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Research Article

The role of education in the intersection of partnership transitions and motherhood in Europe and the United States

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The role of education in the intersection of partnership transitions and motherhood in Europe and the United States

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Abstract

BACKGROUND
Previous research has shown that partnership status at first birth is associated with education across Europe and the United States. Most research has indicated that first births within cohabitation have a negative educational gradient. However, the pathway to a first birth in different partnership types can be complex and may vary across countries.

OBJECTIVE
We study whether any educational differences observed at the time of a first birth are produced upon entrance into cohabitation, during the transition from cohabitation to marriage, or during the transition to first birth.

METHODS
Using data from the Harmonized Histories we estimate multi-state event history models to examine how educational differences in patterns of early family formation emerge among women born between 1950 and 1969 in 16 European countries and the United States.

RESULTS
The results highlight three main findings. First, the educational gradient of entry into cohabitation is inconsistent across countries. Second, regardless of the educational gradient of entry into cohabitation, the transition to a first birth among cohabiting women has a consistent negative educational gradient across countries. Last, the transition from cohabitation to marriage has a consistent positive educational gradient across countries.

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CONTRIBUTION

Across Europe and the United States, educational differences matter the most during the transition from cohabitation to marriage and the transition to first birth once women are in a cohabiting union. Entrance into cohabitation is common, but key educational distinctions emerge upon childbearing. Disadvantaged women are less likely to marry before having a baby, while highly educated women marry before childbearing.

1. Introduction

Prior research has found that in many countries throughout Europe and the United States the partnership context of first childbearing varies by level of education. The less educated are more likely to experience a first birth within cohabitation, while those who are more educated are more likely to have a first child within marriage (Kennedy and Bumpass 2008; Lichter, Sassler, and Turner 2014; Mikolai 2012; Musick 2007; Perelli-Harris et al. 2010). Given the increase in nonmarital childbearing, this educational divide may have important implications for the reproduction of social inequalities (McLanahan and Percheski 2008). However, the pathways to a birth in different partnership types can be complex: Individuals may transition into and out of cohabiting and marital partnerships before giving birth, and this may differ by educational level. In this paper we ask whether educational differences in the partnership context of first births are produced upon entrance into cohabitation, during the transition from cohabitation to marriage, or during the transition to first birth. Answering this question can provide important insights into the meaning of cohabitation and marriage.

To disentangle where in the early family life course educational differences in behaviour emerge, we follow the life course approach (Elder 1975) and focus on the role of education across several partnership trajectories leading to a first birth. The timing and sequencing of family events has become increasingly de-standardized across Europe (Elzinga and Liefbroer 2007; Perelli-Harris and Lyons-Amos 2015), raising questions about whether the relationship between education and family formation has also become more variable. At the beginning of a relationship, educational differences in the likelihood of cohabiting rather than marrying directly may be small. In most European countries, coresidential unions increasingly start as cohabitation and only a minority marry without having lived together. In this relationship stage, individuals may focus on getting to know each other to understand whether they make a good match, and unions are more likely to dissolve. As relationships progress, the meaning of cohabitation and marriage can change (Perelli-Harris and Bernardi 2015) and differ by educational level. Many cohabiting couples marry (Heuveline and Timberlake 2004;

Kiernan 2004; Perelli-Harris et al. 2012), and the more and less educated are likely to make different marriage decisions. The question is whether these decisions lead to educational inequalities observed at the time of a first birth. Finally, by the time of a first birth the educational gradient could again become distinct. If more- and less-educated women make different marriage decisions, these could produce a pronounced educational gradient of childbearing by partnership status.

The association between family life transitions and educational attainment may or may not be universal across countries. Whereas the relationship between level of education and some demographic processes (e.g., marriage and fertility postponement, nonmarital first births) is consistent across countries, the role of education in the decision to cohabit or to marry has been found to vary (Hoem et al. 2010; Perelli-Harris and Lyons-Amos 2016). Perelli-Harris and Lyons-Amos (2016) found that a woman's country of residence matters more for determining partnership patterns than her education. Thus, it is not clear from previous studies whether educational differences in the early family life course emerge in the same way across countries. To understand whether the role of education in producing inequalities as family life courses progress depends on a specific context or is instead consistent across countries, we study the interrelationship between level of education and partnership trajectories leading to a first birth in Europe and the United States.

We study women born between 1950 and 1969 in 16 European countries and the United States, using multi-state event history models, which simultaneously model the complexity of multiple transitions and produce estimates of the role of education across each transition in the early family life course. This approach allows us to study interdependencies in partnership transitions and the transition to motherhood by level of education as they evolve over the life course and to coherently generate results that would be difficult to produce with conventional event history models. We focus on trajectories leading to a first birth because transitions to higher-order births are driven by different processes. Although some studies have compared elements of family formation across countries, few have studied this range of behaviours with event history techniques. To our knowledge, no study has followed respondents as they progress through different transitions on the way to a first birth. Moreover, we expand the number of countries that have been previously studied from a comparative perspective. Taken together, studying educational gradients of family life transitions leading to a first birth across Europe and the United States will provide systematic comparative evidence and new insights into which groups led the increase in levels of nonmarital childbearing and the role of cohabitation as a context of intimacy and parenthood. As children living within cohabiting partnerships are more likely to see their parents' union dissolve (Andersson, Thomson, and Duntava 2017), these educational differences may play a role in the reproduction of social inequalities.

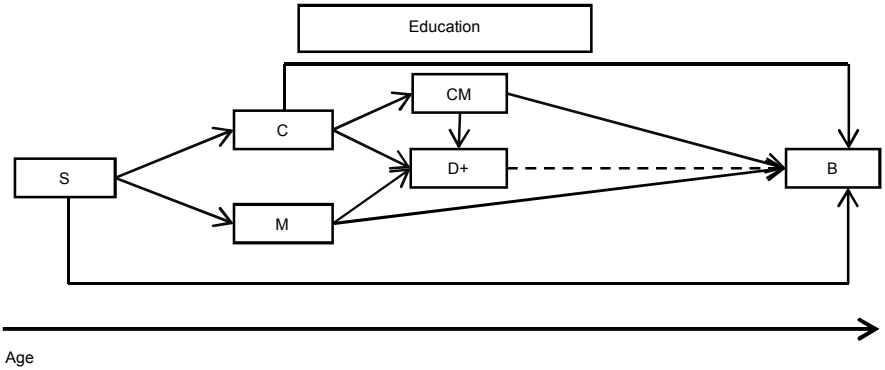
2. Background and theory

Prominent theories on the relationship between education and family behaviours, such as new home economics theory or the second demographic transition theory, try to explain the relationship between education and partnership transitions or union status at first birth. However, these theories do not incorporate arguments that reflect the increased complexity that exists today in the interrelationship between partnership trajectories and entry into motherhood. In other words, these theories have not addressed the intersection of partnership transitions and the transition to first birth or how the effect of education may change over the duration of a partnership. Below, we present arguments for the relationship between education and each step in the early family life course to understand where educational differences emerge.

Over the early family life course, individuals move between different partnership and parenthood states (Figure 1): 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). We do not specifically focus on the transition to first birth outside of a union, as it has been shown to have a consistent negative educational gradient across countries (e.g., Berrington 2003; Mikolai 2012; Perelli-Harris et al. 2010; Perelli-Harris and Gerber 2011; Rindfuss, Morgan, and Offutt 1996; Upchurch, Lillard, and Panis 2002; Ventura 2009). Additionally, due to small numbers we do not study the transition to a first birth following union dissolution.

A first coresidential union can either start as cohabitation or direct marriage, with recent cohorts tending to be far less likely to marry without prior cohabitation (Bumpass and Lu 2000; Kiernan 2002). Some people may 'slide into cohabitation', perhaps because it is more convenient than a nonresidential sexual relationship (Manning and Smock 2005). This could be more common among couples where at least one of the partners is already residentially independent. If this is the case, more-educated women who left the parental home for higher education might be more likely to slide into cohabitation. At the same time, women who are not in higher education might move in with their partner to establish residential independence. Moving in together results in economies of scale (Sassler and Miller 2011), which might further motivate lower-educated couples to cohabit. For others, cohabitation might act as a testing ground for a relationship where individuals gather information about the quality of their match (Brien, Lillard, and Waite 1999; Oppenheimer 1988; Perelli-Harris et al. 2014), which is useful in the context of increased relationship and economic uncertainties (McLanahan 2004; Perelli-Harris and Gerber 2011).

Figure 1: Partnership transitions and the transition to first birth



Notes: S – never partnered, C – cohabitation, M – marriage, CM – marriage preceded by cohabitation with the same partner, D+ – union dissolution (also includes women who experienced re-partnering following union dissolution), B – first birth.

Proponents of the second demographic transition theory suggest that entry into cohabitation will be more common among highly educated women because they have more liberal, egalitarian, and individualistic values (Lesthaeghe and van de Kaa 1986). Hence, they are more likely to reject the institution of marriage and to cohabit instead. The lower-educated, on the other hand, have more traditional values and are therefore more likely to marry their partner. However, others have argued that lower-educated women are more likely to have partners with uncertain employment opportunities who are less attractive marriage partners than those with stable employment (Oppenheimer 1988). If this is the case, lower-educated women's first partnership type is more likely to be cohabitation and less likely to be marriage, as was found to be the case for the United States (Goldstein and Kenney 2001; Seltzer 2004; Thornton, Axinn, and Teachman 1995).

Once in a cohabiting union, women might marry their partner, continue cohabiting, have a child within cohabitation, or dissolve their union (the latter two transitions are discussed later). Some reasons behind women's decision to marry their cohabiting partner, such as love and the symbolic value of marriage, are not related to education (Billari and Liefbroer 2016; Wiik, Bernhardt, and Noack 2010). Nonetheless, higher- and lower-educated cohabiting women are likely to have different reasons for marrying. For example, higher-educated women have more economic resources (Lichter, Qian, and Mellott 2006; Oppenheimer 1997, 2000), which may enable them to settle down into a stable marriage (Cherlin 2010; Perelli-Harris et al. 2010). The lower-educated may not have the financial and psychological resources to convert their cohabiting unions into marriages (Berrington, Perelli-Harris, and Trevena 2015; Smock, Manning, and Porter 2005; Wiik, Bernhardt, and Noack 2010). Additionally, women with more

resources and who own property might find it more important to marry for financial security and legal protection and may be more aware of policies and legal regulations relating to marital status and breakdown (Wiik, Bernhardt, and Noack 2010). Depending on the country, marriage can provide protection of property, tax breaks, social benefits, parental rights, and alimony in case of union dissolution (Hiekel and Keizer 2015; Perelli-Harris and Sánchez-Gassen 2012). On the other hand, higher-educated women may feel empowered to reject the institution of marriage, while the least-educated may be more likely to automatically progress into traditional marriage (Surkyn and Lesthaeghe 2004).

Cohabiting women might have a first child within cohabitation, marry their partner (see previous paragraph), or dissolve their union. Highly educated women are likely to be more liberal, secularised, individualistic, and more tolerant of new behaviours than lower-educated women (Perelli-Harris et al. 2010; Perelli-Harris and Gerber 2011; Surkyn and Lesthaeghe 2004; Weakliem 2002). These values are also likely to promote continued cohabitation in case of a nonmarital pregnancy (Berrington 2001; Gibson-Davis and Rackin 2014; Surkyn and Lesthaeghe 2004) and a decline in 'shot-gun' marriages (Raley 2001). This implies that highly educated women may be more likely to have a child within cohabitation than lower-educated women. On the other hand, lower-educated women, who tend to be in a precarious and uncertain financial position, may remain in cohabiting unions and decide to have a child despite this instability (Edin and Kefalas 2005; Perelli-Harris et al. 2010; Perelli-Harris and Gerber 2011). Even if they do not find their partners (who are also likely to be low-educated and have fewer resources) suitable for marriage, they may feel that having a child provides meaning in their lives (Edin and Kefalas 2005; Perelli-Harris and Gerber 2011). Low-educated women may feel that marriage is not a requirement or the norm for childbearing and that other, more pressing needs take priority over marriage (Berrington, Perelli-Harris, and Trevena 2015). Additionally, lower-educated women are more likely to have an unintended pregnancy in cohabiting unions (Musick 2002; Musick et al. 2009). This means that cohabiting, low-educated women would be more likely to have a child within cohabitation (Berrington 2001; Perelli-Harris and Gerber 2011; Steele et al. 2005).

Childbearing may occur more quickly among women who are already married than among those who are not yet married. This is especially the case among highly educated women who are likely to have delayed marriage to later ages. Once they marry they are likely to have children more quickly than lower-educated women (Blossfeld and Huinink 1991; Lappegård and Rønsen 2005). Additionally, the decision to marry may be closely linked to the decision to have a child. Moreover, findings from Britain suggest that the expectations of and pressure from family and peers, and pressure from them to marry prior to childbearing, are highest among those with greater

levels of education (Berrington, Perelli-Harris, and Trevena 2015). We therefore expect that the risk of childbearing after marriage will be higher among those with higher levels of education.

Women can experience union dissolution at several stages of the early family life course. For example, a first cohabiting union can either dissolve or transition to marriage. Additionally, both direct marriage and marriage preceded by cohabitation can dissolve before the birth of a first child. Previous research suggests that the relationship between education and union dissolution differs across countries (Härkönen and Dronkers 2006). Recently, Matysiak, Styrc, and Vignoli (2014) conducted a meta-analysis of studies on the effect of women's education on divorce in Europe over time. The overall effect of education on divorce was negative in the Nordic countries, positive in the Mediterranean, and close to zero in the remaining countries (Western, Central, and Eastern Europe, and the United Kingdom). Additionally, the positive educational gradient of divorce has weakened or even became negative across Europe. To summarise, this leads us to expect inconsistent educational gradients of the dissolution of cohabiting and marital unions across countries.

3. Cross-national differences

In this paper we provide comprehensive comparative evidence for the educational gradient of partnership trajectories leading to a first birth across 16 European countries and the United States. We might expect cross-national differences in the educational gradient of different partnership trajectories leading to a first birth because next to the broader historical, cultural, political, and economic differences, countries vary with respect to welfare provision, the rights and responsibilities of cohabiting and married partners as well as of cohabiting and married parents, and policies related to families and fertility (Esping-Andersen 1990; Mayer 2001). To understand how such cross-national differences translate to differences in family formation across countries, previous studies have attempted to group countries geographically, according to similar cultural context, or welfare state typology (Billari and Liefbroer 2010; Kalmijn 2007, 2011, 2013). However, macro-level factors are interrelated in a complex and nontrivial way, producing specific combinations of partnership and family formation behaviours in a given country. This means that it is difficult to group countries based on one or even several of these macro-level characteristics. Additionally, recent evidence suggests that the complex interrelationships between country characteristics and family formation processes often lead to inconsistent and heterogeneous findings within country groups (Hoem et al. 2010; Perelli-Harris and Lyons-Amos 2016). For example, policies related to the legislation of cohabitation and marriage differ greatly across

Northern and Western European countries, and these policies do not necessarily align with demographic behaviour (Perelli-Harris and Sánchez-Gassen 2012). Thus, previous evidence suggests that it is not useful to group countries a priori when studying the complex link between partnership and parenthood transitions across countries.

Given these complexities and the aim of the paper, we do not develop country-specific expectations on the role of education for each family life transition. Rather, we focus on understanding whether countries are similar or different with respect to how educational differences emerge across the early family life course in order to gain insight into the meaning of cohabitation and marriage in the early family life course.

4. Data and methods

This study analyses data from Austria, Belgium, Bulgaria, the Czech Republic, Estonia, France, Hungary, Italy, Lithuania, the Netherlands, Norway, Romania, Russia, Spain, Sweden, the United Kingdom, and the United States using the Harmonized Histories, a harmonized set of nationally representative surveys with retrospective monthly information on union formation and childbearing (Perelli-Harris, Kreyenfeld, and Kubisch 2010). The data primarily comes from the Generations and Gender Surveys, (GGS) except for the Netherlands (Fertility and Family Survey), Spain (Spanish Fertility Survey), the United Kingdom (British Household Panel Survey), and the United States (National Survey of Family Growth) (for more information on sample size and birth cohorts covered see Appendix Table A-1).

First, to understand whether there are educational differences in partnership status at first birth we estimate competing risks event history models and study the effect of education on the risk of three competing events: a first birth (1) while being single, (2) in cohabitation, and (3) within marriage. We estimate the monthly hazard of a first birth of type k (here $k = 3$) using continuous-time competing risks models:

$$\mu_i^k(t) = \mu_0(t) \exp\left(\alpha_j^k x_{ijt}\right) \tag{1}$$

where $\mu_i^k(t)$ denotes the hazard of an event of type k for individual i in month t, $\mu_0(t)$ represents the baseline hazard, x_{ijt} denotes respondents' values on a set of j potentially time-varying covariates at time t, and α_j^k is the parameter estimate for variable j for each type of event.

Next, the influence of education on the hazard of each partnership and parenthood transition is estimated using multi-state event history models. Multi-state event history models are an extension of simple event history models: Rather than studying one transition, these models allow individuals to move among different states over time

(Mikolai and Lyons-Amos 2017). These models enable us to study the educational gradient of each partnership transition and the transition to first birth in a systematic way, thereby allowing us to follow individuals' life courses and to understand the influence of education over the early life course.

Figure 1 defines the discrete state space, with the rectangular boxes representing the examined partnership and parenthood states, and the arrows indicating possible transitions between these states. Unlike previous studies, this model allows the influence of education on transition hazards to first birth to differ for direct marriage and for marriage preceded by cohabitation. This is important to elucidate the point in the family life course where the negative educational gradient of a cohabiting first birth emerges. Everyone who experiences union dissolution before the birth of a first child is included in the state 'D+' regardless of the type of subsequent partnership, due to the small number of such events.

The multi-state 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 the effect of each variable to differ across transitions. The transition hazards for individual *k* are given by:

$$\lambda_{ij}(t) = \lambda_{ij,0}(t) \exp\left(\beta_{ij} Z_{ij}\right) \tag{2}$$

where *ij* indicates a transition from state *i* to state *j*, $\lambda_{ij,0}(t)$ is the baseline hazard of this transition, and Z_{ij} is the vector of transition-specific covariates. This model allows the covariate effects to differ across transitions. The multi-state model is estimated separately for each country using the *mstate* package in R (de Wreede, Fiocco, and Putter 2011).[3]

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). Thus, technically, a multi-state model is equivalent to estimating a series of competing risks models (Putter et al. 2006). However, estimating a single stratified Cox model using data in long format provides insights into holistic processes by enabling us

[3]Although weights are included in some of the Harmonized Histories, the *mstate* package does not allow for the inclusion of survey weights. Although this is a limitation, the goal of this paper is not to provide population estimates but to explore the influence of education across the family life course. Nonetheless, we present weighted descriptive statistics in the Appendix. Appendix Table A-2 displays the weighted proportion of women who experience each of the examined partnership and parenthood transitions. These proportions are very similar to the unweighted proportions shown in Table 2. Additionally, Appendix Table A-3 displays the weighted and unweighted distribution of educational level across countries. Again, these proportions are very similar, although we observe somewhat larger differences between the weighted and unweighted distribution in Norway and Romania. Additional, weighted analyses (not shown but available from the authors on request) for these two countries reveal very similar results to those shown in the paper.

to focus on trajectories of family life transitions. Additionally, this approach allows for estimating the influence of education on all examined transitions within the same model. Thus, this method provides an innovative way to study the role of education in family formation trajectories from a life course perspective.

We study women born between 1950 and 1969, the first cohort to ever experience nonmarital cohabitation, more diverse partnership forms, and less standardised pathways to parenthood. Women are observed from age 15 until either age 45, the time of their first birth, or the survey date, whichever happens first. Time t is measured in months since age 15. This means that for each set of transitions, time is measured since age at entry into a given origin state (e.g., for the transitions from cohabitation, time is measured since age at entry to cohabitation). Due to differing survey years and age at interview across countries, the length of time that women have been exposed to the examined transitions varies between countries (see Appendix Table A-1).

5. Variables

Level of education: Education, measured at the time of the survey, is classified into six categories based on the International Standard Classification of Education (ISCED 1997). We compare low- (ISCED 0–2) and highly educated (ISCED 5–6) women to their medium-educated (ISCED 3–4) counterparts.[4] 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 a medium level of education takes on average four years, while obtaining higher education takes three additional years on average.[5] 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: A time-varying educational enrolment variable takes the value 1 for each period when the respondents are enrolled in education and 0 otherwise.

Birth cohort: Two birth cohorts are compared: women born between 1950 and 1958 and between 1959 and 1969. In the United States and Austria only one birth cohort is included in the analysis because in these countries the age range at interview was 15–45 and 18–46, respectively.

[4] Appendix Table A-3 shows the weighted and unweighted distribution of educational level at the time of the survey across the study countries.

[5] We performed sensitivity analyses (not shown but available from the authors on request) using a time-constant measure of education (i.e., education at the time of the survey) and found that the results were very similar to those presented in the paper.

6. Descriptive results

To understand where educational differences in partnership status at birth are produced across the family life course, it is important to first explore educational differences in partnership status at first birth. Although previous research has shown a clear negative educational gradient of a first birth in cohabitation (Perelli-Harris et al. 2010), they only included eight countries and used a period perspective. In this paper we include a larger number of countries not previously examined in terms of the intersection between partnership transitions and first birth. In comparison to previous work, we are likely to find increased heterogeneity in the results.

Table 1 shows the relative risk of a first birth while single (i.e., unpartnered), cohabiting, or married (the reference category is no birth), by education, and controlling for birth cohort and educational enrolment. These results come from competing risks event history models. In general, we find a significant negative educational gradient of a first birth while being unpartnered in all countries except Lithuania and Romania. In other words, low-educated women have a higher risk of having a first child while being unpartnered than medium- or highly educated women. Significant differences between medium- and highly educated women only emerge in the United Kingdom and the United States. Moreover, we find a significant negative educational gradient of a first birth within cohabitation in most study countries (except Austria, Belgium, the Czech Republic, the Netherlands, Spain, and the United Kingdom). In these 11 countries at least one parameter estimate for the effect of education is significant, indicating that low-educated women are more likely than medium-educated women to have a cohabiting first birth, and/or highly educated women are less likely than medium-educated women to experience a cohabiting first birth. In the remaining countries we find no significant differences between low/high- and medium-educated women. Finally, we find a negative educational gradient for marital first births in eight countries (Bulgaria, France, Hungary, Italy, the Netherlands, Romania, Spain, and the United Kingdom); that is, lower/higher-educated women have a higher/lower risk of experiencing a first birth in marriage than those with medium levels of education. In some countries (i.e., Estonia, Norway, and Sweden) the educational gradient is U-shaped, indicating that both low- and high-educated women have higher marital first birth risks than medium-educated women. Additionally, we find a positive educational gradient in the Czech Republic and the United States, where highly educated women have a higher risk of having a marital first birth than women with medium levels of education. Last, we detect no significant educational differences in the risk of a marital first birth in Austria, Belgium, Lithuania, and Russia.

Table 1: Hazard ratios of first birth by partnership status at first birth and country, women born between 1950 and 1969

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Single																	
Education																	
Low	2.29***	1.75*	1.90**	2.05***	2.15***	1.61**	2.35***	1.71***	0.95	2.49**	2.32***	1.12	1.83**	1.70**	3.77***	2.15***	1.78***
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	0.81	0.71	1.00	1.09	1.40	0.71	0.78	0.65	0.70	0.90	0.85	0.00	0.81	0.58	1.09	0.58**	0.61*
Cohort																	
1950–1959 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1960–1969		1.46	0.72	1.08	1.28	0.86	1.36	1.04	1.31	1.23	0.66***	0.73	1.17	0.90	0.67*	2.00***	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.15***	0.33**	0.28***	0.17***	0.26***	0.27***	0.26***	0.14***	0.40**	0.00	0.38***	0.20***	0.23***	0.37**	0.27***	0.41***	0.24***
Cohabiting																	
Education																	
Low	1.45	1.01	2.96***	1.38	1.75**	1.40**	3.34***	1.72**	3.09**	0.99	1.30**	2.78***	1.27	0.76	1.82***	0.88	1.95**
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	0.70	1.12	0.42*	0.45	0.54***	0.92	0.69	1.26	0.61	0.82	0.98	0.43	0.61*	0.84	0.94	0.77	0.45***
Cohort																	
1950–1959 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1960–1969		1.82*	1.36	2.27**	2.08***	2.13***	4.83***	1.31	1.90*	2.71***	2.54***	1.69**	1.43*	1.64*	1.22**	2.33***	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.26***	0.42	0.08***	0.39*	0.21***	0.41***	0.14***	0.06**	0.09***	0.01*	0.51***	0.12***	0.26***	0.33*	0.47**	0.62	0.17***

Table 1: (Continued)

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Married																	
Education																	
Low	1.19	1.00	1.13*	0.92	1.30**	1.19*	1.34***	1.57***	1.12	1.32***	1.24**	1.16**	1.05	1.25***	1.40*	1.30**	1.28
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	1.02	0.90	1.05	1.37**	1.15*	0.87	1.02	0.98	0.93	0.80**	1.29***	1.02	1.11	0.76***	1.47***	1.00	1.22*
Cohort																	
1950–1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1959–1969		0.92	1.05	1.11	1.02	0.68***	1.03	0.76***	1.27***	0.74***	0.56***	1.13*	1.22*	0.70***	0.74***	0.73***	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.32***	0.22***	0.40***	0.43***	0.45***	0.30***	0.37***	0.16***	0.46***	0.20***	0.53***	0.34***	0.52***	0.39***	0.70**	0.46***	0.26***

Source: Harmonized Histories, authors' own calculations.
Notes: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, EE – Estonia, FR – France, HU – Hungary, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, RO – Romania, RU – Russia, ES – Spain, SE – Sweden, UK – United Kingdom, US – United States.
*p < .05, **p < .01, ***p < .001.

To summarise, we find a negative educational gradient of a birth while being unpartnered or within cohabitation, although this gradient is not significant in all of the study countries. We found more heterogeneity in the educational gradient of a marital first birth across countries. This is partially because the educational gradient of a first birth within cohabitation or marriage is a combination of the risk of entering cohabitation or marriage as well as the speed at which women enter motherhood once they are cohabiting or married.

To study whether these educational differences observed at the time of a first birth are produced upon entrance into cohabitation, during the transition from cohabitation to marriage, or during the transition to first birth, Table 2 describes the proportion of women who experienced each transition between age 15 and age 45. The number of women at risk of each transition is shown following each set of transitions. The proportion of those experiencing each set of transitions does not add up to 100% because some women do not experience any transitions but stay in the state of origin. Looking first at transitions from the childless single state (columns 1 to 4), cohabitation is most widespread in Sweden (86%) followed by Austria and Norway (over 60%). By contrast, in Spain, Italy, Lithuania, Romania, and Hungary less than 20% of childless single women enter cohabitation. In these countries the majority of childless single women marry their partner directly. The proportion of never partnered women who have a first child is below 15% in all countries. Among women whose first union is a cohabitation (columns 5 to 8 in Table 2), the majority of cohabiting unions transition to marriage in Belgium, Bulgaria, the Czech Republic, Estonia, Lithuania, the Netherlands, Romania, Russia, and Spain. In these countries the proportion of first cohabiting unions that end in dissolution is below 10% (except in the Netherlands). However, in the remaining countries a smaller proportion (about 50%) of first cohabiting unions translates to marriage and a larger share (about 15% to 25%) ends in union dissolution. This indicates that in these countries cohabitation might be less stable than in the other countries. Additionally, in countries where cohabitation is widespread, cohabiters constitute a less selective group. However, in countries where cohabitation is less common (e.g., Spain, Italy, Lithuania, Romania, Russia, and Hungary) the majority of women who experience cohabitation marry before having a child. Additionally, in these countries only a small proportion of never partnered women experience cohabitation, but a relatively large share of these women go on to have a child within cohabitation.

The majority of directly married women (columns 9 to 11 in Table 2) have a child within this union, while less than 10% of direct marriages end with a divorce prior to childbearing. This proportion is larger in the United States (20%). Dissolution is somewhat more prevalent in the case of marriages preceded by cohabitation and, in

turn, a somewhat smaller proportion of women have a first child within a marital union preceded by cohabitation compared to direct marriages (columns 12 to 13 in Table 2).

Table 2: Proportion (%) of women who experience each of the examined partnership and parenthood transitions and total number of women in each state by country, women born between 1950 and 1969

	From S to				From C to				From M to			From CM to		
	C	M	B	Total entered S	CM	D+	B	Total entered C	D+	B	Total entered M	D+	B	Total entered CM
Austria	69.5	16.8	9.4	855	54.9	19.0	24.9	594	5.6	89.6	144	8.9	83.4	326
Belgium	45.3	44.8	7.2	1,137	77.3	9.5	11.7	515	0.8	90.0	509	11.3	82.4	398
Bulgaria	53.0	36.3	5.5	2,396	88.5	0.9	9.6	1,271	1.6	96.3	870	1.2	96.6	1,125
Czech Republic	23.4	60.0	11.0	1,511	74.9	5.4	17.5	354	2.5	92.8	906	4.5	89.8	265
Estonia	44.5	44.1	8.3	1,776	66.7	4.4	27.9	792	4.5	94.9	783	5.5	91.7	528
France	55.4	32.3	6.6	2,061	52.5	15.8	29.7	1,142	4.8	91.9	666	5.2	90.8	599
Hungary	10.3	81.6	4.8	2,257	59.5	14.2	23.7	232	4.2	93.6	1,841	5.1	89.1	138
Italy	8.8	79.3	3.1	7,246	52.4	20.4	20.5	638	2.6	90.6	5,746	5.7	78.4	334
Lithuania	15.2	69.3	8.3	1,641	71.9	5.6	20.5	249	2.5	94.2	1,138	3.9	90.5	179
Netherlands	44.9	50.3	1.9	2,069	69.4	16.4	11.1	928	5.1	89.7	1,041	5.4	87.7	644
Norway	63.2	24.9	8.7	2,767	47.1	18.4	33.1	1,748	4.8	92.0	688	6.7	88.7	824
Romania	17.5	75.4	4.4	2,185	61.6	4.4	33.2	383	2.1	92.7	1,647	3.4	86.9	236
Russia	24.4	64.3	8.4	2,573	60.7	9.4	29.1	629	5.0	93.5	1,655	7.1	90.3	382
Spain	13.8	74.9	5.4	2,761	60.1	5.5	27.9	381	1.8	93.8	2,067	3.1	88.6	229
Sweden	85.8	8.0	4.5	1,659	29.7	25.7	43.0	1,424	6.1	88.6	132	5.7	89.1	423
United Kingdom	35.8	46.2	11.4	1,766	55.6	24.5	16.0	633	10.5	85.0	816	8.8	78.4	352
United States	42.0	37.4	14.0	1,396	55.0	25.7	18.4	587	20.1	74.9	522	19.2	71.2	323

Source: Harmonized Histories, authors' own calculations.
Note: S – never partnered, C – cohabitation, M – marriage, D+ – union dissolution (also includes women who experienced re-partnering following union dissolution), B – first birth.
CM indicates that women married their cohabiting partner.

7. Multivariate results

Table 3 (panels a to f) presents results of the multi-state event history models. Each panel shows the hazard ratios for level of education associated with experiencing each event, relative to remaining in the baseline state, controlling for educational enrolment and birth cohort. Hazard ratios (i.e., the exponential of the regression coefficients) are interpreted as relative risks. A hazard ratio larger (smaller) than 1 indicates that the risk of a given transition is higher (lower) for this group of women than for the reference group. The results are combined and synthesised in Table 4. Due to small number of cases, once women arrive at the union dissolution state we do not distinguish between them based on 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+) are not reported in Table 3. However, these results are summarised in Table 5.

The estimated models assume that the hazards of low-, medium-, and highly educated women are proportional. However, we know from previous literature that the impact of education on different partnership and parenthood transitions is likely to vary by age. To test this idea, we estimated an additional set of models which included interactions between educational attainment and age. Due to the complexity of the results and the number of tables presented, these models are not shown in the paper but are available upon request. However, the estimates are very similar and the overall message of the paper remains the same.

We focus on observed tendencies in the educational gradient of all transitions. We rarely find a 'full' educational gradient where the hazards of both low- and highly educated women are significantly different from that of medium-educated women, but we often find significant differences between low/high- and medium-educated women. These results are interpreted as an indication of an educational gradient. Whether a difference is statistically significant is likely to depend on sample size, number of events, and variation in the meaning of (medium-) education across countries and birth cohorts.

Table 3: Results of the multi-state event history models, hazard ratios, by country

a) Transition from being never partnered to cohabitation (S → C)

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Education																	
Low	0.97	1.00	1.12	0.69*	1.36**	0.89	1.92***	0.99	1.43	0.91	1.02	1.66***	1.15	0.83	1.02	0.87	0.92
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	1.16	1.44**	0.78*	1.71*	0.83	1.32**	1.09	1.25	0.74	1.15	1.00	0.72	0.84	1.23	0.96	1.16	0.81
Cohort																	
1950–1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1959–1969		1.18	1.13	1.38**	1.64***	1.76***	3.82***	1.31**	1.83***	1.82***	1.45***	1.45***	1.34***	1.45**	1.00	2.11***	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.71**	0.65***	0.37***	0.61**	0.51***	0.63***	0.45***	0.52***	0.38***	0.72***	0.62***	0.25***	0.50***	0.81	0.62***	1.00	0.46***

Source: Harmonized Histories; authors' own calculations.
Notes: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, EE – Estonia, FR – France, HU – Hungary, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, RO – Romania, RU – Russia, ES – Spain, SE – Sweden, UK – United Kingdom, US – United States.
*p < .05. **p < .01. ***p < .001.

Table 3: (Continued)

b) Transition from being never partnered to direct marriage (S → M)

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Education																	
Low	1.81**	0.89	0.86	0.76**	0.80*	1.36***	1.11	1.34***	0.89	1.30***	0.97	1.07	0.88	1.27***	1.70	0.93	0.90
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	1.57	0.88	1.38**	1.72***	1.25*	0.90	1.10	1.14*	1.04	0.75	1.42*	1.12	1.02	0.83*	1.24	0.96	0.77*
Cohort																	
1950–1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1959–1969		0.66***	0.85*	0.89	0.78***	0.44**	0.87**	0.70***	1.19**	0.42***	0.38***	0.96	1.03	0.80***	0.61**	0.51***	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.19***	0.17***	0.47***	0.53***	0.61***	0.27***	0.42***	0.19***	0.57***	0.31***	0.54***	0.31***	0.50***	0.37	0.52*	0.65***	0.46**

Source: Harmonized Histories, authors' own calculations.
Notes: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, EE – Estonia, FR – France, HU – Hungary, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, RO – Romania, RU – Russia, ES – Spain, SE – Sweden, UK – United Kingdom, US – United States.
*p < .05. **p < .01. ***p < .001.

Table 3: (Continued)

c) Transition from cohabitation to marriage (C → CM)

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Education																	
Low	0.74	1.09	0.73***	0.57**	1.00	1.00	1.16	0.83	0.83	1.14	0.96	0.49***	1.07	1.34	1.44*	1.18	1.20
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	1.25	1.05	1.28*	1.28	1.44**	0.91	1.73*	1.34	1.17	0.88	1.49***	1.80	1.15	1.60*	1.43**	1.14	1.53**
Cohort																	
1950–1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1959–1969		0.75**	0.91	1.02	0.79**	0.63***	0.93	1.01	1.33	0.72***	0.42***	0.96	1.01	0.78	0.64***	0.93	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.69*	0.37***	0.99	1.06	1.15	0.53***	0.72***	0.29***	1.48	0.48***	0.97	1.72**	0.95	0.75	0.80	0.48**	1.11

Source: Harmonized Histories, authors' own calculations.
Notes: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, EE – Estonia, FR – France, HU – Hungary, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, RO – Romania, RU – Russia, ES – Spain, SE – Sweden, UK – United Kingdom, US – United States.
*p < .05. **p < .01. ***p < .001.

Table 3: (Continued)

d) Transition to a cohabiting first birth conditional on entering cohabitation (C → B)

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Education																	
Low	1.29	1.16	2.13***	0.94	1.21	1.88***	3.11***	1.67*	1.44	1.52	1.28*	1.06	1.35	1.35	1.91***	0.85	1.78*
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	0.58	0.59	0.49	0.35	0.59**	0.75	0.77	1.19	0.55	0.65	1.06	0.89	0.49**	0.67	0.98	0.42***	0.38***
Cohort																	
1950–1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1959–1969		0.96	1.01	1.63	1.16	1.13	1.18	0.68*	1.37	0.95	1.41**	1.10	1.01	0.96	1.10	1.11	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.28***	0.34*	0.24***	0.88	0.39***	0.44***	0.19***	0.07**	0.34	0.10*	0.63***	0.56	0.44**	0.22	0.54***	0.64	0.49**

Source: Harmonized Histories, authors' own calculations.
Notes: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, EE – Estonia, FR – France, HU – Hungary, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, RO – Romania, RU – Russia, ES – Spain, SE – Sweden, UK – United Kingdom, US – United States.
*p < .05. **p < .01. ***p < .001.

Table 3: (Continued)

e) Transition to a marital first birth conditional on having experienced direct marriage (M → B)

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Education																	
Low	0.72	1.01	0.94	0.87	1.21	0.88	1.09	1.15***	0.95	1.18*	1.21	0.89*	1.02	1.06	1.22	1.31*	1.24
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	1.05	1.09	1.16	1.42**	0.96	1.14	1.09	1.12*	1.04	1.01	1.28*	1.15	1.31**	0.86	1.92*	1.02	1.08
Cohort																	
1950–1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1959–1969		1.30**	1.22**	1.34***	1.00	0.89	1.12*	0.93*	1.08	1.11	0.75***	1.08	1.01	0.82***	0.62*	1.04	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.71	0.65	0.88	1.10	0.73**	0.70*	0.75***	0.77**	0.88	0.67	0.67***	0.95	0.86	0.73**	1.12	0.84	0.53***

Source: Harmonized Histories, authors' own calculations.
Notes: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, EE – Estonia, FR – France, HU – Hungary, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, RO – Romania, RU – Russia, ES – Spain, SE – Sweden, UK – United Kingdom, US – United States.
*p < .05. **p < .01. ***p < .001.

Table 3: (Continued)

f) Transition to a marital first birth conditional on having experienced marriage preceded by cohabitation (CM → B)

	AT	BE	BG	CZ	EE	FR	HU	IT	LT	NL	NO	RO	RU	ES	SE	UK	US
Education																	
Low	1.70*	0.97	0.87	0.90	1.31	1.11	0.75	1.25	0.73	0.96	1.08	1.08	0.87	0.97	1.00	1.62*	1.28
Medium (ref)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High	0.95	1.41*	1.15	1.00	1.08	1.04	0.77	0.99	1.35	0.86	1.33**	2.33*	1.03	0.69	1.28	1.02	0.95
Cohort																	
1950–1958 (ref)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1959–1969		1.33*	1.15*	1.16	1.36**	1.09	0.77	1.72***	1.10	1.44***	1.10	2.05***	1.27*	0.82	1.21	1.57**	
Enrolment																	
Not enrolled	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Enrolled	0.48**	0.88	1.24*	0.97	0.80	0.93	0.36**	0.30*	1.18	0.62	0.84	0.54*	0.87	0.91	1.17	0.66	0.49*

Source: Harmonized Histories, authors' own calculations.
Notes: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, EE – Estonia, FR – France, HU – Hungary, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, RO – Romania, RU – Russia, ES – Spain, SE – Sweden, UK – United Kingdom, US – United States.
*p < .05. **p < .01. ***p < .001.

7.1 Education and the transition to cohabitation or marriage (S → C or S → M)

The first set of competing transitions is the transition from being never partnered and childless to cohabitation, direct marriage, or a first birth whilst never partnered, compared to remaining never partnered and childless. In this section we examine the first two transitions; the transition to a first birth while being never partnered will be briefly discussed later. The educational gradient of entry into cohabitation as compared to remaining never partnered and childless varies across countries (Table 3, panel a). We find a significant positive educational gradient in Belgium, the Czech Republic, and France and a significant negative gradient in Bulgaria, Hungary, Estonia, and Romania. The remaining countries have a flat educational gradient.

The educational gradient of direct marriage, relative to remaining never partnered, is also inconsistent (Table 3, panel b). We find four distinct groups: a negative educational gradient (Austria, France, the Netherlands, Spain, and the United States), a positive educational gradient (Bulgaria, the Czech Republic, Estonia, and Norway), inconsistent educational gradient (Italy), and no significant educational gradient (Belgium, Hungary, Lithuania, Romania, Russia, Sweden, and the United Kingdom).

7.2 Education and the transition from cohabitation to marriage or first birth (C → CM) or (C → B)

The second set of competing transitions is the transition from cohabitation to marriage, union dissolution (discussed later), or a first birth, compared to remaining childless and in cohabitation.

Education has a consistent positive gradient on the transition from cohabitation to marriage across countries (Table 3, panel c). In most countries we find a significant positive educational gradient (Bulgaria, the Czech Republic Estonia, Hungary, Norway, Romania, Spain, and the United States). It is only in the Czech Republic that we find significant differences between both low/high- and medium-educated women. Additionally, the educational gradient is inconsistent in Sweden, whereas in the remaining countries there are no significant differences between low/high- and medium-educated cohabiting women's risk of marrying their partner.

The educational gradient of a first birth among cohabiting women, relative to remaining in cohabitation as a childless couple, is negative in all examined countries, although in some countries (Austria, Belgium, Lithuania, the Netherlands, Romania, and Spain) the relative risks are not significant (Table 3, panel d). This means that lower-educated women have higher risks of experiencing a first birth within cohabitation than more-educated women.

7.3 Education and having a marital first birth conditional on being married (M → B and CM → B)

This section discusses the transition to first birth within direct marriage and in marriage preceded by cohabitation. These results come from two additional sets of competing risks models where union dissolution is a competing risk to both events (the results of these transitions will be briefly discussed later). The educational gradient of the transition to first birth among women who married directly is inconsistent: It is negative in the United Kingdom and the Netherlands, positive in the Czech Republic, Norway, Romania, Russia, and Sweden, and U-shaped in Italy (Table 3, panel e).

In most countries we find no significant educational gradient of the transition to first birth within marriage preceded by cohabitation (Table 3, panel f). However, in Belgium, Norway, and Romania the educational gradient is positive, while in Austria and the United Kingdom it is negative. These findings suggest that the influence of education on the transition to a first birth within marriage (both direct marriage and marriage preceded by cohabitation) is inconsistent across countries.

7.4 Educational gradients across the life course

To help elucidate the role of education across family formation trajectories, Table 4 summarises the findings for each partnership trajectory leading to a first birth, as well as the educational gradient of a single, cohabiting, and marital first birth as shown in Table 1 (see columns S → SB, S → CB, and S → MB). A negative sign indicates a negative educational gradient for a given transition, and vice versa for a positive sign. The letter 'U' indicates a U-shaped relationship (i.e., both low- and high-educated women have higher risks than medium-educated women), whereas the letter 'I' indicates an upside-down relationship (i.e., both low- and high-educated women have lower risks than the medium-educated) between education and the risk of a given transition. Significant relationships are marked with a shaded background. Light grey shading indicates that the risks of low-educated women to experience a given transition are significantly different from the risks of the medium-educated. Medium grey shading indicates that the risks of highly educated women to experience a given transition are significantly different from the risks of medium-educated women. Finally, dark grey shading indicates that the risks of both low- and high-educated women to experience a given transition are significantly different from that of medium-educated women.

In most countries the transition to a first birth while being never partnered has a negative educational gradient (Table 4, column S → B). These results are identical (with the exception of Belgium) to those shown in Table 1 (summarised in Table 4,

column S→SB), where not only never partnered but also separated women were included in the risk set of a first birth while being unpartnered.

Table 4: Summary of findings from Table 1 (columns labelled 'Final gradient') and Table 3: Educational gradient across the life course

	First birth while never partnered	Final gradient	First birth within cohabitation		Final gradient	First birth within marriage that was preceded by cohabitation			First birth within direct marriage		Final gradient
	S → B	S → SB	S → C	C → B	S → CB	S → C	C → CM	CM → B	S → M	M → B	S → MB
Austria	–	–	+	–	–	+	+	–	–	+	–
Belgium	–	–	+	–	U	+	U	+	I	U	U
Bulgaria	–	–	–	–	–	–	+	+	+	+	–
Czech Republic	–	–	+	I	–	+	+	+	+	+	–
Estonia	–	–	–	–	–	–	+	U	+	–	–
France	–	–	+	–	–	+	–	U	–	+	–
Hungary	–	–	–	–	–	–	+	I	U	U	–
Italy	–	–	+	–	–	+	+	–	U	U	–
Lithuania	I	I	–	–	–	–	+	+	+	+	–
Netherlands	–	–	+	–	I	+	–	I	–	–	I
Norway	–	–	–	–	–	–	+	+	+	+	–
Romania	–	–	–	–	–	–	+	+	U	+	–
Russia	–	–	–	–	–	–	U	+	+	+	–
Spain	–	–	+	–	I	+	+	I	–	–	I
Sweden	–	–	–	–	–	–	U	+	U	+	–
United Kingdom	–	–	+	–	I	+	U	–	I	–	I
United States	–	–	I	–	–	I	+	–	–	U	–

Notes: 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 the given transition, i.e., both low- and high-educated women have higher transition risks than medium-educated women. The letter I indicates an inverse relationship between education and the given transition, i.e., both low- and high-educated women have lower transition risks compared to medium-educated women.
Shading indicates that the effect of education was significant at least at the 5% level. Light grey shading indicates that the risks of low-educated women to experience a given transition are significantly different from the risks of the medium-educated. Medium grey shading indicates that the risks of highly educated women to experience a given transition are significantly different from the risks of medium-educated women. Dark grey shading indicates that the risks of both low- and high-educated women to experience a given transition are significantly different from that of medium-educated women.
The analyses control for educational enrolment and birth cohort.

Next, we consider the role of education in the partnership trajectory leading to a cohabiting first birth (Table 4, Columns S → C and C → B, as well as S → CB). The risk of a cohabiting first birth is negative in most study countries (with the exception of Belgium, the Netherlands, Spain, and the United Kingdom). Disaggregating this transition into the transition to cohabitation and to a first birth among cohabiting

women reveals that the educational gradient of the transition to cohabitation is inconsistent. What is consistent across countries is the negative educational gradient of the transition to a first birth among cohabiting women. In other words, regardless of the educational gradient of the transition to cohabitation, once they cohabit, lower-educated women have a higher risk of experiencing a cohabiting birth than more-educated women (although this is not significant in some countries). All in all, these results indicate that it is not the transition to a first cohabiting union where education plays an important role in the pathway to a cohabiting first birth, but it is the transition to a first birth among cohabiting women where the negative educational gradient of a cohabiting first birth emerges.

The overall educational gradient of a marital first birth (Table 4, column S → MB) is negative across countries (except where this relationship is not significant). However, several possible partnership changes, i.e., cohabitation and/or marriage, may occur between being never partnered and experiencing a marital first birth, and each of these transitions may have different educational gradients. To delineate where these final educational differences emerge across the family life course, Table 4, columns S → C, C → CM, and CM → B highlight the role of education in the trajectory leading to a marital first birth via cohabitation. Although the educational gradient for entrance into cohabitation is mixed, in most countries higher-educated women have a higher risk of marrying their cohabiting partner than the less educated. These results indicate that it is the transition from cohabitation to marriage where education plays an important role in the trajectory leading to a first birth within marriage preceded by cohabitation. Once cohabiting women marry their partners the educational gradient of a first birth is mixed across countries and is not significant in most countries. Furthermore, examining the influence of education on the partnership trajectory leading to a first birth within direct marriage (Table 4, column S → M and M → B) reveals that whilst the educational gradient of the transition to direct marriage is mixed, once in direct marriage the educational gradient of a first birth is positive in most countries where this relationship is significant.

Finally, Table 5 summarises the results of the educational gradient of the transitions concerning union dissolution and first birth. Note that few coefficients are statistically significant, most likely due to the small number of events. When marriage was preceded by cohabitation, more-educated women have smaller divorce risks than the lower-educated in Norway and the United States. The dissolution of direct marriage has a significant negative educational gradient only in Estonia and Russia, whereas in Italy medium-educated women are the most likely to divorce following direct marriage. To sum up, educational gradients in transitions related to union dissolution are inconsistent.

Table 5: Summary of findings for the educational gradient of partnership experiences that include union dissolution

	C → D+	CM → D+	M → D+
Austria	U	–	+
Belgium	–	I	U
Bulgaria	–	–	U
Czech Republic	+	I	–
Estonia	U	–	–
France	U	U	U
Hungary	U	–	U
Italy	+	U	I
Lithuania	+	+	–
Netherlands	I	I	I
Norway	–	–	U
Romania	+	I	+
Russia	U	I	–
Spain	–	I	U
Sweden	–	U	–
United Kingdom	I	+	–
United States	+	–	–

Notes: 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 the given transition; i.e., both low- and high-educated women have higher transition risks than medium-educated women. The letter I indicates an inverse relationship between education and the given transition; i.e., both low- and high-educated women have lower transition risks than medium-educated women.
Shading indicates that the effect of education was significant at least at the 5% level.
The analyses are controlled for birth cohort.

8. Discussion

This study examined the educational gradient of partnership trajectories leading to a first birth across 16 European countries and the United States, to understand whether the role of education in partnership trajectories leading to a first birth is unique or universal across countries. First, we estimated competing risks event history models to study the risk of a single, cohabiting, or marital first birth. We found that in most countries, low-educated women had a higher risk of having a first birth while being unpartnered as well as in cohabitation, although there were some exceptions. We also showed that the risk of a marital first birth has a negative educational gradient in most countries. However, several partnership changes may occur between being never partnered and experiencing a marital first birth, each of which may be differently associated with education. Therefore, in the next step we used multi-state event history

models to understand whether the educational differences observed at the time of a first birth emerge upon entry into cohabitation, during the transition from cohabitation to marriage, or during the transition to first birth. In doing so we showed that women from different socioeconomic backgrounds follow different partnership trajectories to a first birth.

More specifically, our study highlighted three new key findings. First, we found that the educational gradient of entry into a first cohabitation is inconsistent across countries, with some countries having a significant negative educational gradient and others having a positive gradient. Thus, education did not have a universal relationship with entry into cohabitation, which may reflect different processes within each country. For example, in Belgium, the Czech Republic, and France, more-educated women had a higher risk of entering cohabitation as a first union, whereas in Bulgaria, Estonia, Hungary, and Romania we found the opposite. The latter countries are former socialist countries with a traditionally stronger preference for marriage. In these countries, cohabitation is often associated with disadvantage, and cohabiters are often on the margins of society (Koytcheva and Philipov 2008; Muresan et al. 2008). By contrast, in Belgium and France cohabitation might be a more accepted form of living arrangement among the highly educated who are at the forefront of demographic change (Lesthaeghe and van de Kaa 1986). In the remaining countries we found no significant relationship between education and the risk of entering cohabitation as a first union. It is possible that in some of these countries cohabitation as a form of first union is so widespread that educational differences do not exist: Low- and high-educated women are equally likely to enter cohabitation as a first union. At the same time, cohabitation was rare in some countries among the examined cohort of women, which may also lead to very small educational differences.

Second, we showed that the negative educational gradient of a cohabiting first birth consistently emerges during the transition from cohabitation to first birth. Regardless of which educational groups are more likely to enter a first cohabitation, lower-educated cohabiting women have a higher risk of having a cohabiting first birth than higher-educated cohabiting women. This means that even in countries where more-educated women have a higher risk of entering cohabitation (e.g., Belgium, Czech Republic, France, Italy, the Netherlands, Spain, and the United Kingdom), it is the least-educated for whom cohabitation represents a context for childbearing. Cohabitation is a suitable childbearing context for the lower-educated but not for the more highly educated in Bulgaria, Estonia, France, Hungary, Italy, Norway, Russia, Sweden, the United Kingdom, and the United States. In the remaining countries we found negative but not significant educational gradients, with the exception of the Czech Republic. Thus, we argue that on the whole, the role of cohabitation differs for low- and high-educated women, with some variation. 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" (Heuveline and Timberlake 2004) for them, although we know from previous studies that they are also more likely to dissolve their relationships (Lyngstad and Jalovaara 2010). This provides further evidence for the 'pattern of disadvantage' argument (Perelli-Harris et al. 2010). Lower-educated women tend to be in a precarious and financially uncertain position, which may prevent them from turning their cohabiting union into marriage because they may not be able to afford a big wedding (Berrington 2001; Perelli-Harris et al. 2012). At the same time, they may decide to have a child within a cohabiting union despite these uncertainties, in order to provide meaning in their lives (Edin and Kefalas 2005). Alternatively, women from more disadvantaged backgrounds may be more likely to have a birth within cohabitation because there are fewer economic incentives to marry the father, who is usually also low-educated and has few resources (Upchurch, Lillard, and Panis 2002).

Related to this, we found a consistent and positive association between education and the risk of entering marriage among cohabiting women. This implies that the trajectory to a marital first birth via cohabitation is associated with more advantage. In other words, for more-educated women, cohabitation represents a temporary life stage that precedes marriage and is less frequently a context for childbearing. A likely explanation is that more-educated women have more resources and more attractive marriage partners and experience more social pressure to marry than their lower-educated counterparts, who are more likely to remain in cohabitation (McLanahan 2004; Oppenheimer 1997, 2000; Perelli-Harris et al. 2010). Additionally, highly educated women are more likely to be aware of policies and regulations related to marital status and marital breakdown and their consequences for childbearing and custody rights. Therefore, they might find it more important to marry their cohabiting partner for financial security and legal protection, especially when planning to have children. Additionally, the symbolic value and importance of marriage may have increased over time. Marriage is increasingly seen as a status symbol, something to be achieved via investments in education, career, and personal savings (Cherlin 2004). This finding is consistent with the idea that new family behaviours are the cause and consequence of economic and social disadvantage (Furstenberg 2014; McLanahan 2004; Perelli-Harris and Gerber 2011) and that marriage is becoming a privilege of the highly educated minority because they are the ones who can afford it (Cherlin 2004, 2010; Lichter, Qian, and Mellott 2006).

While this study has highlighted the importance of examining the educational gradient of partnership trajectories leading to a first birth, it has some limitations. It is likely that decisions relating to union formation, childbearing, and school attendance are interrelated. Although some scholars argue that these processes should be modelled

simultaneously (Upchurch, Lillard, and Panis 2002), simultaneous models lead to complex results (Baizán, Aassve, and Billari 2003, 2004), limiting the number of transitions that can be examined. Applying these models to a large number of countries and several transitions would make the interpretation of the results complex and unfeasible. This study does not attempt to identify a causal relationship between education and family life transitions. Rather, by applying multi-state event history models it aims to provide a first description of the role of education in family formation trajectories in a cross-national context. Additionally, we defined the transition to motherhood at the time of first birth. However, conception or pregnancy is likely to influence partnership transitions. Pregnant cohabiters, especially those with higher education, are likely to marry and have a marital first birth (Berrington 2001; Holland 2013; Perelli-Harris et al. 2012). We did not include conception as an additional state in the investigation because the primary interest was in partnership status at first birth.

Despite these limitations, this study contributes to the growing literature on how educational disparities are shaping partnership and fertility dynamics. We show that socioeconomic differences are revealed most clearly at the time of a first birth, signalling that the most significant event in the early family life course is the birth of a first child and not the formation of a first union. In most countries, highly educated women are just as likely to enter cohabitation for their first union as lower-educated women, if not more likely, but they usually marry before having a child with their partner. The low-educated, however, are less likely to marry and more likely to have a birth within cohabitation. For them, cohabitation seems to be a suitable context for childbearing, even if they do not deem their partner suitable for marriage.

These findings raise important questions about the potential new meaning of marriage across Europe and the United States, and the possible barriers to marriage across social groups in a cross-national context. Our findings contribute to the ongoing discussions about the role of education for marriage. Previous studies argue that for the highly educated, marriage increasingly seems to be based on a companionate relationship, with shared interests and goals (Cherlin 2010; Stevenson and Wolfers 2007) and more gender equality (Kalmijn 2013). Marriage, which provides long-term security, is a prerequisite for raising children, but also a shared project (Reed 2006). The less educated, on the other hand, may aspire to marry but find that just living with a partner is the normative situation among their peers (Berrington, Perelli-Harris, and Trevena 2015). Given other expenses related to housing and day-to-day living, marriage may not be a priority (Berrington, Perelli-Harris, and Trevena 2015). The different abilities of high- and low-educated women to draw on resources and achieve stability, especially when raising children, may result in "diverging destinies" (McLanahan 2004). Thus, socioeconomic differences in family behaviours may further contribute to

socioeconomic inequalities by creating different opportunities for low- and highly educated individuals and their families (McLanahan and Percheski 2008).

Nonetheless, it is important to keep in mind that while educational differences in family behaviours are important, the results across countries are not uniform (Perelli-Harris and Lyons-Amos 2016; Raymo et al. 2015). To some extent this variation may reflect the diversity in the diffusion of new family behaviours across countries. For example, although the prevalence of cohabitation as a first union has increased dramatically across the examined countries (Kennedy and Bumpass 2008), countries differ in the onset and pace of this increase. In the Nordic countries, Western Europe, and the United States, most first unions start as cohabitation (Berrington 2003; Bumpass and Lu 2000; Kiernan 2001; Manning and Smock 2002; Seltzer 2000, 2004), while in Southern Europe and post-socialist countries the proportion of cohabiting first unions is considerably lower but increasing (Dominguez-Folgueras and Castro-Martin 2013; Hoem et al. 2009; Hoem et al. 2010; Perelli-Harris et al. 2012). This potentially leads to different social norms, expectations, and attitudes towards cohabitation, marriage, and the 'appropriate' partnership context for childbearing across different contexts. Building on this study, future research could take a further step and focus on explaining the inconsistent educational gradient of partnership transitions using contextual information, such as the effect of country-specific policies, labour market opportunities, and cultural and social norms.

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Appendix

Table A-1: Characteristics of national surveys included in the Harmonized Histories

Country	Survey Name	Year of interview	Cohorts	Age at interview	Original N
Austria	Austrian Generations and Gender Survey wave 1	2008/2009	1963–1990	18–46	5,000
Belgium	Belgian Generations and Gender Survey wave 1	2008/2010	1928–1990	18–82	7,163
Bulgaria	Bulgarian Generations and Gender Survey wave 1	2004	1919–1987	17–85	12,858
Estonia	Estonian Generations and Gender Survey wave 1	2004/2005	1924–1983	21–18	7,855
Czech Republic	Czech Generations and Gender Survey wave 1	2004/2006	1926–1987	17–80	10,006
France	French Generations and Gender Survey wave 1	2005	1926–1987	17–79	10,079
Hungary	Hungarian Generations and Gender Survey wave 1	2004/2005	1926–1983	20–79	13,540
Italy	Italian Generations and Gender Survey wave 1	2003	1901–1985	18–64	21,454
Lithuania	Lithuanian Generations and Gender Survey wave 1	2006	1926–1989	17–80	10,036
Netherlands	Dutch Fertility and Family Survey	2003	1940–1984	18–63	8,145
Norway	Norwegian Generations and Gender Survey wave 1	2007/2008	1927–1988	19–81	14,881
Romania	Romanian Generations and Gender Survey wave 1	2005	1925–1987	18–80	11,986
Russia	Russian Generations and Gender Survey wave 1	2004	1923–1987	17–81	11,261
Spain	Spanish Fertility Survey	2006	1908–1991	15–98	9,737
Sweden	Swedish Generations and Gender Survey wave 1	2012/2013	1933–1994	19–80	9,688
United Kingdom	British Household Panel Survey	2005/2006	1925–1989	16–80	14,539
United States	National Survey of Family Growth	2007	1961–1993	15–45	13,495

Table A-2: Weighted proportion of women who experience each of the examined partnership and parenthood transitions (%) and total number of women in each state, women born between 1950 and 1969

	From S to			Total entered	From C to			Total entered	From M to		Total entered	From CM to		Total entered
	C	M	B	S	CM	D+	B	C	D+	B	M	D+	B	CM
Austria	66.4	17.7	8.8	855	55.5	19.7	23.6	594	6.0	90.7	144	10.5	82.5	326
Belgium	44.5	46.2	7.0	1,137	77.7	9.3	11.5	515	0.8	89.9	509	11.2	82.7	398
Bulgaria	53.0	36.3	5.5	2,396	88.5	0.9	9.6	1,271	1.6	96.3	870	1.2	96.6	1,125
Czech Republic	14.8	37.8	6.9	1,511	74.9	5.4	17.5	354	2.5	92.8	906	4.5	89.8	265
Estonia	44.5	44.1	8.3	1,776	66.8	4.4	27.8	792	4.5	94.9	783	5.5	91.7	528
France	58.5	35.8	6.1	2,061	54.5	13.9	29.4	1,142	3.7	93.1	666	4.6	91.2	599
Hungary	10.9	79.3	5.2	2,257	54.5	16.7	25.6	232	4.7	93.2	1,841	5.2	88.8	138
Italy	8.8	78.5	2.7	7,246	50.9	20.9	22.0	638	2.6	90.6	5,746	5.2	78.5	334
Lithuania	15.1	69.2	8.5	1,641	71.8	6.0	20.6	249	2.4	94.4	1,138	3.4	89.9	179
Netherlands	44.7	43.3	2.4	2,069	63.3	20.7	11.9	928	6.9	86.6	1,041	6.7	83.9	644
Norway	64.8	25.5	9.8	2,767	47.7	17.8	32.9	1,748	4.3	92.9	688	7.2	88.2	824
Romania	17.7	74.8	4.5	2,185	61.4	4.4	33.4	383	2.1	92.4	1,647	3.4	86.5	236
Russia	24.4	64.3	8.4	2,573	60.7	9.4	29.1	629	5.0	93.5	1,655	7.1	90.3	382
Spain	14.3	75.1	5.1	2,761	56.6	5.8	26.9	381	2.0	93.7	2,067	4.0	89.2	229
Sweden	55.3	5.1	2.9	1,659	29.7	25.7	43.0	1,424	6.1	88.6	132	5.7	89.1	423
United Kingdom	33.5	37.8	5.9	1,766	55.8	27.2	15.4	633	8.5	87.6	816	6.4	83.6	352
United States	42.0	49.0	15.7	1,396	56.9	24.9	17.9	587	15.4	81.1	522	18.3	75.1	323

Source: Harmonized Histories, authors' own calculations.
Notes: S – never partnered, C – cohabitation, M – marriage, D+ – union dissolution (also includes women who experienced re-partnering following union dissolution), B – first birth. CM indicates that women married their cohabiting partner. Weights are not available for Bulgaria, Czech Republic, Russia, and Sweden.

Table A-3: Unweighted and weighted distribution of educational level across countries, women born between 1950 and 1969

	Unweighted			Weighted			
	Low	Medium	High	Low	Medium	High	Total
Austria	16.02	63.86	20.12	16.06	63.23	20.71	855
Belgium	31.98	32.69	35.34	31.70	32.94	35.36	1,137
Bulgaria	19.24	57.37	23.4				2,396
Czech Republic	15.96	66.81	17.24				1,511
Estonia	9.99	54.87	35.15	10.66	56.26	33.08	1,776
France	27.03	45.20	27.77	29.14	44.93	25.93	2,061
Hungary	18.45	63.89	17.67	19.95	63.32	16.73	2,257
Italy	49.71	38.77	11.52	48.92	39.19	11.95	7,246
Lithuania	4.57	66.61	28.82	4.35	66.56	29.10	1,641
Netherlands	37.07	40.71	22.22	37.44	38.73	23.84	2,069
Norway	16.40	46.73	36.87	23.84	46.63	29.53	2,767
Romania	27.53	61.10	11.37	34.79	54.18	11.04	2,185
Russia	3.52	74.04	22.45				2,573
Spain	51.98	29.57	18.45	51.33	29.52	18.95	2,761
Sweden	9.66	55.35	34.99				1,659
United Kingdom	12.54	33.56	53.89	9.82	32.17	58.01	1,766
United States	15.49	28.82	55.69	13.19	27.86	58.95	1,396

Source: Harmonized Histories, authors' own calculations.
Note: Weights are not available for Bulgaria, Czech Republic, Russia, and Sweden.