and the transition to first birth within this marriage. In Austria, France, the Netherlands, and Spain, low educated women have a greater risk of marrying their partner directly but in Bulgaria, Estonia, and Norway, it is the higher educated whose risk of direct marriage is higher (Table 3, panel f). Additionally, in Italy and Romania, the influence of education on the transition to direct marriage changes over age; a first negative gradient becomes positive over age indicating that in these countries higher educated women are more likely to experience a transition to direct marriage at later ages. We find the opposite in the US.

When examining the influence of education on the transition to first birth within direct marriage (Table 3, panel g) it seems that in the UK, education has a negative gradient while in Russia it has a positive gradient on this transition. When we also account for possible timing differences in the influence of education on the transition to first birth within direct marriage, in Bulgaria, France, Italy, the Netherlands, Norway, Romania, Spain, and the US the influence of education on the risk of a first birth within direct marriage changes over age. More specifically, at younger ages, lower educated women have a higher risk of experiencing this transition whereas at older ages more educated women are more likely to do so.

Transition to First Birth following Union Dissolution

When examining the educational gradient of the transition to first birth following union dissolution, we find that in Estonia, highly educated women have a higher risk of experiencing this transition than their medium educated counterparts (Table 3, panel h). Additionally, in Belgium, the influence of education on the risk of a first birth after union

dissolution changes over age); at younger ages low educated women are less likely to have a first birth following union dissolution than the medium educated (positive gradient) but they become more likely to do so as they get older (negative gradient). In the other countries, no significant educational differences were detected in the risk of a first birth after union dissolution.

The Educational Gradient of Pathways to First Birth

To summarise the influence of educational attainment on the five examined pathways to first birth, Table 4 combines results of the no-interaction models and the interaction models. As explained earlier, where no significant interaction between educational attainment and age is found, hazard ratios from the no-interaction models are interpreted. Where a significant interaction term is found, we interpret results of the interaction models.

In most countries, transition to a first birth while being never partnered has a negative educational gradient (Table 4, column 1). Over age, this gradient gets steeper in the US and becomes positive in Italy, Norway, and the UK while it is not significant in Belgium, Romania, and Lithuania.

When examining the influence of education on the pathway to first birth within nonmarital cohabitation (Table 4, column 2 and 3), we find that even in countries where more educated women have a higher risk to enter cohabitation as a first union (Belgium, France, and at younger ages Russia and the US), it is the lower educated who have a higher risk of a first birth within cohabitation. Additionally, in Bulgaria (and at younger ages in Estonia and Italy) both the transition to cohabitation and to a first birth within cohabitation has a negative educational gradient. Furthermore, in Romania, education only has a significant influence on the transition into cohabitation and not on the transition to first birth. On the contrary, in Norway and the UK, the influence of education is only important in the transition to first

birth within cohabitation birth but not in the transition into cohabitation. In other words, in these countries women of all educational levels are equally likely to enter a cohabiting union but once they cohabit, lower educated women have a higher risk to experience a cohabiting birth than their more educated counterparts. Finally, in Austria, Spain, Lithuania, and the Netherlands, education does not seem to have a significant influence on this pathway; higher and lower educated women are equally likely to enter cohabitation and to have a first child within cohabitation. All in all, these results indicate that it is not the transition to a first union where the importance of educational attainment really matters but it is the transition to first birth within cohabitation that, in itself, is a pathway to first birth experienced by the more disadvantaged. Additionally, in Belgium, Estonia, France, and Norway, more educated women delay childbearing within cohabitation.

Studying the influence of education on the pathway from being never partnered to a first birth within a marital union that was preceded by cohabitation (Table 4, column 4 to 6) reveals that irrespective of the educational gradient of the transition to cohabitation, in most countries higher educated women are more likely to marry their cohabiting partner than the less educated. In the Netherlands and Lithuania, this is only the case at older ages. In Austria and the UK, where education does not have a significant influence on the transition to cohabitation or on the transition from cohabitation to marriage, the transition to first birth within marriage that was preceded by cohabitation had a negative educational gradient. In Norway and Romania, both the transition from cohabitation to marriage and from this marriage to first birth had a positive educational gradient. These results indicate that it is mainly the transition from cohabitation to marriage where education plays an important role in the pathway to first birth within marriage that was preceded by cohabitation and that women from more advantageous backgrounds are more likely to marry their cohabiting partner than their more disadvantaged counterparts. Additionally, in some countries, the

educational gradient of a first birth within marriage that was preceded by cohabitation changes from negative to positive over age indicating that higher educated women have their first children at later ages within such a marital union in Belgium, France, Lithuania, and the Netherlands.

When we look at the influence of education on the pathway to first birth within direct marriage (Table 4, column 7 and 8), we find that in countries where education has a significant influence on both the transition to direct marriage and to first birth within direct marriage, irrespective of the educational gradient of direct marriage, women have a negative educational gradient at younger ages and a positive gradient at older ages to experience a first birth within direct marriage. This finding indicates that highly educated women who married their partner without having lived together with them delay having a first child. Additionally, in Belgium and Lithuania, no significant influence of education on the risk of a direct marriage or on the risk of a first birth within direct marriage could be detected.

Table 5 summarises the results of the educational gradient of the transitions into and out of union dissolution. We do not find significant educational differences in the risk of the dissolution of cohabitation in the examined countries. Additionally, more educated women have smaller divorce risks in Norway and the US when marriage was preceded by cohabitation than the lower educated. The dissolution of direct marriage has a significant negative gradient only in Estonia; and it has an inverted U shape in Italy. Additionally, in Russia and the UK, the first positive gradient of education turns into a negative gradient at older ages. Finally, education only has a significant influence on the transition from union dissolution to first birth in Estonia (positive gradient) and Belgium (positive gradient at younger ages and negative gradient thereafter). To sum up, we do not find a consistent educational gradient for the transitions into and out of union dissolution.

Conclusion and Discussion

To better understand the role of partnership trajectories in the transition to parenthood for women with different socio-economic status, this study examined the educational gradient of five possible pathways to first birth: while being never partnered, within nonmarital cohabitation, within marriage that was preceded by cohabitation, within direct marriage, and following union dissolution.

We found a consistent negative educational gradient of childbearing among never partnered women supporting the argument that women from more disadvantaged backgrounds are more likely to have a birth outside marriage. Additionally, we observed that in some countries at older ages, higher educated women have a higher risk compared to their lower educated counterparts to have a first child while being never partnered. It is possible that in these countries some highly educated women experience difficulties in finding a stable partner but if they happen to conceive, due to their more advanced age they decide to carry the pregnancy to term.

The findings for entrance into cohabitation were less consistent, with some countries having a significant negative educational gradient, others having a positive gradient, and others having a gradient that changed over time. However, childbearing within cohabitation had a consistent negative educational gradient across countries. In other words, low educated women were found to be more likely to have a first child within cohabitation than those with higher education. This means that even in countries where more educated women are more likely to cohabit, it is the least educated for whom cohabitation represents a context for childbearing. Thus, it seems that cohabitation is a more permanent stage in the childbearing process for low educated women, unless they marry after the birth, and it may even represent an "alternative to marriage" for them, although they are also more likely to dissolve their relationships (Perelli-Harris, forthcoming). Similarly, when we examined the impact of

education on the pathway to a first birth within marriage preceded by cohabitation we found that irrespective of the educational gradient of the transition to cohabitation, higher educated women had a higher risk of marrying their cohabiting partner. This supports the argument that these women have more resources and are more attractive marriage partners than their lower educated counterparts who are more likely to remain in cohabitation (McLanahan, 2004; Perelli-Harris, Sigle-Rushton, et al., 2010).

However, the results are less consistent for the transition to first birth from marriage that was preceded by cohabitation, suggesting that once the marriage occurs education matters less. In most countries, higher educated women have smaller first birth risks within such a marital union but usually this gradient becomes positive over age indicating that highly educated women tend to delay having a first child within a marital union that was preceded by cohabitation. All in all, these findings indicate that the pathway to a first birth via marriage that was preceded by cohabitation is associated with more advantage. The role of the transition to cohabitation is not important *per se* in this pathway, but education plays a crucial role in whether the cohabiting union transitions into marriage. We found that this is exactly what happens to higher educated women. This finding highlights the importance of differentiating between direct marriage and marriage that was preceded by cohabitation. Additionally, this result further supports the idea that for highly educated women, cohabitation is usually a short-lived, temporary life stage which precedes marriage and less frequently a context for childbearing.

The impact of education on the pathway to a first birth via direct marriage was found to be similar to what was found for the pathway to first birth via marriage that was preceded by cohabitation. Again, whether the transition to direct marriage had a positive or negative gradient, highly educated directly married women were likely to delay having a first child to

later ages in most countries. Finally, we did not find a consistent educational gradient of the transitions into and out of union dissolution.

While this study demonstrated the importance of examining the educational gradient of partnership trajectories leading to a first birth, it also has some limitations. It is possible that there is reverse causality between educational attainment and the experience of certain family life transitions. Additionally, family life transitions and educational transitions as well as partnership transitions and the transition to first birth could be interrelated processes. Although some scholars argue that they should be modelled simultaneously (Upchurch et al., 2002) they also acknowledge that using simultaneous models lead to results which are extremely hard to interpret (Baizán et al., 2003; Baizán, Aassve, & Billari, 2004). This also limits the number of transitions that can be examined within the same model. By applying multistate event history models, this study did not attempt to identify a causal relationship between education and the different family transitions. Rather, it aimed to pinpoint at what point education plays a role in union formation in the transition to parenthood. Moreover, it is possible that the influence of education on the examined pathways to first birth changes across birth cohorts. The small sample sizes did not allow for testing such interactions leaving scope for future research to investigate these possible changes.

Taken together, this study demonstrated that the meaning of cohabitation in the pathway to a fist birth is different for women with different socio-economic status. In most countries, highly educated women are more likely to marry their cohabiting partner. Their lower educated counterparts will most likely remain cohabiting and have a first child within this union. These findings indicate that in most countries cohabitation is a temporary stage or a "prelude to marriage" for women from more advantaged background. On the other hand, for the disadvantaged, it seems to be a permanent stage ("alternative to marriage") which is likely to be a context for childbearing. These findings generally hold across the examined

countries indicating that the meaning of cohabitation by socio-economic status is universal across these countries.

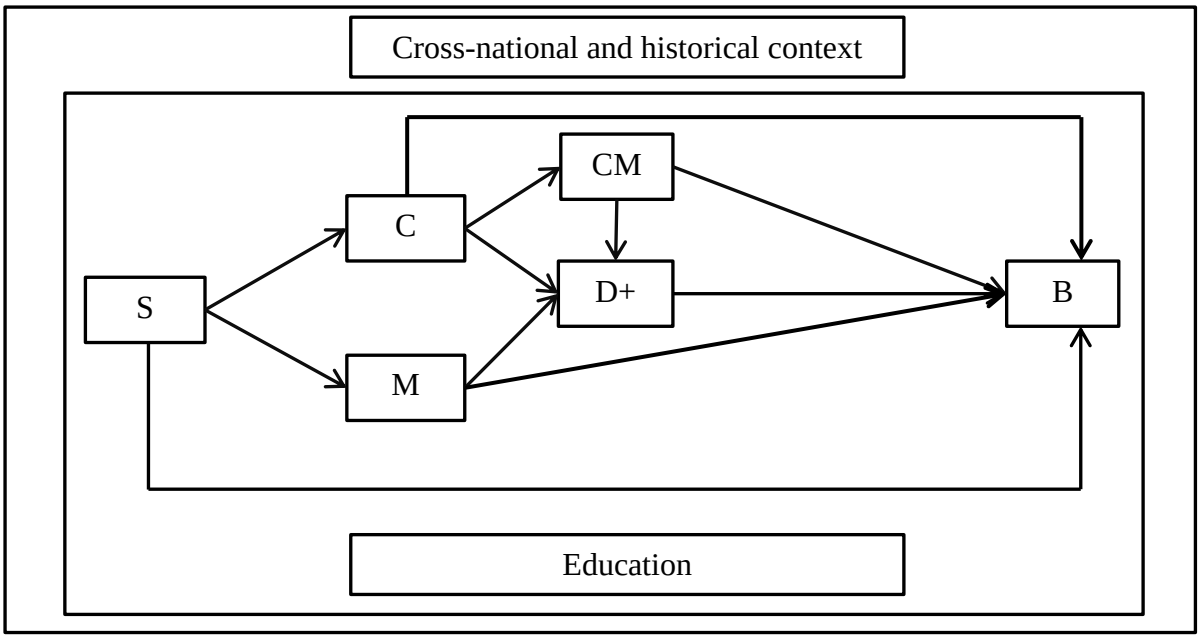

Figure 1. Multistate event history model to examine the influence of education across the family life course in a cross-national context.

Table 1. Weighted Proportion of First Births by Partnership Status at First Birth and Country within Different Educational Levels (%)

	Low			Medium			High			Total		
	SB	CB	MB	SB	CB	MB	SB	CB	MB	SB	CB	MB
Austria	19	27	54	12	29	59	4	31	65	13	29	58
Belgium	14	9	78	8	8	84	6	11	83	9	9	81
Bulgaria	9	10	82	5	4	91	6	3	91	6	6	88
Estonia	12	15	72	29	52	19	12	11	77	16	23	61
France	12	22	66	8	22	70	4	31	65	9	24	67
Italy	5	2	93	4	2	94	2	6	92	4	3	93
Lithuania	13	5	82	10	4	86	9	3	88	11	4	86
the Netherlands	8	7	85	4	12	84	3	15	82	5	10	84
Norway	18	28	54	8	34	58	5	37	58	12	32	56
Romania	7	10	83	5	4	90	0	2	98	6	7	88
Russia	13	9	78	11	9	80	10	8	82	12	9	80
Spain	7	3	90	5	6	88	4	6	90	6	4	89
the UK	27	5	68	11	13	75	6	14	80	12	12	76
United States	37	19	45	28	14	58	10	15	75	21	16	63

Note: SB - first birth while being unpartnered, CB - first birth within cohabitation, MB - first birth within marriage

Note: Weights are not available for Bulgaria and Russia

Table 2. Weighted Proportion of Women Who Experience Each of the Examined Partnership and Parenthood Transitions (%)

	From S			Total entering S	From C			Total entering C	From M		Total entering M	From CM		Total entering CM	From D+	Total entering D+
	to				to				to			to			to	
	C	M	B		CM	D+	B		D+	B		D+	B		B	
Austria	66.4	17.7	8.8	855	55.5	19.7	23.6	568	6.0	90.7	151	10.5	82.5	315	51.9	154
Belgium	44.5	46.2	7.0	1137	77.7	9.3	11.5	506	0.8	89.9	525	11.2	82.7	393	49.5	95
Bulgaria	53.0	36.3	5.5	2396	88.5	0.9	9.6	1271	1.6	96.3	870	1.2	96.6	1125	57.9	38
Estonia	44.5	44.1	8.3	1776	66.8	4.4	27.8	791	4.5	94.9	784	5.5	91.7	528	60.6	99
France	58.5	35.8	6.1	2061	54.5	13.9	29.4	1205	3.7	93.1	738	4.6	91.2	657	60.9	225
Italy	8.8	78.5	2.7	7246	50.9	20.9	22.0	640	2.6	90.6	5685	5.2	78.5	326	28.9	301
Lithuania	15.1	69.2	8.5	1641	71.8	6.0	20.6	248	2.4	94.4	1135	3.4	89.9	178	52.1	48
the Netherlands	44.7	43.3	2.4	2069	63.3	20.7	11.9	924	6.9	86.6	895	6.7	83.9	585	52.4	292
Norway	64.8	25.5	9.8	2767	47.7	17.8	32.9	1794	4.3	92.9	705	7.2	88.2	856	66.2	411
Romania	17.7	74.8	4.5	2185	61.4	4.4	33.4	386	2.1	92.4	1635	3.4	86.5	237	44.1	59
Russia	24.4	64.3	8.4	2573	60.7	9.4	29.1	629	5.0	93.5	1655	7.1	90.3	382	65.1	169
Spain	14.3	75.1	5.1	2761	56.6	5.8	26.9	394	2.0	93.7	2074	4.0	89.2	223	41.1	73
the UK	33.5	37.8	5.9	1766	55.8	27.2	15.4	591	8.5	87.6	668	6.4	83.6	330	67.4	239
United States	42.0	49.0	15.7	1396	56.9	24.9	17.9	587	15.4	81.1	684	18.3	75.1	334	64.1	312

Note: Weights are not available in Bulgaria and Russia

Table 3. Results of the Stratified Cox Regressions, No-Interaction Model and Interaction Model (where significant), Hazard Ratios, by country

a) Transition to First Birth while being Never Partnered (S → B)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands[a]	Norway	Romania[a]	Russia	Spain	UK	US
Education														
low	2.63 ***	1.45	1.89 **	1.91 **	1.71 **	4.21 ***	0.98	3.04 **	2.95 *	1.43	1.89 **	1.77 **	2.35 **	1.00
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	0.97	0.62	0.87	1.17	0.71	0.06	0.64	0.33	0.10 *	0.00	0.70	0.50	0.06 ***	0.55
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		1.134	0.69 *	1.17	0.95	0.88	1.27	0.98	0.68 **	0.63 *	1.03	0.89	2.09 ***	
Enrolment														
not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1
enrolled	0.14 ***	0.25 ***	0.23 ***	0.18 ***	0.22 ***	0.09 ***	0.35 ***	0.00	0.29 ***	0.18 ***	0.63 ***	0.37 ***	0.35 ***	0.18 ***
Education*age														
low*age						0.99 *			1.00				1.00	1.01 *
high*age						1.01			1.01 *				1.01 **	1.00

*Note: *p < .05. **p < .01. ***p < .001*
Note: [a] indicates that some estimation problems were encountered during the analyses

b) Transition from being Never Partnered to Cohabitation (S → C)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands	Norway	Romania	Russia	Spain	UK	US
Education														
low	0.97	1.00	1.12	2.09 **	0.89	1.70 *	1.43	0.91	1.02	1.66 ***	0.81	0.83	0.87	0.64 *
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	1.16	1.44 **	0.78 *	0.53 *	1.32 **	0.92	0.74	1.15	1.00	0.72	1.16	1.23	1.16	0.83
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		1.18	1.13	1.65 ***	1.76 ***	1.31 **	1.83 ***	1.82 ***	1.45 ***	1.45 ***	1.35 ***	1.45 **	2.11 ***	
Enrolment														
not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1
enrolled	0.71 **	0.65 ***	0.37 ***	0.50 ***	0.63 ***	0.50 ***	0.38 ***	0.72 ***	0.62 ***	0.25 ***	0.53 ***	0.81	1.00	0.46 ***
Education*age														
low*age				0.99 *		1.00 **					1.00 *			1.01 *
high*age				1.00		1.00					1.00			1.00

*Note: *p < .05. **p < .01. ***p < .001*

c) Transition from Cohabitation to First Birth (C → B)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands	Norway	Romania	Russia	Spain	UK	US
Education														
low	1.29	1.34	2.13 ***	1.31	3.69 ***	1.67 *	1.44	1.52	2.19 **	1.06	1.35	1.36	0.85	1.78 *
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	0.58	0.06 *	0.49	0.18 **	0.37 *	1.19	0.55	0.65	0.33 *	0.89	0.49 **	0.67	0.42 ***	0.38 ***
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		0.91	1.01	1.17	1.13	0.68 *	1.37	0.95	1.39 **	1.10	1.01	0.96	1.12	
Enrolment														
not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1
enrolled	0.28 ***	0.31 *	0.24 ***	0.38 ***	0.43 ***	0.07 **	0.35	0.10 *	0.60 ***	0.56	0.44 **	0.23	0.64	0.49 **
Education*age														
low*age		1.00		1.00	1.00 *				1.00 *					
high*age		1.01 *		1.01 *	1.00				1.01 *					

*Note: *p < .05. **p < .01. ***p < .001*

d) Transition from Cohabitation to Marriage (C → CM)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands	Norway	Romania	Russia	Spain	UK	US
Education														
low	0.74	1.09	0.73 ***	1.01	1.00	0.83	5.30 *	1.52	0.96	0.49 ***	1.07	1.34	1.18	1.20
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	1.25	1.05	1.278 *	1.44 **	0.91	1.34	2.13	0.22 *	1.49 ***	1.80	1.15	1.60 *	1.14	1.53 **
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		0.75 **	0.92	0.79 **	0.63 ***	1.01	1.33	0.72 ***	0.42 ***	0.96	1.01	0.78	0.93	
Enrolment														
not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1
enrolled	0.69 *	0.37 ***	0.99	1.15	0.53 ***	0.29 ***	1.37	0.48 ***	0.97	1.72 **	0.95	0.75	0.48 **	1.11
Education*age														
low*age							0.98 *	1.00						
high*age							1.00	1.01 **						

*Note: *p < .05. **p < .01. ***p < .001*

e) Transition to First Birth within Marriage that was preceded by Cohabitation (CM → B)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands	Norway	Romania	Russia	Spain	UK	US
Education														
low	1.70 *	2.87 **	0.87	1.31	2.22 *	1.25	1.87	3.40 *	1.08	1.08	0.87	0.97	1.62 *	1.28
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	0.95	0.69	1.15	1.08	0.45 *	0.99	0.26	0.24 *	1.33 **	2.33 *	1.03	0.69	1.02	0.95
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		1.36 **	1.151 *	1.36 **	1.36 **	1.72 ***	1.18	1.38 ***	1.11	2.05 ***	1.27 *	0.82	1.57 **	
Enrolment														
not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1
enrolled	0.48 **	0.96	1.24 *	0.80	0.96	0.30 *	1.05	0.68	0.84	0.54 *	0.87	0.91	0.66	0.50 *
Education*age														
low*age		0.99 **			0.99 *		0.99	0.99 ***						
high*age		1.00			1.01 *		1.01 *	1.01 *						

*Note: *p < .05. **p < .01. ***p < .001*

f) Transition to Direct Marriage (S → M)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands	Norway	Romania	Russia	Spain	UK	US
Education														
low	1.82	0.89	0.86	0.80	1.36	2.94	0.89	1.30	0.97	1.67	0.88	1.27	0.93	0.53
	**			*	***	***		***		***		***		*
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	1.57	0.88	1.38	1.25	0.90	0.83	1.04	0.75	1.42	0.69	1.03	0.83	0.961	0.45
			**	*					*			*		*
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		0.66	0.85	0.78	0.44	0.70	1.19	0.42	0.38	0.96	1.03	0.80	0.51	
		***	*	***	**	***	**	***	***			***	***	
Enrolment														
not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1
enrolled	0.19	0.17	0.47	0.61	0.27	0.18	0.57	0.31	0.54	0.30	0.50	0.37	0.65	0.45
	***	***	***	***	***	***	***	***	***	***	***		***	***
Education*age														
low*age						0.99				0.99				1.01
						***				***				*
high*age						1.00				1.00				1.01

*Note: *p < .05. **p < .01. ***p < .001*

g) Transition to First Birth within Direct Marriage (M → B)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands	Norway	Romania	Russia	Spain	UK	US
Education														
low	0.72	1.01	1.16	1.21	1.46	1.65 ***	0.95	1.85 **	1.28	1.09 *	1.02	1.57 **	1.31 *	1.73
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	1.05	1.09	0.54	0.96	1.26	0.52 **	1.04	0.60	0.26 **	0.40 *	1.31 **	0.66	1.02	0.49 *
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		1.30 **	1.21 *	1.01	0.89	0.93 **	1.08	1.11	0.74 ***	1.09	1.01	0.82 ***	1.04	
Enrolment														
not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1
enrolled	0.71	0.65	0.87	0.73 **	0.70 *	0.76 **	0.88	0.70	0.66 ***	0.94	0.86	0.74 **	0.84	0.56 **
Education*age														
low*age			1.00		1.00 *	1.00 ***		1.00 *	1.00	1.00		1.00 **		1.00
high*age			1.01 *		1.00	1.00 **		1.00	1.01 ***	1.01 **		1.00		1.01 *

*Note: *p < .05. **p < .01. ***p < .001*

h) Transition to First Birth after Union Dissolution (D+ → B)

	Austria	Belgium	Bulgaria	Estonia	France	Italy	Lithuania	Netherlands	Norway	Romania	Russia	Spain	UK	US
Education														
low	0.76	0.06 *	0.63	1.35	0.83	1.06	1.08	1.20	0.98	1.28	0.80	0.76	1.52	1.08
medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
high	0.90	0.49	0.98	2.31 **	1.04	1.24	1.10	1.08	1.32	0.65	0.72	1.08	1.22	1.45
Cohort														
1950-1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	
1959-1969		1.37	0.31	1.47	1.26	1.29	1.95	1.17	1.38 *	0.66	1.01	1.41	1.11	
Education*age														
low*age		1.01 *												
high*age		1.00												

*Note: *p < .05. **p < .01. ***p < .001*

Table 4. Summary of Findings from Table 3: Educational Gradient of the four main Pathways to First Birth

	First birth while never partnered	First birth within cohabitation		First birth within marriage that was preceded by cohabitation			First birth within direct marriage	
	S → B	S → C	C → B	S → C	C → CM	CM → B	S → M	M → B
Austria	-	+	-	+	+	-	-	+
Belgium	-	+	-/+	+	U	-/+	I	U
Bulgaria	-	-	-	-	+	+	+	-/+
Estonia	-	-/+	-/+	-/+	+	U	+	-
France	-	+	-/+	+	-	-/+	-	-/+
Italy	-/+	-/+	-	-/+	+	-	-/+	-/+
Lithuania	I	-	-	-	-/+	-/+	+	+
the Netherlands	-	+	-	+	-/+	-/+	-	-/+
Norway	-/+	-	-/+	-	+	+	+	-/+
Romania	-	-	-	-	+	+	-/+	-/+
Russia	-	+/-	-	+/-	U	+	+	+
Spain	-	+	-	+	+	I	-	-/+
the UK	-/+	+	-	+	U	-	I	-
US	-	+/-	-	+/-	+	-	+/-	-/+

Note: A negative (-) sign indicates a negative educational gradient for a given transition. A positive (+) sign indicates a positive educational gradient for that transition. The letter U indicates a U-shaped relationship between education and this transition. The letter I indicates an inverse relationship between education and this transition.
Note: A slash (/) indicates that the influence of education on this transition changes over age; before the slash a '+' or '-' sign refers to the educational gradient of that transition at younger ages. After the slash, a '+' or '-' sign refers to the educational gradient of that transition at older ages.
Note: Shading indicates that the effect of education was significant at least at the 5 percent level.
Note: The analyses control for educational enrolment and birth cohort.

Table 5. Summary of Findings for the Educational Gradient of Pathways to first Birth through Partnership Experiences that Include Union Dissolution

	C → D+	CM → D+	M → D+	D+ → B
Austria	U	-	+	I
Belgium	-	I	U	+/-
Bulgaria	-	-	U	I
Estonia	U	-	-	+
France	U	U	U	+
Italy	+	U	I	U
Lithuania	+	+	-	U
the Netherlands	I	I	I	U
Norway	-	-	U	+
Romania	+	I	+	-
Russia	U	I	+/-	I
Spain	-	I	U	+
the UK	I	+	+/-	U
US	+	-	-	U

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