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Changing educational gradients of US partnership formation and dissolution? A multilevel multistate competing risks assessment

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Abstract

The effect of female education on partnership formation and dissolution in the United States is a widely investigated topic in the literature. However, several questions remain unanswered to understand how the role of education has changed in predicting entry and exit into partnership in the past decades. The objective of this article is to investigate the changing effect of female education on partnership formation and dissolution taking into account interrelationships between partnership dynamics and educational choices. Using data from 1968 – 2011 of the Panel Survey of Income Dynamics (PSID), we take a multilevel multistate competing risks approach to model jointly partnership transitions and education outcomes across women's life course. Our results suggest that after correcting for selection into partnership and education, college education increasingly predicts women's higher risk of entry into any type of partnership, but a lower risk of separation from marriage. However, we do not find a significant or changing relationship between college education and the outcomes of cohabitation, i.e. marriage or separation. These findings provide only partial support for McLanahan's argument about changes in the impact of women's educational attainment on family transitions.

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Social demographers note a changing role of education in predicting entry into and exit from partnership (Esping-Andersen 2009; Härkönen and Dronkers 2006; McLanahan 2004). In the post-war period, highly-educated women were less likely to be married and generally had a higher propensity to forego marriage altogether (Isen and Stevenson 2011). Today, however, evidence suggests that less-educated women are retreating from marriage and are more likely to cohabit (Copen, Daniels and Mosher 2013; Lundberg and Pollak 2013). Also, the risk of experiencing dissolution of any type of partnership is increasingly more pronounced among less-educated women (McLanahan 2004). Furthermore, the sequence of partnerships also appears to differ along educational lines. For example, college-educated women are more likely to marry their cohabiting partner but also to re-marry after a divorce (Copen, Daniels and Mosher 2013; Isen and Stevenson 2011). In contrast, serial cohabitation is more prevalent among lower-educated women (Lichter and Qian 2008).

Parallel to these fast changes in partnership behaviors, women's participation in higher education has also undergone great transformation. Educational attainment has steadily increased since the 1960s, with more US women now completing a university degree as compared with men (DiPrete and Buchmann 2006). As a result, it is unclear to what extent changing educational trends in US family formation and dissolution might be driven by education *per se* or rather by the changing interplay between women's characteristics and educational and family decisions.

The objective of this article is therefore two-fold. First, we investigate how the relationship between education and women's partnership formation and dissolution has changed across US cohorts. Second, we model partnership and education transitions simultaneously in order to disentangle the effect of education from time-invariant unmeasured characteristics, which may jointly affect educational outcomes and partnership decisions. The United States is an excellent case for studying these trends, as women's participation in higher education has historically been greater than in many Western countries and continues to increase (DiPrete and Buchmann 2006). Overall, US partnership dynamics and educational attainment have undergone fast and simultaneous changes. This paper therefore traces the effect of education on partnership dynamics taking in account changing intersections of both educational and family decisions.

Literature Review

Theories of household specialization

The predominant theoretical framework in the literature on marriage and divorce behaviors comes from Becker (1973, 1974, 1991; Becker, Landes and Michael 1977). Becker posits that marital stability depends on a gendered division of labor within the household, in which one partner specializes in the labor market and the other specializes in family unpaid household tasks and child rearing. The benefits of specialization are theoretically gender-neutral, although Becker further argues that, because of their child-bearing capacity, women have comparative advantage in unpaid work. The hypothesized stability of this model stems from the "mutual interdependence" created by the partners needing to share the fruits of their specializations in order to maximize simultaneously household production and reproduction.

One prediction from this model is that a wife's employment undermines marital stability by disrupting the mutual interdependence and enhancing a woman's ability to leave an unhappy marriage (Becker et al. 1977). The role of wives' education in marital stability, however, is more ambiguous. One the one hand, highly-educated women are more likely to be employed, which would be disruptive. On the other, more educated women tend to marry at older ages indicating a longer partner search, which should improve the quality of the match (Becker 1974). As a result, highly-educated couples have greater gains to marriage and are therefore predicted to be less likely to divorce (Becker 1974; Becker, et al. 1977). As more individuals attain higher levels of education, we therefore have somewhat competing hypotheses, depending on whether the positive impact of wives' education in terms of greater gains to marriage offsets the negative impact of an educated wife's employment on marital stability.

Another prediction from Becker's model is that the determinants of marriage have remained static over time (Teachman 2002). However, the twenty-first century has been marked by great changes, in particular, for women's gender roles (Goldin 2006). Thus, such a static model may not be able to explain recent changes in partnership dynamics (Cherlin 2004, Sweeney 2002). Oppenheimer (1988, 1994, 1997) contests this assumption and suggests that the nature of marital relationships has been altered by changing gender roles. As women increasingly participate in tertiary education and in the labor market, the marriage bargain has shifted from a 'specialization model of marriage' to an 'adaptive family strategy' model (Oppenheimer 1994). Marriage formation and stability depend on the ability of both partners within a couple to pool resources. Better economic prospects should, thus,

render both men and women more attractive on the marriage market and, also, act as a stabilizer for marriage. As women's higher education increasingly predicts a better position in the labor market, the impact of education should be positively predict marriage and subsequent marital stability. Differently from Becker, Oppenheimer argues that women's investment in higher education explains the increase in age at marriage and the emergence of cohabitation as a trial marriage rather than a decline of marriage altogether.

McLanahan (2004) makes a similar prediction within the context of the Second Demographic Transition, but instead blames feminism, new birth control technologies, changes in men's labor market opportunities, and welfare-state policies for the reversal in women's educational trends in divorce. McLanahan contends that highly-educated women have benefited the most from feminist gains, are more likely to be employed, and, à la Becker, more likely to find high-quality educated men with whom to partner. In contrast, less-educated women are less likely to be employed or work fewer hours if they are employed, at the same time that less-educated men's labor market opportunities have eroded, which decreases their desirability as marital partners (see also Edin and Kefalas 2005). As a result, less-educated women are more likely to cohabit than marry, and experience the dissolution of any type of relationship than highly-educated women.

The context of marriage and cohabitation in the United States

The logics of partnership dynamics in the United States follow quite distinctive logics with respect to other nations but also across socio-economic groups within the country. In industrialized countries, both the value and the frequency of marriages have declined (Cherlin 2004). For instance, in Scandinavian countries and France, cohabitation has become an alternative form of committed partnership. Research shows that this is not the case in the United States (Cherlin 2004, 2005; Edin, Kefalas and Reed 2004). Indeed, marriage is still a relevant institution in the United States, both as an ideal and also for its high occurrence (Cherlin 2004). In the most recent wave of the World Values Survey (2005-2008), only 13% of Americans agreed with the statement "marriage is an outdated institution" against 22% in Sweden for instance.

The decline in marriage and increase in out-of-wedlock childbearing among lower-educated women could wrongly suggest that there exists an educational gradient to the value of marriage among American women. Quite on the contrary, Cherlin (2004) argues that the value of marriage has shifted from conformism to prestige, and, as a consequence,

marriage is highly valued among low income individuals as a sign of social achievement. The marriage bar is set very high regarding both the actual ceremony and the financial prerequisites to consider the possibility of marriage, such as a mortgage, a car and the ability to "make ends meet" (Edin et al. 2004). Furthermore, Edin and Kefalas (2005) in their ethnographic work on low-income single mothers in Philadelphia show that there is great distrust between partners in low-income households. Therefore, cohabitation is considered as a crucial trial before the actual marriage. Low-income women postpone or even forgo marriage as a consequence of the high value they place on marriage rather than the opposite. Conflicting with women's expectations, men's relative socio-economic position has declined in the last decades, leaving low-educated women with fewer marriageable men (McLanahan 2004).

The changing context of family life not only influences partnership formation but also marital stability. Goode (1951, 1970, 1993) was the first to argue that the association between education and divorce changes according to the degree of diffusion of divorce in society (Härkönen and Dronkers 2006). When divorce is a rare phenomenon, marital instability is concentrated among individuals with higher social status predicted by education because the legal and social costs of divorce are high. Thus, high social status individuals will be able to face the incurred costs by a divorce. As divorce becomes more widespread in society, the relationship between social status and marital instability reverses and becomes concentrated among those with low social status. While the value of marriage remains high in the United States, in line with Goode's prediction, the legal and social barriers of ending a marriage have substantially decreased over time in the United States. In a recent survey by the Pew Research Center, about half of Americans agree that divorce is preferable to an unhappy marriage and this share goes up to two-third when the question is whether divorce is preferable for children in the case of an unhappy marriage (Taylor, Funk and Clark 2007). These trends suggest that the social acceptability of divorce has increased in the American society. Also, the legal barriers to divorce have decreased starting in the 1960s with the shift from consent to unilateral or `no-fault' divorce laws (Stevenson and Worfers 2007). Following Goode's model, these changes anticipate that the risk of divorce among the less-educated should increase over time.

Previous Findings and Current Study

Due to data constraints, few single US studies have explored how the determinants of partnership transitions have varied across historical time (Teachman 2002). What evidence is available for different time periods provides mixed results for the effect of female education on partnership transitions (see Table 1 for a summary). A majority of studies finds a reversal in the education gradient into marriage, from negative to positive (Goldstein and Kenney 2001; Sweeney 2002; Torr 2011). In other words, more recent US cohorts of women with higher educational attainment experience a higher risk of marriage with respect to their less-educated contemporaries than did earlier cohorts of highly-educated women. Isen and Stevenson (2010), however, report that the effect of female education on marriage is still negative but the marital educational gap is diminishing over time. Their analysis provides useful historical trends on marriage and divorce patterns, but they are fairly descriptive and do not include any control variables.

Analogously, studies on historical changes of US divorce risk factors have produced inconsistent results both on the extent of change but also on the sign of the differential. Most empirical findings show the US female educational gradient for divorce to be negative and decreasing over time (Harkonen and Dronkers 2006; Isen and Stevenson 2010; Martin 2006; Martin and Bumpass 1989; Raley and Bumpass 2003; Sweeney and Phillips 2004). These analyses suggest that college-educated women are less-likely to divorce and that the effect of education on divorce has become even more negative over time. Other findings for the United States contradict these. Both South (2001) and Teachman (2002) find that the role of education has remained stable over time; however, South (2001) finds a negative relationship between education and divorce, whereas Teachman (2002) finds a positive one. Teachman's cross-cohort analysis also suggests that it is the husband's education that predicts marital stability, and once controlling for this, a wife's education has no effect.

Existing evidence therefore draws a conflicting picture as to changing effects of female education on partnership transitions in the United States. Conclusions remain tentative as the datasets differ, as do time periods and empirical strategies. Interestingly, even the measure of time change varies – some focus on period change (e.g. Martin 2006) and others on cohort change (e.g. Sweeney 2002). Also, some studies include a wide range of control variables and others very few. We add to the literature by taking a life course approach to analyze how the female education gradient of partnership dynamics over time. Assessing an individual women's risk along the sequence of family transitions is even rarer (see Steele et al. 2006 for such an analysis on UK data). We therefore make a

substantial contribution to the literature by employing a seldom-used modeling approach and the length of collection of US panel data to assess the changing impact of US women's education on transitions both into and out of different types of partnerships.

Methods

The case for a multilevel multistate approach

Previous literature on women's educational gradient and partnership usually considers only one type of transition, i.e. single to married or married to single, and of single order, i.e. first marriage or dissolution of first marriage. However, the two types of unions do not share equivalent meaning and should thus be jointly considered as different typologies of partnerships when studying union formation. Also, the rise in partnership instability suggests that we lose information when only considering first-order transitions.

Furthermore, recent trends in partnership dynamics suggest that selection in and out of partnerships, as well as unobserved heterogeneity are factors to be considered when attempting to explain changes in partnership dynamics. Selection bias may come from unobserved heterogeneity between individuals. This selection bias can affect our estimates in the following two ways. First, unobserved characteristics could be correlated across the same types of events (Steele et al. 2006). For instance, some individuals have an inherently high partnership dissolution risk, which could be interpreted as a low threshold to stay in a partnership. This can be problematic when including repeated events and estimating dissolution risk at higher partnership orders, as we know our sample will be a very select sample of highly unstable individuals. Illustrating this issue, Aassve et al. (2006) using the British Household Panel Survey show that when taking into account unobserved heterogeneity the risk of partnership dissolution does not increase with partnership order. Secondly, some unobserved heterogeneity can be related across different but related events (Steele et al. 2006). In our case, this could be an issue if some unmeasured characteristics drive the entire partnership trajectories of respondents as well as education transitions.

A second advantage of taking a multistate multilevel approach is to obtain estimates of the residual correlations between different processes. These estimates provide an insightful description of individual selection in and out of partnerships and also with education. In our case, the cross-process correlations are of particular interest because

they allow us to gauge whether and which partnership and education transitions are jointly determined by an individual's common unmeasured characteristics.

Finally, this empirical approach has the advantage of not requiring any exclusion restrictions on the covariates for identification. When incorporating repeated events for each individual into the model, it can be identified by assuming that the woman-level residuals term fully captures the selection bias among processes (Steele et al. 2005).

Model

Our empirical strategy is a direct application of the model developed by Steele, Kallis, and Constantinos (2006) in which the authors use multilevel discrete time model for competing risks and multiple states to allow for residual correlation between the hazards of partnership formation and outcomes. We extend this model by allowing for the joint determination of education in addition to partnership dynamics. By taking this empirical approach to study partnership dissolution, we are able to distinguish between marriage and cohabitation, include repeated events rather than first-order transitions, and deal with some potential endogeneity from unmeasured co-determinants of partnerships and educational decisions.

Model for partnership dynamics

In the partnership transitions model, we include three different partnership states: single, cohabiting and married. Figure 1 summarizes the structure of the empirical model and the different states and transitions that will be included in the analysis. Following Steele et al. (2006), the partnership transitions can be divided between the partnership formation model and partnership outcomes model (see the full lines indicating these transitions in Figure 1). In the partnership formation model, we include two equations which model the transitions from the state single-to-married or single-to-cohabiting, with marriage and cohabitation treated as competing risks. In the partnership outcomes model, three different transitions are possible. The first two arise from the state cohabiting and are treated as competing risks: cohabiting-to-married and cohabiting-to-single. The last one stems from the state married and is simple the transition married-to-single (separated or divorced).

Following Steele, Goldstein and Browne (2004), we define the hazard of making a transition of type r_s $(r_s = 1, \dots, R_i)$from state s $(i = 1, \dots, S)$ as a two-level random-effects logit:

$$h_{sijt}^{r_s} = \log\left(\frac{p_{sijt}^{r_s}}{1-p_{sijt}^{r_s}}\right)$$

where $p_{ijt}^{r_i}$ is the probability that a transition of type r_s occurs from state s at time t during episode i for the j^{th} individual.

$$h_{sijt}^{r_s} = \boldsymbol{\delta}_{\mathrm{s}}^{(\mathrm{r_s})^{\mathrm{T}}}\mathbf{D}_{\mathrm{st}}^{\mathrm{r_s}} + \boldsymbol{\beta}_{\mathrm{s}}^{(\mathrm{r_s})^{\mathrm{T}}}\mathbf{Z}_{\mathrm{sijt}}^{\mathrm{r_s}} + \mathbf{u}_{\mathrm{sj}}^{\mathrm{r_s}}$$
$$\mathbf{u}_{\mathrm{sj}}^{\mathrm{r_s}} \sim N(0, \boldsymbol{\Omega}^R)$$

where $\boldsymbol{\delta}_{\mathrm{s}}^{(\mathrm{r_s})^{\mathrm{T}}}\mathbf{D}_{\mathrm{st}}^{\mathrm{r_s}}$ is a function of the cumulative duration and $\mathbf{Z}_{\mathrm{sijt}}^{\mathrm{r_s}}$is a vector of covariates with coefficients $\boldsymbol{\beta}_{\mathrm{s}}^{(\mathrm{r_s})^{\mathrm{T}}}$. The women-specific random effects, which capture unobserved time-invariant characteristics, are represented by $\mathbf{u}_{\mathrm{sj}}^{\mathrm{r_s}}$ and are assumed to follow a multivariate normal distribution with zero mean and variance $\boldsymbol{\Omega}^R$.

Model for education transitions

The model for education decisions includes the sequential transitions from one level of education to another, i.e. No education to high-school diploma, from high-school diploma to some college, from some college to college graduation. Each transition is treated as a repeated event within the education model.

The hazard of making and educational transition can be defined as a two-level random-effects logit:

$$h_{ijt}^{E} = \log\left(\frac{p_{ijt}^{E}}{1-p_{ijt}^{E}}\right)$$

where p_{ijt} is the probability that a transition occurs at time t during episode i for the j^{th} individual.

$$h_{ijt}^{E} = \boldsymbol{\delta}^{(\mathrm{E})^{\mathrm{T}}}\mathbf{D}_{\mathrm{t}}^{\mathrm{E}} + \boldsymbol{\beta}^{(\mathrm{E})^{\mathrm{T}}}\mathbf{Z}_{\mathrm{ijt}}^{\mathrm{E}} + \mathrm{u}_{\mathrm{j}}^{\mathrm{E}}$$
$$\mathrm{u}_{\mathrm{j}}^{\mathrm{E}} \sim N(0, \sigma_C^2)$$

where $\boldsymbol{\delta}^{(\mathrm{E})^{\mathrm{T}}}\mathbf{D}_{\mathrm{t}}^{\mathrm{E}}$ is a function of the cumulative duration and $\mathbf{Z}_{\mathrm{ijt}}^{\mathrm{E}}$is a vector of covariates with coefficients $\boldsymbol{\beta}^{(\mathrm{E})^{\mathrm{T}}}$. The women-specific random effects, which capture unobserved time-invariant characteristics, are represented by $\mathrm{u}_{\mathrm{j}}^{\mathrm{E}}$ and are assumed to follow a normal distribution with zero mean and variance σ_C^2.

Joint modeling of partnership and education transitions

We estimate the partnership and education models in two different ways. First, in the single-process specification, we do not take into account the interdependency between the different partnership decisions and education transitions. Thus, we assume that the random errors are not correlated between the transitions[i]. Second, in the multi-process specification, we jointly estimate the partnership and education transitions. This specification allows us to take into account shared unmeasured factors that influence both partnership and education decisions. In the multi-process estimation, we allow for the random error to be correlated across the five different transitions, which give us the following random error matrix

$$\begin{pmatrix} \sigma^2_{S1} \\ \sigma^2_{S2} \\ \sigma^2_{C1} \\ \sigma^2_{C2} \\ \sigma^2_{M} \\ \sigma^2_{E} \end{pmatrix} \sim N \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \begin{pmatrix} \sigma^2_{S1} & 0 & 0 & 0 & 0 & 0 \\ \sigma_{S1S2} & \sigma^2_{S2} & 0 & 0 & 0 & 0 \\ \sigma_{S1C1} & \sigma_{S2C1} & \sigma^2_{C1} & 0 & 0 & 0 \\ \sigma_{S1C2} & \sigma_{S2C2} & \sigma_{C1C2} & \sigma^2_{C2} & 0 & 0 \\ \sigma_{S1M} & \sigma_{S2M} & \sigma_{C1M} & \sigma_{C2M} & \sigma^2_{M} & 0 \\ \sigma_{S1E} & \sigma_{S2E} & \sigma_{C1E} & \sigma_{C2E} & \sigma_{ME} & \sigma^2_{E} \end{pmatrix}$$

where on the diagonal of matrix, we find the women-level time-invariant residuals for each transition and on the lower quadrant are the residual correlations between each transition. Each of the following terms corresponds to a transition:

- $S1$: Transition from single to married;
- $S2$: Transition from single to cohabiting;
- $C1$: Transition from cohabiting to single;
- $C1$: Transition from cohabiting to married;
- M : Transition from married to single.
- E: Education transitions.

Our estimations are carried out using Markov Chain Monte Carlo (MCMC)[ii] methods in MLwiN through STATA 12 with *runmlwin* (Leckie and Charlton 2011).

Limitations of the model

Although our approach presents several advantages, it also does have certain limitations that should be taken into account when interpreting the results.

First, the model does not allow for selection on time-varying unobservable characteristics. We have to assume that the bias from educational transitions and previous partnership experience is due to selection on unmeasured factors at the woman level that are fixed across the six potential different transitions.

Second, by jointly estimating the different partnership transitions, we relax the assumption that the covariates that capture education and previous partnership experience are exogenous with respect to subsequent transitions. Nevertheless, for the other covariates, the exogeneity assumption still holds therefore the coefficients should be read as associations rather than effects.

Data

The empirical analysis is conducted using the Panel Study of Income Dynamics, an annual survey that started in 1968 with a nationally representative sample of over 18,000 individuals residing in 5,000 family units. The survey includes information on employment, earnings, and demographic behaviors. Interviews were collected annually from 1968 until 1997 and biennially thereafter until the most recent wave of the PSID in 2011.

We restrict our sample to women that enter the PSID before or at age sixteen[iii] and exit the sample no earlier than age 22. Combining retrospective histories on marriage with interview information on both marital status (both marriage and cohabitation), we reconstruct monthly partnership histories[iv]. After excluding respondents with missing information on our key covariates, we obtain a final sample of 6104 women born between 1950 and 1989. One main limitation of the PSID is that respondents are not asked to reconstruct their cohabitation histories. Thus, cohabitation is derived from the respondents' partnership status. As a consequence, we cannot observe cohabitation that fall in between two interviews, this is particularly problematic starting when the PSID switched to a biennial survey calendar.

Key explanatory variables

In each of the partnership formation and outcomes equations, we include our key variables of interest on education attainment and birth cohort for the partnership formation models and partnership cohort for the partnership outcomes models. In addition, we include several control variables on individual background, geographical context, fertility status and previous partnership experience. Table 2 summarizes the explanatory variables included in all of the partnership models.

In the empirical section, we focus on the partnership models to answer our hypotheses on the changing female educational gradient of partnership dynamics. However, further details about the education transitions equations can be found in the Technical Appendix.

Duration of partnership[v]. Each transition includes the duration of the partnership. For the first episode, the duration is calculated from age 16 up to the first partnership event. We apply right-censoring either at age fifty or, if it occurs before, at the last available interview or the death of the respondent. In each transition, we specify the form of the base-line hazard according to the hazard plot of each transition. In the partnership formation model, for both marriage and cohabitation, we include the duration and the duration squared terms as explanatory variables. In the cohabitation outcomes model, for both cohabitation dissolution and marriage via premarital cohabitation, the hazard is defined as the logarithmic of the duration. Finally, in the marital separation model, we also include the logarithmic of the marital duration as an explanatory variable.

Education attainment[vi]. The variable education is categorized into four groups: no high-school diploma, high-school diploma[vii], some college[viii], and, college degree[ix]. The variables are constructed according to the degrees obtained by the respondent and when they received each qualification. In each of the model, education is included as a time-varying variable. Looking at Table 2, we can see that women in the single sample are on average less educated with respect to the cohabiting and married sample. These differences stem from the fact that education attainment is included as a time-varying variable. Single women are more likely to be younger and still in education.

Education enrolment. All the partnership models include a categorical on the respondent's education enrolment. Unfortunately, the PSID started collected education enrolment of wives in the year 1976 and from 1979 onwards. Also, this information is not asked for household members that are neither household heads nor wives. As a consequence, this variable presents a large portion of missing (25.83% in the single sample, 10.69% in the cohabiting sample, and 18.69% in the married sample). We include the available information on education enrolment and supplement it with an indicator variable when education enrolment information is missing. Echoing the education attainment variable, in Table 2, we observe that about 22% of single women are still enrolled.

Birth cohorts. We include four birth cohorts: 1950-1959, 1960-1969, 1970-1979, and 1980-1989. When interpreting the final results, we need to keep in mind that the youngest birth cohort, 1980-1989, is still fairly young. Thus, the effects found for this specific cohort should be considered with some caution as individuals may still not have completed their education and are only at the beginning of their partnership history.

Education and birth cohort interactions. We include interactions between education categories and birth cohorts. Thus, in each model, we have a 4x4 interaction between the

four categories of education and the four birth cohorts. We take as a reference category the lowest level of education and the oldest cohort.

Race[x]. Each transition includes the race of the respondent, which is classified as 'white', 'black' or others[xi] (others regroup American Indian and Alaska natives, Asian and Pacific Islanders, Latin descents, and 'others'). First, in 1990, the PSID added a Latino supplemental sample to the original 1968 sample. Nevertheless, due to funding constraints, the PSID dropped the Latino sample in 1995. Then, in 1997, the PSID included a sample refresher of immigrants in order to keep the study representative. However, we had to exclude both refresher samples from our analysis as they observed for substantially fewer years. As a consequence, the PSID is not representative of the American Hispanic population. Furthermore, the same can be said for the post-1968 immigrants, in particular, for Asians.

Age and age squared at partnership formation. Age at partnership formation and its squared are included in the partnership outcome models only. We center the age and age squared variables at the grand mean of the sample.

Previous partnership experience. Previously cohabiting and previously married: In the partnership outcome models, we include an indicator variable to capture whether the respondent has ever cohabited and/or been married. In the risk of marital separation model, we distinguish whether the respondent has cohabited with their current partner only, with their previous partners only, or both.

Fertility status. We measure the current fertility status using the PSID retrospective file on fertility. We include as time-varying variables the following fertility status: currently pregnant, any children under the age of five, any children between the age of five and below eighteen, and any children of age eighteen and above.

Region of residence. We control for the current region of residence: Northeast, North Central, South, West, Alaska/Hawai/Foreign country/Missing[xii].

Results

Descriptive analysis of partnership and education transitions

In this section, we start by presenting some descriptive results on the changing relationship between female education and partnership dynamics. In Table 3, we summarize the distribution of the duration for each partnership transition. On average, we find that the transition to either cohabitation or marriage follows a similar pattern. The median duration of

singlehood is 5 years for the transition to marriage and 4.8 years for cohabitation formation. Also, we observe that cohabitations are short-lived in our sample: the median duration is 1.1 year in the case of premarital cohabitation and 1.3 for cohabitation dissolution. By comparison, the median marriage duration is 4.1 years. Thus, we see that in line with the literature, we find that marriage remains a more stable form of union. We also illustrate the first four partnership trajectories of women in the sample in Figure 2. Marriage remains the predominant type of first union, which is not surprising as we include women born starting in the 1950s. Furthermore, as explained earlier, we know that we are not able to capture cohabitations that fall in between two interviews. Most likely, we are thus underestimating the prevalence of cohabitation. Additionally, Figure 2 shows that 30% of the sample has not experienced any event. The youngest birth cohort makes for most of this sub-group of our sample.

With regard to the education gradient of partnership dynamics, we first show in Figure 3 how educational attainment has changed for women born in different birth cohorts. In line with previous findings (e.g. DiPrete and Buchmann 2006), we find that in the 1950s and 1960s birth cohorts about 20% of women have a college degree compared to about 30% for women born between 1970 and 1989. We note that the educational attainment of the youngest cohort is slightly lower with respect to the 1970s birth cohort. However, these differences are driven by the fact that some of the 1980s cohort still has not completed their education.

Figures 4-9 illustrate descriptively the educational gradient of each partnership transition that we will then analyze using simultaneous equations technique. In Figure 4, we present the percentage of women who have ever cohabited by birth cohort and educational attainment. As explained previously, we can already confirm that the PSID is underestimating the prevalence of cohabitation. In particular, in the last two birth cohorts, we would expect the percentage of women who have ever cohabited to be much higher. Descriptively, we do not observe any strong differences between educational groups for cohabitation. In Figure 5 and 8, we show, respectively, the percent of women that have ever been married and the percent of cohabitation ending in marriage. Here, as expected, we observe a strong educational gradient for both partnership transitions. Overall, the prevalence of marriage (both directly and via premarital cohabitation) has declined for everyone but relatively less so for college-educated women. In Figure 6 and 9, we show, respectively, the percent of marriage and cohabitation ending in separation. Similarly for both types of union, separation is increasingly more present among less-educated women.

Residual correlations across partnership and education transitions

The first step to our analysis is to check whether our decision to jointly estimate entry and exit from partnerships together with education transitions was justified. Table 4 shows the random effects variance and covariance across the six possible transitions. The multi-process specification is preferred to the single-process if the variance and covariance terms are found to be statistically significant (Steele et al. 2005).

The random effects variance captures woman-specific unobservable characteristics for each specific transition. As shown in Table 4, we find strong evidence of the presence of women-specific unobservable traits affecting the hazards of partnership formation and outcomes as well as education (p<0.001).

Of most interest are the covariance terms between the residuals of partnership dynamics and education hazards. A positive covariance term, σ_{xy}^2, can be interpreted in the following way: women's unmeasured characteristics places them at an above(below)-average risk of experiencing a transition x and also to have an above(below)-average propensity to transition to y. Another way to think of the cross-process residuals correlations is to interpret them in terms of timing, i.e. fast or short transitions. Table 4 shows that several of the cross-correlations are statistically significant, which suggests that net of observed characteristics education and partnership decisions are closely related. More precisely, we find that 8 out of the 15 covariance terms are statistically different from zero (at least p<0.1).

First, we look at the covariance terms between the partnership formation and outcomes equations. The random effect for marital separation σ_M is positively correlated with two other partnership transitions: cohabitation dissolution σ_{C1} (p<0.05) and marriage formation σ_{S1} (p<0.001). Thus women who marry quickly tend to have shorter marriages. These positive correlations suggest as well that women with a high risk of marital separation tend to have also a high risk of cohabitation dissolution. Then, the random effects of marriage formation σ_{S1} are positively correlated with the other two partnership formation hazards: cohabitation formation σ_{S2} (p<0.01) and marriage via cohabitation σ_{C2} (p<0.05). Thus, women who cohabit quickly also have fast transitions to marriage either directly or via cohabitation. We also find a positive correlation between the outcomes of cohabitation: cohabitation dissolution σ_{C1} and marriage via cohabitation σ_{C2} (p<0.1). This suggests that an above-average propensity to exit cohabitation is also linked to an above average propensity to form a marriage via cohabitation.

Now turning to the covariance terms between partnership dynamics and education transitions, we find that education transitions are only significantly linked to the entry into partnership hazards. Precisely, the random effect for education σ_E is positively correlated with marriage via cohabitation σ_{C2} (p<0.1), but negatively with marriage formation σ_{S1} (p<0.001) and cohabitation formation σ_{S2} (p<0.001). These results suggest that, net of observed characteristics, women marry or cohabit quickly are less likely make education transitions. However, women who are more likely to enter marriage via cohabitation also have a higher propensity to carry on with their studies.

Overall, our findings are consistent with previous results. Brien, Lillard and Waite (1999) using the National Longitudinal Study of the High School Class of 1972 also find a positive cross-correlation between marriage formation and cohabitation formation. For the case of Britain but using very similar methods, Aassve et al. (2006) and Steele et al. (2005) find a positive correlation between the random effects of partnership formation and partnership dissolution. The most noteworthy difference is that differently from Steele et al. (2006), we do not find any statistically significant cross-state correlation between marital separation and entry into cohabitation. This difference could be due to many factors such the context, i.e. Britain vs. the United States, but also the birth cohorts of the respondents, i.e. only 1970 in Steele et al. (2006) vs. 1950-1989 in our case.

Comparing the single-process and multi-process outcomes

First, we compare the education and birth cohort coefficients for the partnership formation model summarized in Table 5. In the marriage formation output, we can observe that the education variables with respect to 'not having a high-school diploma' in the first birth cohort are slightly understated in the single-process models. A similar result can be observed in the cohabitation formation results. However, for cohabitation, the differences between the single- and multi-process models are quite large. The positive effects of all educational attainments with respect to 'not having a high school diploma' are only slightly significant (High-School <0.05, Some college < 0.05, College degree N.S.) in the single-process estimation but then become strongly significant with the multiprocess specification (High-School <0.001, Some college < 0.001, College degree 0.01). The change in the magnitude of the coefficients and the statistical significance can be explained by the strong negative cross-process residual correlation between the hazard of partnership formation and of making education transitions. On average, women with low risk of entering either a

cohabitation or a marriage have a higher hazard of upgrading their education. As a consequence, women with low risk of entering a partnership are overly represented among the higher educated women.

Turning now to the cohabitation outcomes models, we summarize the estimated coefficients in Table 6. For the hazard of cohabitation dissolution, the education- and birth cohort-related coefficients are very similar when allowing or not for cross-state residual correlation. This is not surprising as we find no significant correlation between the random effects of cohabitation dissolution and education. For the hazard of hazard of marriage via cohabitation, the estimated coefficients of education in the single-process model are slightly overstated compared to the multi-process output. The magnitude of the education coefficients and their interactions with the birth cohort categories are smaller and less significant when taking into account selection in the multiprocess model. These differences between the two models can be explained by the positive cross-process residual correlation between the hazard of entering a marriage via cohabitation and of making education transitions. On average, women with high risk of marrying their cohabiting partner have a higher hazard of upgrading their education. As a consequence, women with high risk of marrying (via cohabitation) are overly represented among the higher educated women.

Finally the estimated coefficients of the marriage outcome model are presented in Table 7. Again here, we find very small differences between the single- and multi-process estimated coefficients for the education- and birth cohort-related variables. In the single-process model, for the baseline of the interaction between education and birth cohorts, the negative effect of being college-educated relative to not having graduated from high-school is overstated and significant compared to the multi-process specification. While the negative interactions between educational categories and birth cohorts are slightly smaller in the single-process model with respect to the multi-level models. There is not direct significant covariance between the residuals of marital separation and education transitions, as a consequence, the change in coefficient is more difficult to interpret. However, some selection could derive from the cross-process correlation between the residuals of the different partnership hazards.

Changing effects of education on partnership transitions over time

We now turn to the substantive question of this article: taking into account selection into education and partnership, to what extent does the effect of female education on partnership dynamics has changed over time? In order to simplify the interpretation of our

models, using the multi-process estimations, we compute the average predicted risks of all partnership hazards for each cell of the interaction between birth cohorts and education (4x4) using the MCMC chains of our models. The predicted probabilities are illustrated in Figures 10-14 for each of the partnership transitions: marriage formation, cohabitation formation, cohabitation dissolution, marriage via premarital cohabitation and marital separation.

Starting with partnership formation, the predicted probabilities of marrying and cohabiting are illustrated, respectively, in Figure 10 and 11. We see that college-educated women are more likely to marry than their less-educated contemporary throughout the four birth cohorts. These differences are found to be statistically significant except with respect to women with some college education in the birth cohort 1950-1959 and 1960-1969. Interestingly, the education gap in terms of marriage risk is getting narrower in the youngest birth cohorts but the precision of the estimated differences is increasing as we observe that the confidence intervals are becoming smaller. Overall, we find strong evidence for a positive educational gradient of marriage. However, we do not find any reversal in the relationship as it is already found to be positive in the first birth cohorts in our study. Nevertheless, these differences suggest that college-educated women are detaching themselves in terms of marriage behaviors with respect to their less-educated contemporaries. For cohabitation formation (Figure 11), we also observe a positive educational gradient: college-educated women are more likely to cohabit with respect to women in all other education categories. Differently from marriage, these differences are growing in the younger cohorts. In the first birth cohort (1950-1959), we find that only women with no high-school diploma are significantly less likely to cohabit with respect to college-educated women. In the subsequent birth cohorts, these differences are wider and also significant with respect to women with a high school diploma. However, we do not find any significant differences between college-educated and some college women throughout the four birth cohorts.

Now turning to cohabitation outcomes, the educational differences in the predicted probability of cohabitation dissolution and marriage via premarital cohabitation are illustrated, respectively, in Figure 12 and 13. In Figure 12, we observe no statistically significant education gradient for the risk of cohabitation dissolution when taking as a benchmark college-educated women. This is not surprising given that none of the coefficients of the education and birth cohort variables are significant in the cohabitation dissolution model (Table.6a). Nevertheless, when looking at the risk of marriage via

premarital cohabitation, illustrated in Figure 13, we do find some significant educational differences. Overall, the educational gap for the marriage via cohabitation transitions is positive but seems to be decreasing over time. In the first birth cohort, 1950-1959, only women with no high-school diploma are significantly less likely to enter marriage via premarital cohabitation with respect to college-educated women. However, this difference loses statistically significance in the successive birth cohorts. In the two middle birth cohorts, 1960-1969 and 1970-1979, college-educated women are more likely to marry their cohabiting partner with respect to their contemporaries with a high-school diploma or with some college. In the last birth cohort, 1980-1989, the differences in probability between college-educated women and all other educational categories are not statistically significant.

Finally, we discuss the the predicted probability of marital dissolution. In Figure 14, we find a negative education gradient for the risk of marital dissolution across all birth cohorts. The differences in predicted probabilities between college-educated and less-educated women have increased across the four birth cohorts. This gap is always statistically different with respect to the categories high-school graduates and some college. However, it is only statistically significant in the two middle birth cohorts with respect to women with no high-school diploma.

Preliminary conclusion and next steps

In line with McLanahan's arguments (2004), our preliminary results suggest that educational differentials of partnership dynamics are widening over time. In particular, we find that women with college education are increasingly more likely to marry and cohabit and have a lower propensity to divorce with respect to their less-educated counterparts. These educational gradients are stronger when estimating jointly entry into and exit from all types of partnerships together with education transitions. Such findings suggest that unobservable characteristics linked to partnership dynamics are also correlated with education attainment. However, we do not find a significant or changing relationship between college education and the outcomes of cohabitation, i.e. marriage or separation.

This article sheds some light on how women's partnership behaviors have changed over time and along educational lines. Furthermore, we show the importance of considering jointly interrelated events, in this case, marriage and cohabitation but also formation and dissolution. In particular, it seems even more crucial when comparing large time periods.

Indeed, we know that partnership trajectories are increasingly complex. In more recent cohorts, individuals experience different types and potentially higher order of partnerships.

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Figure 1 – Structure of the empirical model

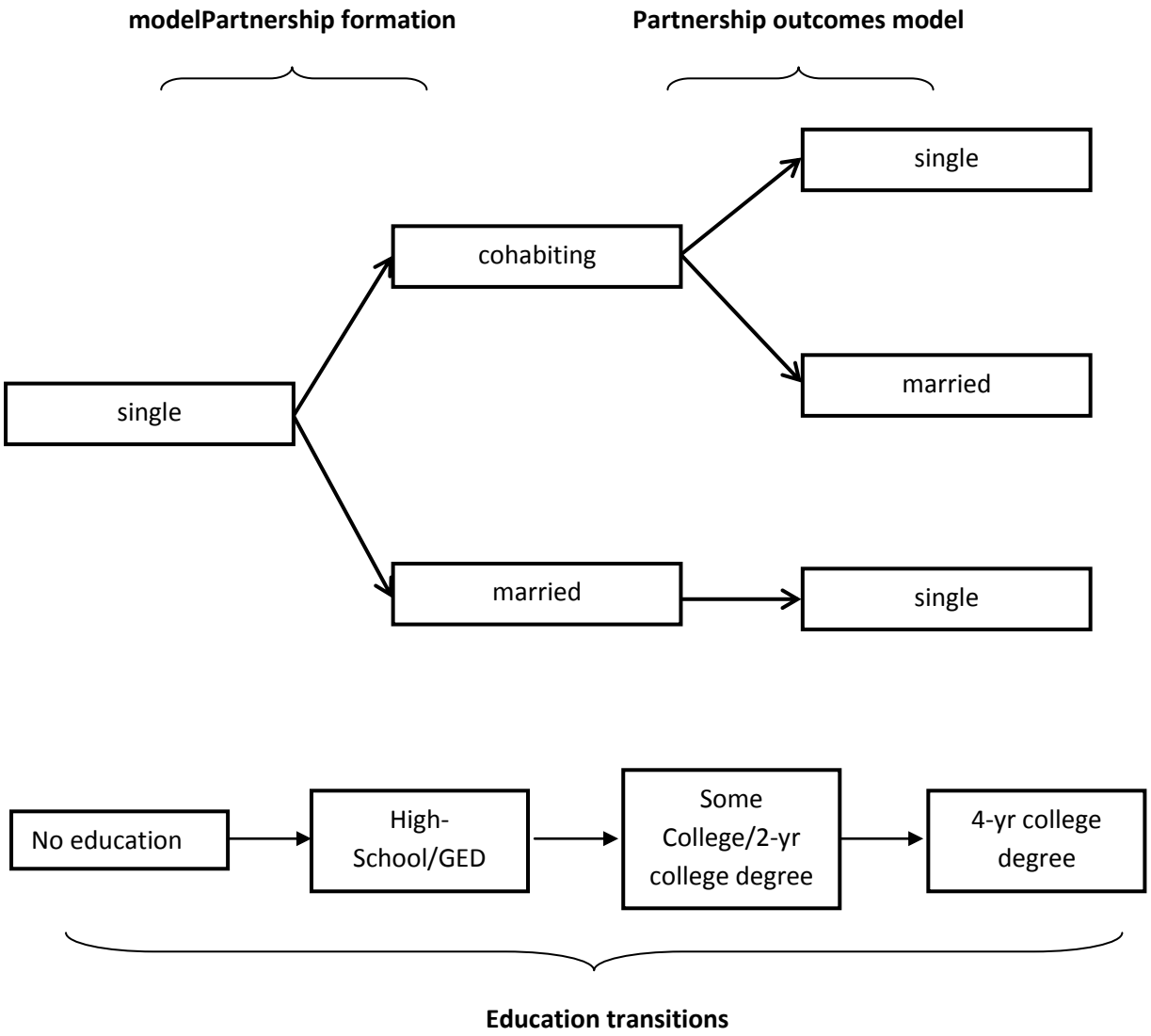
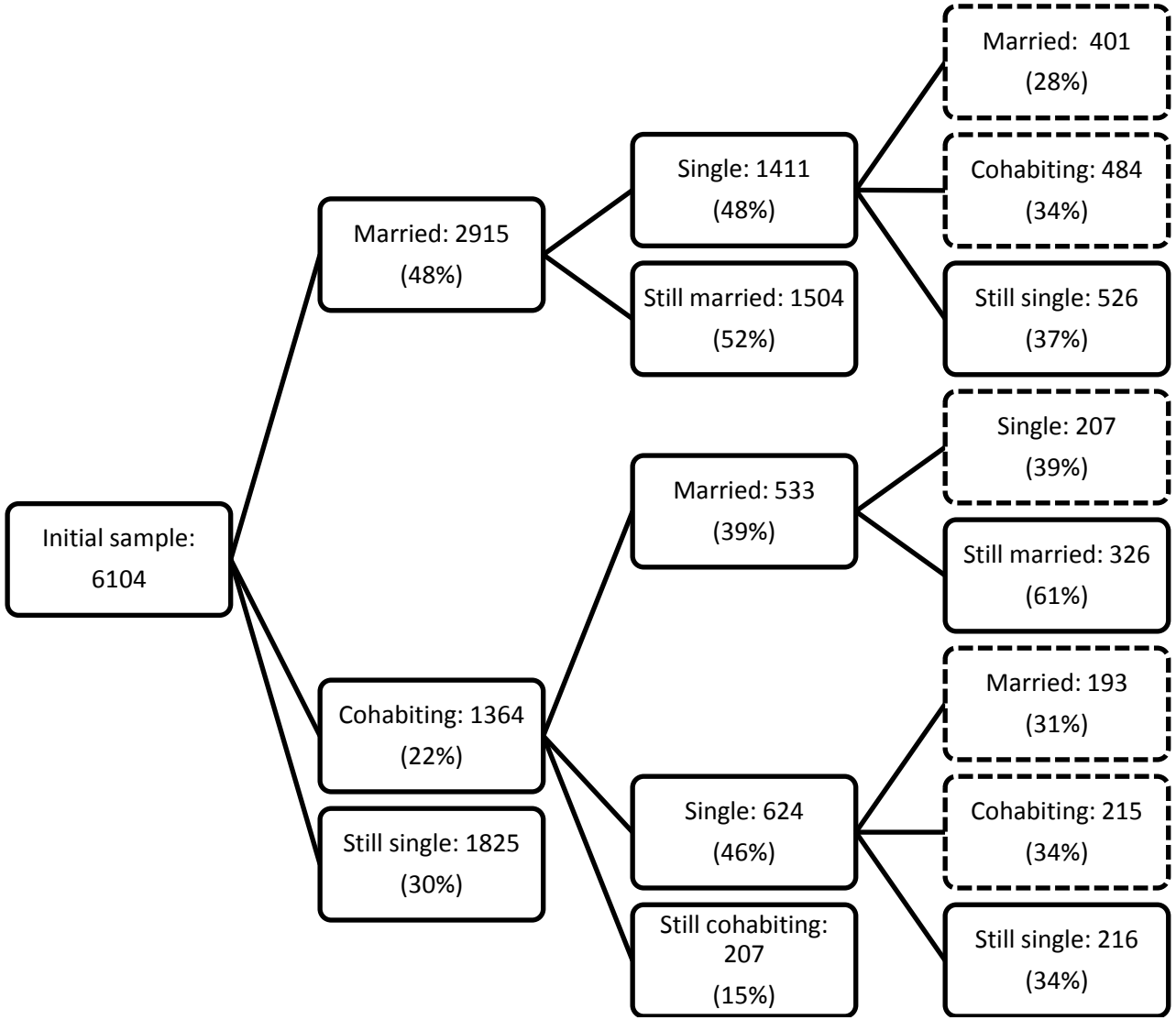
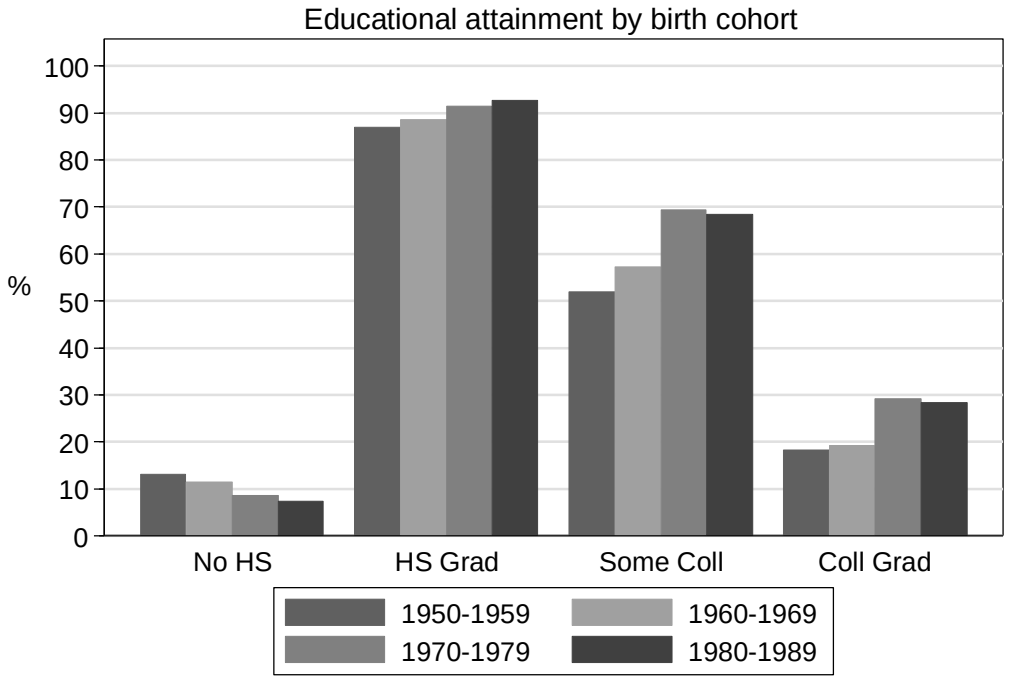


Figure 2 – First four partnership trajectories of women in the sample



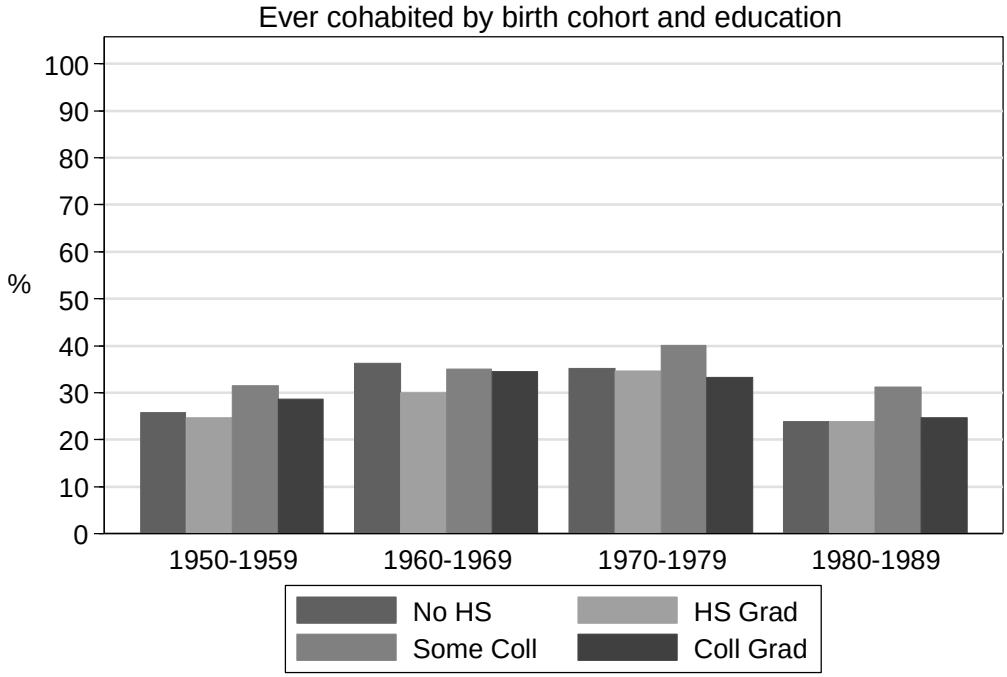
Note: The full line boxes represent women that do not experience any further partnership transition in the analysis while the dashed boxes include women that may experience further partnership transitions but that are not shown in this figure.

Figure 3 – Distribution of educational attainment by birth cohort of women in the analysis



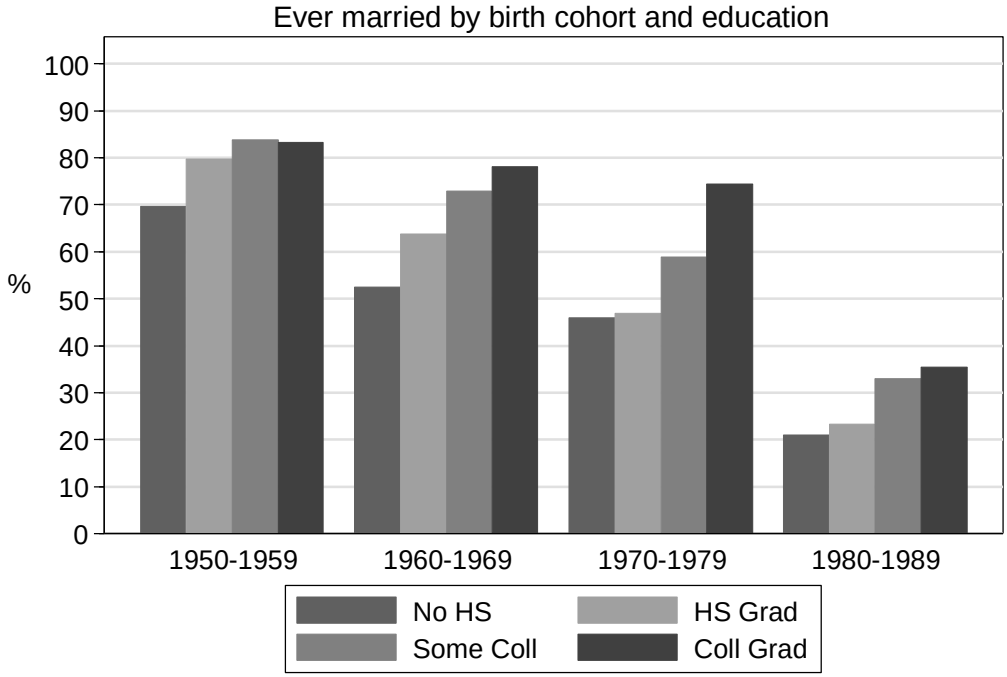
Source: Own elaboration from Panel Study of Income Dynamics 1968-2011

Figure 4 – Percentage of women in the analysis who have ever cohabitated by birth cohort and educational attainment.



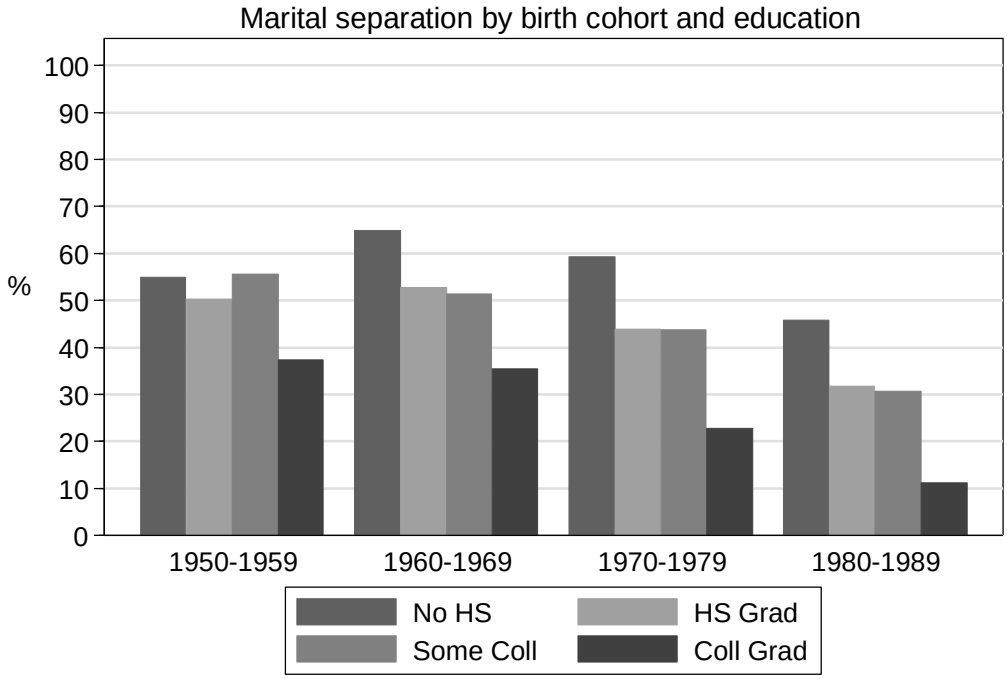
Source: Own elaboration from Panel Study of Income Dynamics 1968-2011

Figure 5 – Percentage of women in the analysis who have ever been married by birth cohort and educational attainment.



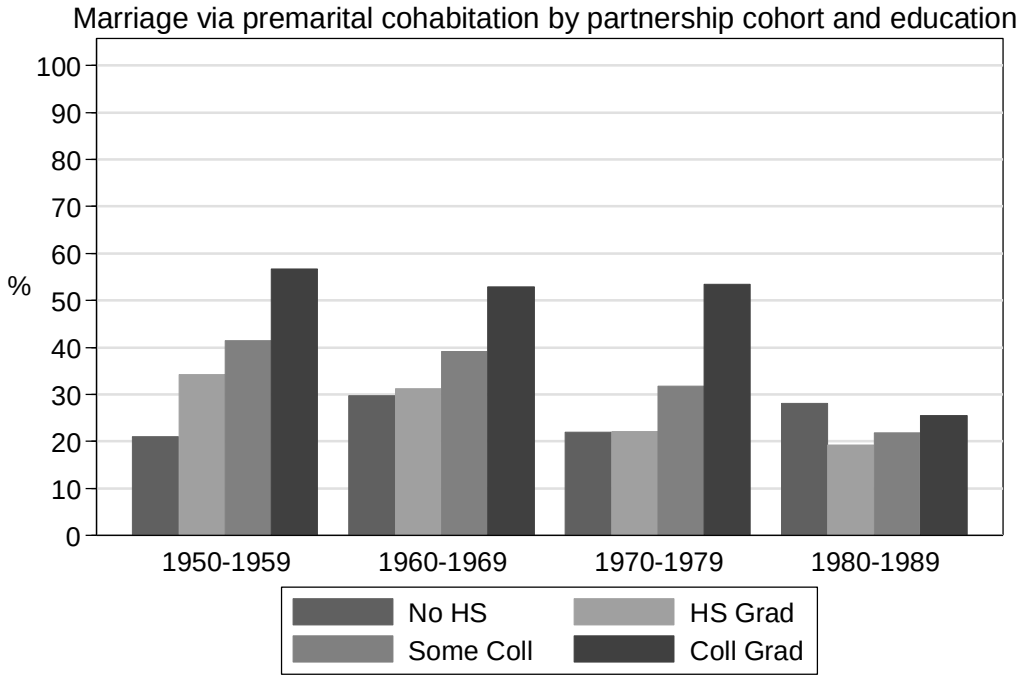
Source: Own elaboration from Panel Study of Income Dynamics 1968-2011

Figure 6 – Percentage of marriage ending in separation in the analysis by birth cohort and educational attainment.



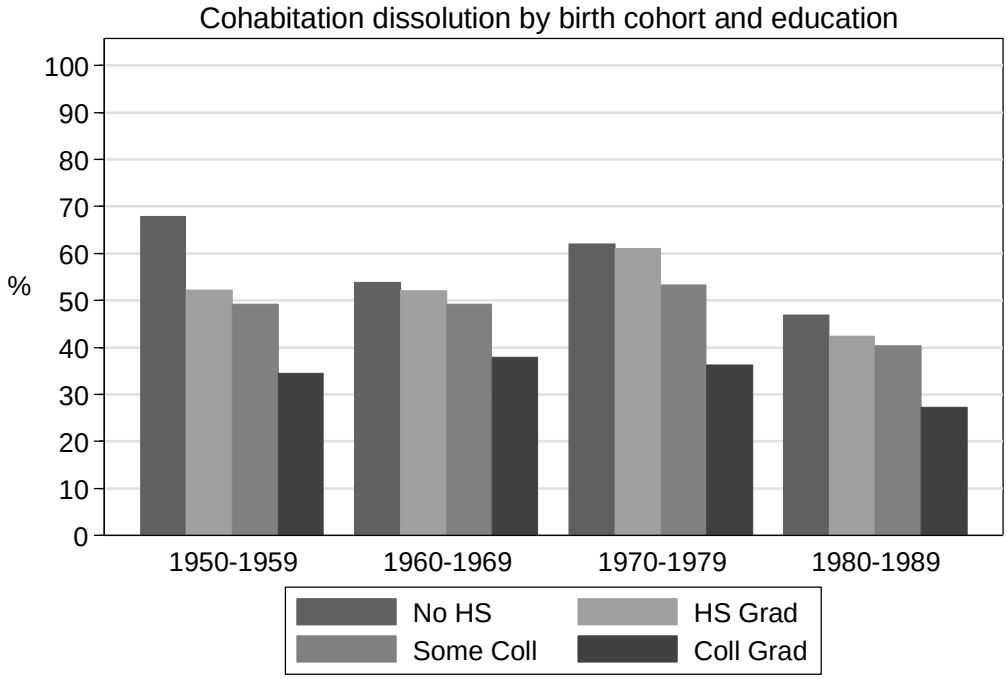
Source: Own elaboration from Panel Study of Income Dynamics 1968-2011

Figure 8 – Percentage of cohabitation ending in marriage in the analysis by partnership cohort and educational attainment.



Source: Own elaboration from Panel Study of Income Dynamics 1968-2011

Figure 9 – Percentage of cohabitation ending in dissolution in the analysis by birth cohort and educational attainment.



Source: Own elaboration from Panel Study of Income Dynamics 1968-2011

Figure 10 - Predicted probability of marriage

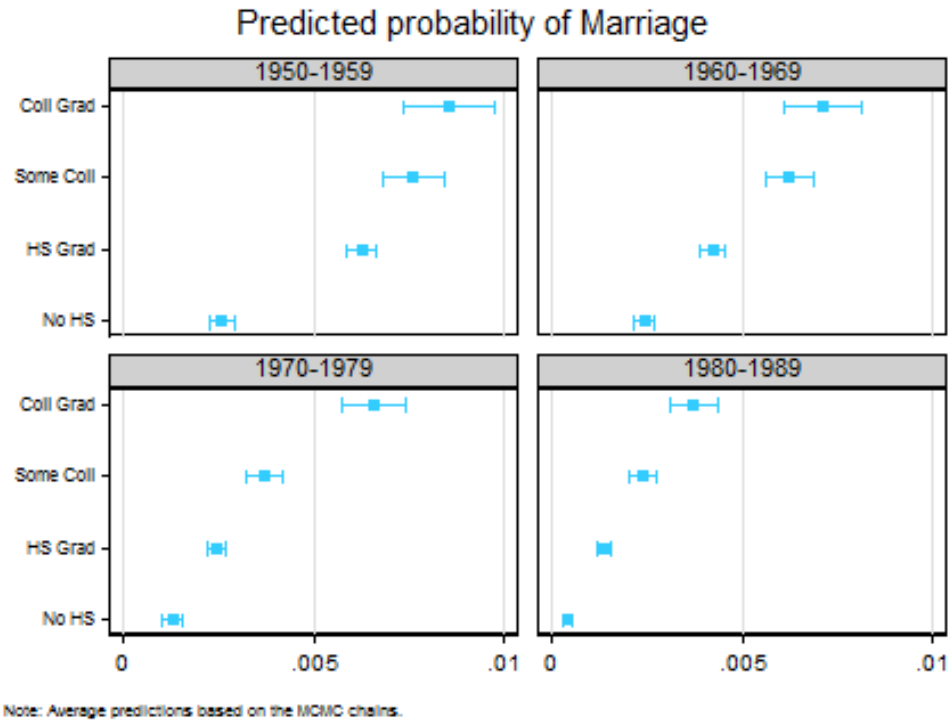
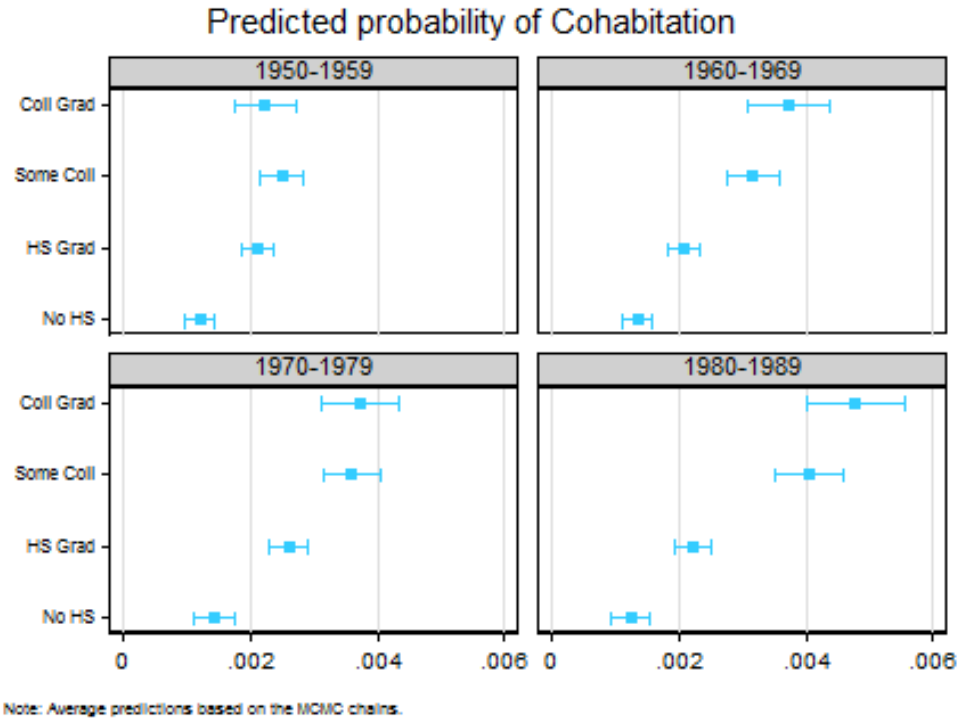


Figure 11 – Predicted probability of cohabitation



Note: Average predictions based on the MCMC chains.

Figure 12 – Predicted probability of cohabitation dissolution by birth cohort.

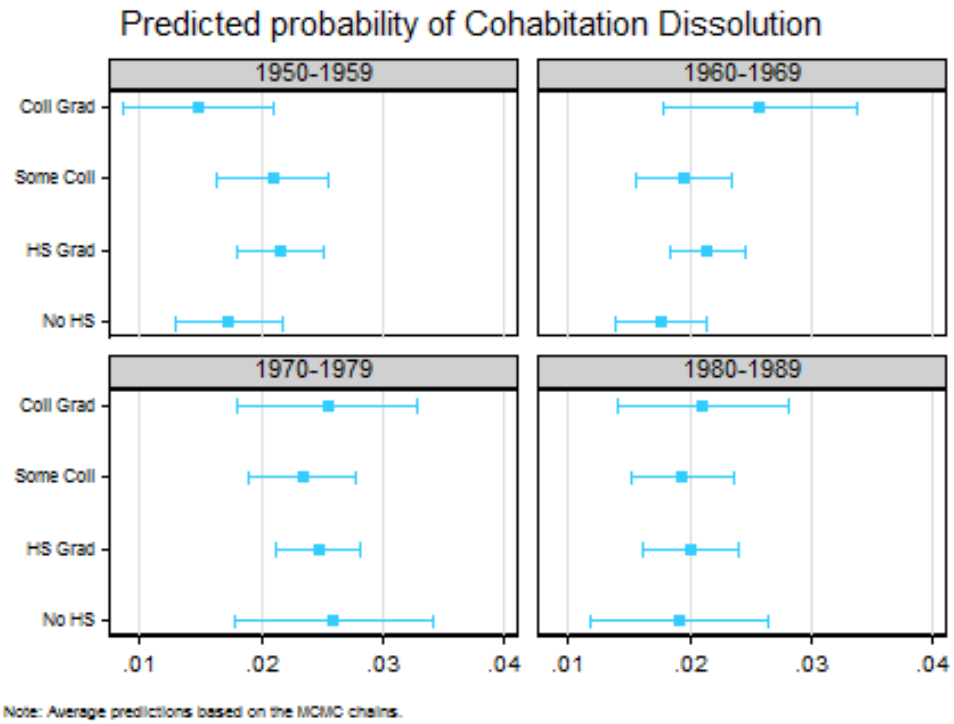


Figure 13 – Predicted probability of marriage via premarital cohabitation

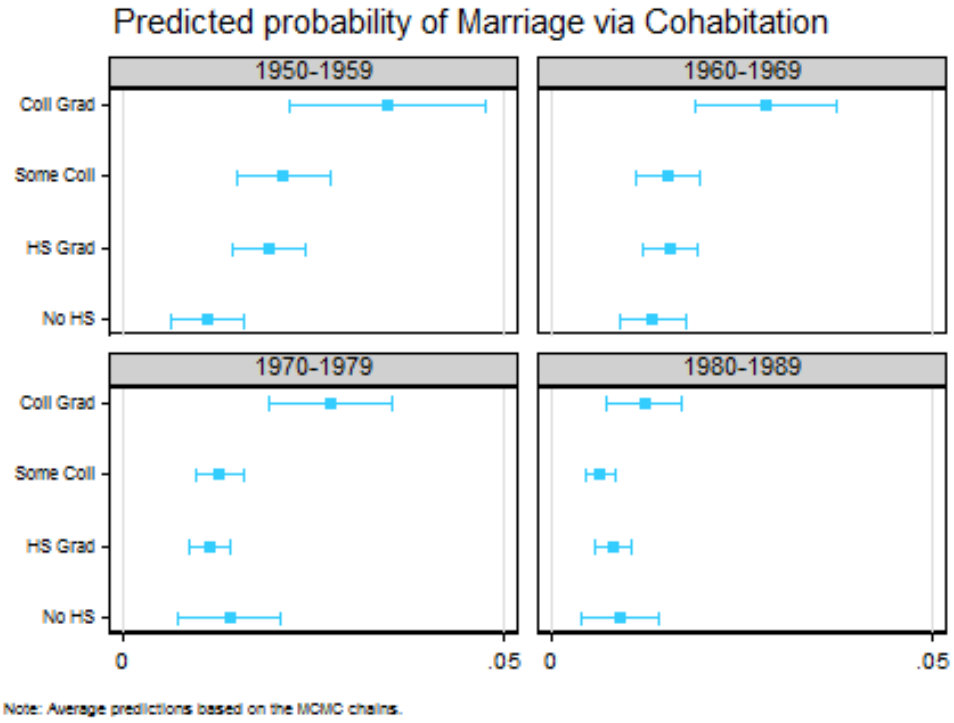
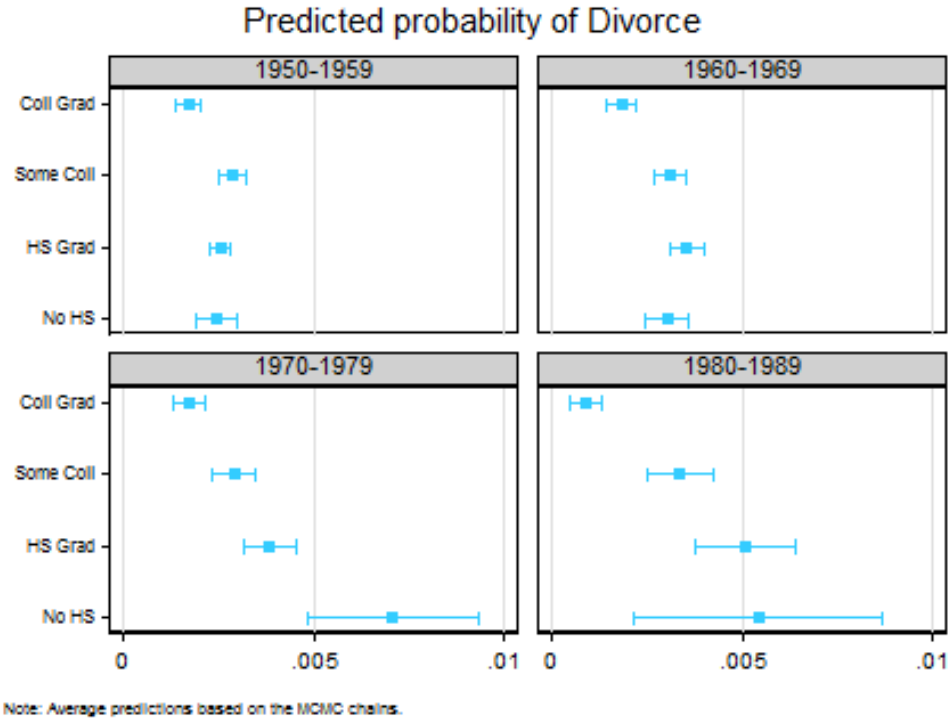


Figure 14 – Predicted probability of marital separation



Note: Average predictions based on the MCMC chains.

Table 1 - Literature summary on the stability of the female educational gradient of partnership transitions in the United States

Article	Partnership transition	Data	Findings	Controls
Härkönen and Dronkers (2006)	Marital dissolution	FFS	Year of marriage x education = Decline in marital instability for college-educated	Marriage duration and its square, parental divorce, Age at marriage, premarital birth, cohabitation
Isen and Stevenson (2010)	Divorce	2004 SIPP	College-educated women are the least-likely to this divorce and this risk has decreased furthermore over time.	Descriptive statistics on % of women first-marriage ending in divorce by education status, race and decade
Martin (2006)	Marital dissolution	SIPP	Year of marriage x education = Decline in marital instability for college-educated	Race, age at 1st marriage, premarital 1st birth and changes in educational composition (tile)
Martin and Bumpass (1989)	Marital dissolution	CPS 85	Negative educational gradient (no trend interaction but split by marriage cohort)	Age at marriage, premarital births, region, regressions split by race
Raley and Bumpass (2003)	Marital dissolution	CPS 1990	Marriage cohort x education = Increase in marital instability for low-educated	Race, age at marriage
Raley and Bumpass (2003)	Union dissolution	CPS 1990	Union cohort x education = Increase in union instability for low-educated; increase in union instability for black women	Age at marriage, preunion births
South (2001)	Marital dissolution	PSID	Year x education = not significant	Wife's hours worked, age at marriage, husband's hours worked, husband's education, marital duration, race, homeowner, remarriage, number of children, metropolitan resident, year and its square, interaction between wife's characteristics and year/marital duration
Sweeney and Phillips (2004)	Marital dissolution	CPS 85-90-95	Marriage cohort x education = Decline in marital instability for white college-educated women and black high-school and college-educated women in 90s	Age at marriage, premarital births, region, regressions split by race
Teachman (2002)	Marital dissolution	NSFG	Year of marriage x education = not significant; The effect of race varies over time and is negative.	Race, religion, age at marriage, husband's age at marriage, husband's education, wife more educated,husband older, wife older, wife's parents divorced
Goldstein and Kenney (2001)	Marital formation	CPS 1995	Reversal in the educational gradient: from negative to positive	Forecast methods
Isen and Stevenson (2010)	Marital formation	CPS 60-70-80-90-00 and 2007 ACS	White college-educated women are less likely to marry but marriage gap has diminished over time, while for black college-educated women the gap has reversed.	Descriptive statistics on % of women ever-married by education status, race and decade
Sweeney (2002)	Marital formation	NLSY	Positive educational gradient (no trend interaction but split by birth cohort)	Family background, region, earnings, employment status and education status, regressions split by race
Torr (2011)	Marital formation	IPUMS	Reversal in the educational gradient: from negative to positive	Age, Region, Metropolitan Area, Farm Area, Currently in School, Hispanic, Foreign-Born, House-owner

Table 2 – Distribution of covariates for each of three states: single, cohabiting and married

Variable	Single	Cohabiting	Married
Race			
White	50.64	60.39	60.75
Black	45.87	36.64	35.61
Others	3.49	2.97	3.64
Birth cohort			
1950-1959	29.47	26.62	38.85
1960-1969	25.63	27.78	28.80
1970-1979	21.35	25.08	20.70
1980-1989	23.55	20.52	11.66
Age at start of partnership†	-	26.66 (6.71)	24.96 (6.69)
Education‡			
Less than high school	23.83	13.01	8.64
High school diploma	44.60	40.34	40.81
Some college	21.39	33.29	29.07
Completed college	10.18	13.36	21.48
Education enrollment‡			
Not enrolled	52.22	86.35	79.52
Enrolled	21.94	2.96	1.79
Missing	25.83	10.69	18.69
Current fertility status‡			
No children	54.62	34.48	15.78
Currently pregnant	7.05	10.49	12.72
Child(en): Age < 5	19.8	33.74	40.24
Child(en): Age [5;18)	26.35	37.47	50.80
Child(en): Age +18	8.92	9.51	15.34
Previously married†	19.25	33.43	15.71
Previously cohabited†	11.62	23.77	22.14
With current partner only	-	-	13.64
With previous partner(s) only	-	-	6.57
With both previous and current partners	-	-	1.92
Current region of residence‡			
Northeast	12.91	14.57	13.45
North Central	22.28	25.10	21.66
South	45.64	40.86	43.93
West	11.86	17.92	13.93
Alaska, Hawai, Foreign country, Missing	7.32	1.55	7.03
Number of 6-month intervals	152,170	10,446	93,354
Number of episodes	9,339	2,437	4,709
Number of women	6,080	1,886	3,740

Note: † Episode-varying covariates; ‡ Time-varying covariates.

Table 3 – Duration in years by type of partnership transition

PartnershipTransitions	Lower quartile	Median	Upper quartile	Number of events
Partnership formation				
Marriage	2.7	5.0	8.2	3606
Cohabitation	2.1	4.8	8.4	2418
Cohabitation outcomes				
Marriage	0.8	1.1	1.9	841
Separation	0.6	1.3	2.4	1152
Marital separation	1.9	4.1	8.3	2043

Table 4 – Estimated random effects variance and covariance terms from the multiprocess model

	Estimates S.E.
Variance	
Single to Married (S-M)	0.580 (0.079)***
Single to Cohabiting (S-C)	0.593 (0.103)***
Cohabiting to Single (C-S)	0.239 (0.069)***
Cohabiting to Married (C-M)	0.898 (0.264)***
Married to Single (M-S)	1.063 (0.168)***
Education (E)	1.095 (0.055)***
Covariance	
S-M and S-C	0.181 (0.065)**
S-M and C-S	0.039 (0.069)
S-M and C-M	0.223 (0.108)*
S-C and C-S	0.048 (0.062)
S-C and C-M	0.018 (0.095)
C-S and C-M	0.164 (0.090)+
M-S and C-S	0.183 (0.083)*
M-S and C-M	0.247 (0.154)
M-S and S-M	0.280 (0.085)***
M-S and S-C	0.085 (0.092)
E and S-M	-0.141 (0.041)***
E and S-C	-0.198 (0.049)***
E and C-S	-0.064 (0.081)
E and C-M	0.196 (0.111)+
E and M-S	-0.058 (0.074)

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001.

Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table 5a – Estimated coefficients from multilevel event history models of the partnership formation model

	Marriage	
	Single-Process	Multi-process
Education (ref. Less than high school)		
High school diploma	0.758 (0.083)***	0.883 (0.091)***
Some college	0.882 (0.105)***	1.085 (0.118)***
College degree	0.936 (0.127)***	1.194 (0.146)***
Birth Cohort (ref. 1950-1959)		
1960-1969	-0.300 (0.124)*	-0.318 (0.125)*
1970-1979	-0.714 (0.153)***	-0.720 (0.155)***
1980-1989	-1.906 (0.246)***	-1.922 (0.245)***
Education x Birth cohort		
High school diploma x 1960-1969	-0.085 (0.135)	-0.075 (0.137)
High school diploma x 1970-1979	-0.228 (0.168)	-0.235 (0.169)
High school diploma x 1980-1989	0.388 (0.265)	0.384 (0.262)
Some college x 1960-1969	0.109 (0.155)	0.121 (0.156)
Some college x 1970-1979	0.012 (0.187)	-0.014 (0.187)
Some college x 1980-1989	0.758 (0.276)**	0.736 (0.274)**
College degree x 1960-1969	0.145 (0.183)	0.132 (0.187)
College degree x 1970-1979	0.497 (0.201)*	0.458 (0.201)*
College degree x 1980-1989	1.130 (0.291)***	1.078 (0.286)***

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001. All effects are net of the effects of other explanatory variables shown in Appendix in Table A1. Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table 5b – Estimated coefficients from multilevel event history models of the partnership formation model

	Cohabitation	
	Single-Process	Multi-process
Education (ref. Less than high school)		
High school diploma	0.312 (0.128)*	0.552 (0.145)***
Some college	0.355 (0.143)*	0.696 (0.172)***
College degree	0.137 (0.179)	0.565 (0.216)**
Birth Cohort (ref. 1950-1959)		
1960-1969	0.346 (0.156)*	0.337 (0.161)*
1970-1979	0.195 (0.184)	0.193 (0.187)
1980-1989	0.020 (0.203)	0.025 (0.203)
Education x Birth cohort		
High school diploma x 1960-1969	-0.336 (0.178)+	-0.347 (0.183)+
High school diploma x 1970-1979	0.061 (0.204)	0.026 (0.206)
High school diploma x 1980-1989	0.082 (0.224)	0.034 (0.225)
Some college x 1960-1969	-0.079 (0.193)	-0.075 (0.199)
Some college x 1970-1979	0.262 (0.218)	0.225 (0.224)
Some college x 1980-1989	0.559 (0.236)*	0.500 (0.236)*
College degree x 1960-1969	0.220 (0.233)	0.206 (0.241)
College degree x 1970-1979	0.437 (0.252)+	0.368 (0.257)
College degree x 1980-1989	0.888 (0.269)***	0.790 (0.269)**

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001. All effects are net of the effects of other explanatory variables shown in Appendix in Table A2. Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table 6a – Estimated coefficients from multilevel event history models of cohabitation outcomes model

	Separation	
	Single-process	Multi-process
Education (ref. Less than high school)		
High school diploma	0.201 (0.178)	0.263 (0.219)
Some college	0.116 (0.195)	0.227 (0.260)
College degree	-0.292 (0.285)	-0.170 (0.359)
Birth Cohort (ref. 1950-1959)		
1960-1969	0.070 (0.219)	0.063 (0.227)
1970-1979	0.433 (0.255)+	0.419 (0.257)
1980-1989	0.087 (0.305)	0.081 (0.314)
Education x Birth Cohort		
High school diploma x 1960-1969	-0.087 (0.253)	-0.069 (0.260)
High school diploma x 1970-1979	-0.286 (0.285)	-0.260 (0.286)
High school diploma x 1980-1989	-0.168 (0.340)	-0.139 (0.347)
Some college x 1960-1969	-0.132 (0.268)	-0.111 (0.278)
Some college x 1970-1979	-0.276 (0.303)	-0.268 (0.304)
Some college x 1980-1989	-0.137 (0.352)	-0.132 (0.362)
College degree x 1960-1969	0.515 (0.359)	0.551 (0.377)
College degree x 1970-1979	0.172 (0.387)	0.195 (0.389)
College degree x 1980-1989	0.298 (0.441)	0.317 (0.456)

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001. All effects are net of the effects of other explanatory variables shown in Appendix in Table A3. Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table 6b – Estimated coefficients from multilevel event history models of cohabitation outcomes model

	Marriage	
	Single-process	Multi-process
Education (ref. Less than high school)		
High school diploma	0.946 (0.298)**	0.632 (0.336)+
Some college	1.116 (0.319)***	0.718 (0.381)+
College degree	1.755 (0.357)***	1.247 (0.433)**
Birth Cohort (ref. 1950-1959)		
1960-1969	0.606 (0.356)+	0.521 (0.354)
1970-1979	0.264 (0.423)	0.214 (0.421)
1980-1989	-0.115 (0.475)	-0.256 (0.472)
Education x Birth Cohort		
High school diploma x 1960-1969	-0.850 (0.395)*	-0.743 (0.395)+
High school diploma x 1970-1979	-0.825 (0.462)+	-0.782 (0.455)+
High school diploma x 1980-1989	-0.805 (0.520)	-0.659 (0.514)
Some college x 1960-1969	-0.943 (0.416)*	-0.848 (0.406)*
Some college x 1970-1979	-0.790 (0.477)+	-0.757 (0.472)
Some college x 1980-1989	-1.152 (0.545)*	-1.014 (0.535)+
College degree x 1960-1969	-0.869 (0.450)+	-0.768 (0.438)+
College degree x 1970-1979	-0.553 (0.498)	-0.485 (0.488)
College degree x 1980-1989	-1.029 (0.578)+	-0.864 (0.569)

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001. All effects are net of the effects of other explanatory variables shown in Appendix in Table A4. Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table 7 – Estimated coefficients from multilevel event history models of marital separation

	Divorce	
	Single-process	Multi-process
Education (ref. Less than high school)		
High school diploma	-0.047 (0.133)	0.053 (0.167)
Some college	0.051 (0.150)	0.177 (0.206)
College degree	-0.529 (0.182)**	-0.361 (0.250)
Birth Cohort (ref. 1950-1959)		
1960-1969	0.619 (0.190)**	0.595 (0.197)**
1970-1979	1.106 (0.244)***	1.060 (0.251)***
1980-1989	0.860 (0.421)*	0.723 (0.427)+
Education x Partnership cohort		
High school diploma x 1960-1969	-0.220 (0.208)	-0.249 (0.214)
High school diploma x 1970-1979	-0.575 (0.267)*	-0.639 (0.273)*
High school diploma x 1980-1989	-0.027 (0.455)	-0.032 (0.458)
Some college x 1960-1969	-0.475 (0.226)*	-0.497 (0.229)*
Some college x 1970-1979	-0.989 (0.283)***	-1.041 (0.287)***
Some college x 1980-1989	-0.564 (0.466)	-0.572 (0.467)
College degree x 1960-1969	-0.492 (0.267)+	-0.523 (0.275)+
College degree x 1970-1979	-0.959 (0.316)**	-1.026 (0.320)**
College degree x 1980-1989	-1.379 (0.568)*	-1.423 (0.566)*

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001. All effects are net of the effects of other explanatory variables shown in Appendix in Table A5. Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Technical Appendix

Table A1 – Estimated coefficients from multilevel event history models of the partnership formation model

	Marriage	
	Single-Process	Multi-process
Constant	-5.130 (0.097)***	-5.205 (0.102)***
Duration unpartnered	0.044 (0.007)***	0.039 (0.007)***
Duration unpartnered^2	-0.001 (0.000)***	-0.001 (0.000)***
Previously married	0.180 (0.086)*	-0.864 (0.091)***
Previously cohabited	-0.686 (0.082)***	0.140 (0.088)
Fertility status (ref. no children)		
Currently pregnant	1.321 (0.049)***	1.300 (0.049)***
Child(en): Age < 5	0.206 (0.049)***	0.192 (0.049)***
Child(en): Age [5;18)	-0.061 (0.057)	-0.029 (0.056)
Child(en): Age +18	-0.333 (0.098)***	-0.290 (0.097)**
Race (ref. white)		
Black	-1.326 (0.056)***	-1.306 (0.056)***
Other	-0.424 (0.111)***	-0.408 (0.112)***
Current region of residence (ref. South)		
Northeast	-0.712 (0.069)***	-0.716 (0.068)***
North Central	-0.362 (0.055)***	-0.353 (0.055)***
West	-0.336 (0.065)***	-0.329 (0.065)***
Alaska, Hawai, Foreign country, Missing	-0.566 (0.086)***	-0.575 (0.087)***
Education enrollment (ref. not enrolled)		
Enrolled	-0.950 (0.069)***	-0.920 (0.070)***
Missing	-0.014 (0.048)	0.000 (0.049)
Education (ref. Less than high school)		
High school diploma	0.758 (0.083)***	0.883 (0.091)***
Some college	0.882 (0.105)***	1.085 (0.118)***
College degree	0.936 (0.127)***	1.194 (0.146)***
Birth Cohort (ref. 1950-1959)		
1960-1969	-0.300 (0.124)*	-0.318 (0.125)*
1970-1979	-0.714 (0.153)***	-0.720 (0.155)***
1980-1989	-1.906 (0.246)***	-1.922 (0.245)***
Education x Birth cohort		
High school diploma x 1960-1969	-0.085 (0.135)	-0.075 (0.137)
High school diploma x 1970-1979	-0.228 (0.168)	-0.235 (0.169)
High school diploma x 1980-1989	0.388 (0.265)	0.384 (0.262)
Some college x 1960-1969	0.109 (0.155)	0.121 (0.156)
Some college x 1970-1979	0.012 (0.187)	-0.014 (0.187)
Some college x 1980-1989	0.758 (0.276)**	0.736 (0.274)**
College degree x 1960-1969	0.145 (0.183)	0.132 (0.187)
College degree x 1970-1979	0.497 (0.201)*	0.458 (0.201)*
College degree x 1980-1989	1.130 (0.291)***	1.078 (0.286)***

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001; Odds ratio.

Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table A2 – Estimated coefficients from multilevel event history models of the partnership formation model

	Cohabitation	
	Single-Process	Multi-process
Constant	-5.787 (0.144)***	-6.017 (0.158)***
Duration unpartnered	0.009 (0.007)	0.005 (0.007)
Duration unpartnered^2	-0.000 (0.000)**	-0.000 (0.000)*
Previously married	-0.097 (0.092)	0.421 (0.100)***
Previously cohabited	0.493 (0.084)***	-0.190 (0.097)+
Fertility status (ref. no children)		
Currently pregnant	0.565 (0.070)***	0.569 (0.071)***
Child(en): Age < 5	0.528 (0.053)***	0.545 (0.053)***
Child(en): Age [5;18)	-0.161 (0.059)**	-0.121 (0.060)*
Child(en): Age +18	-0.399 (0.102)***	-0.355 (0.102)***
Race (ref. white)		
Black	-1.040 (0.064)***	-1.036 (0.063)***
Other	-0.609 (0.140)***	-0.608 (0.143)***
Current region of residence (ref. South)		
Northeast	-0.122 (0.077)	-0.144 (0.079)+
North Central	0.007 (0.061)	0.005 (0.062)
West	0.220 (0.070)**	0.224 (0.072)**
Alaska, Hawai, Foreign country, Missing	-1.138 (0.181)***	-1.166 (0.183)***
Education enrollment (ref. not enrolled)		
Enrolled	-1.878 (0.102)***	-1.793 (0.101)***
Missing	-0.997 (0.071)***	-0.960 (0.072)***
Education (ref. Less than high school)		
High school diploma	0.312 (0.128)*	0.552 (0.145)***
Some college	0.355 (0.143)*	0.696 (0.172)***
College degree	0.137 (0.179)	0.565 (0.216)**
Birth Cohort (ref. 1950-1959)		
1960-1969	0.346 (0.156)*	0.337 (0.161)*
1970-1979	0.195 (0.184)	0.193 (0.187)
1980-1989	0.020 (0.203)	0.025 (0.203)
Education x Birth cohort		
High school diploma x 1960-1969	-0.336 (0.178)+	-0.347 (0.183)+
High school diploma x 1970-1979	0.061 (0.204)	0.026 (0.206)
High school diploma x 1980-1989	0.082 (0.224)	0.034 (0.225)
Some college x 1960-1969	-0.079 (0.193)	-0.075 (0.199)
Some college x 1970-1979	0.262 (0.218)	0.225 (0.224)
Some college x 1980-1989	0.559 (0.236)*	0.500 (0.236)*
College degree x 1960-1969	0.220 (0.233)	0.206 (0.241)
College degree x 1970-1979	0.437 (0.252)+	0.368 (0.257)
College degree x 1980-1989	0.888 (0.269)***	0.790 (0.269)**

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001; Odds ratio.

Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table A3 – Estimated coefficients from multilevel event history models of cohabitation outcomes model

	Separation	
	Single-process	Multi-process
Constant	-4.210 (0.192)***	-4.351 (0.256)***
Log of partnership duration	0.014 (0.060)	0.023 (0.056)
Previously married	0.397 (0.088)***	0.292 (0.123)*
Previously cohabited	-0.008 (0.086)	-0.060 (0.096)
Fertility status (ref. no children)		
Currently pregnant	-0.521 (0.115)***	-0.528 (0.116)***
Child(en): Age < 5	0.044 (0.072)	0.039 (0.075)
Child(en): Age [5;18)	0.035 (0.081)	0.057 (0.084)
Child(en): Age +18	0.041 (0.159)	0.060 (0.164)
Race (ref. white)		
Black	0.247 (0.079)**	0.268 (0.085)**
Other	0.028 (0.196)	0.039 (0.202)
Current region of residence (ref. South)		
Northeast	-0.077 (0.110)	-0.088 (0.113)
North Central	-0.046 (0.085)	-0.046 (0.089)
West	0.100 (0.094)	0.107 (0.099)
Alaska, Hawai, Foreign country, Missing	-0.945 (0.409)*	-0.934 (0.424)*
Age at start of partnership	-0.134 (0.044)**	-0.137 (0.045)**
Age^2 at start of partnership	0.002 (0.001)*	0.002 (0.001)*
Education enrollment (ref. not enrolled)		
Enrolled	-0.143 (0.186)	-0.122 (0.186)
Missing	-0.264 (0.109)*	-0.267 (0.109)*
Education (ref. Less than high school)		
High school diploma	0.201 (0.178)	0.263 (0.219)
Some college	0.116 (0.195)	0.227 (0.260)
College degree	-0.292 (0.285)	-0.170 (0.359)
Birth Cohort (ref. 1950-1959)		
1960-1969	0.070 (0.219)	0.063 (0.227)
1970-1979	0.433 (0.255)+	0.419 (0.257)
1980-1989	0.087 (0.305)	0.081 (0.314)
Education x Birth Cohort		
High school diploma x 1960-1969	-0.087 (0.253)	-0.069 (0.260)
High school diploma x 1970-1979	-0.286 (0.285)	-0.260 (0.286)
High school diploma x 1980-1989	-0.168 (0.340)	-0.139 (0.347)
Some college x 1960-1969	-0.132 (0.268)	-0.111 (0.278)
Some college x 1970-1979	-0.276 (0.303)	-0.268 (0.304)
Some college x 1980-1989	-0.137 (0.352)	-0.132 (0.362)
College degree x 1960-1969	0.515 (0.359)	0.551 (0.377)
College degree x 1970-1979	0.172 (0.387)	0.195 (0.389)
College degree x 1980-1989	0.298 (0.441)	0.317 (0.456)

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001.

Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table A4 – Estimated coefficients from multilevel event history models of cohabitation outcomes model

	Marriage	
	Single-process	Multi-process
Constant	-4.882 (0.319)***	-4.343 (0.366)***
Log of partnership duration	0.366 (0.099)***	0.343 (0.102)***
Previously married	-0.024 (0.124)	-0.410 (0.208)*
Previously cohabited	-0.320 (0.122)**	-0.316 (0.141)*
Fertility status (ref. no children)		
Currently pregnant	0.682 (0.111)***	0.664 (0.113)***
Child(en): Age < 5	-0.156 (0.103)	-0.161 (0.102)
Child(en): Age [5;18)	-0.247 (0.116)*	-0.308 (0.119)**
Child(en): Age +18	-0.442 (0.238)+	-0.550 (0.242)*
Race (ref. white)		
Black	-0.771 (0.124)***	-0.848 (0.132)***
Other	-0.342 (0.286)	-0.375 (0.281)
Current region of residence (ref. South)		
Northeast	-0.432 (0.150)**	-0.461 (0.150)**
North Central	-0.051 (0.118)	-0.070 (0.116)
West	-0.264 (0.133)*	-0.269 (0.132)*
Alaska, Hawai, Foreign country, Missing	-1.311 (0.475)**	-1.332 (0.466)**
Age at start of partnership	-0.050 (0.059)	0.016 (0.064)
Age^2 at start of partnership	0.000 (0.001)	-0.000 (0.001)
Education enrollment (ref. not enrolled)		
Enrolled	0.148 (0.211)	0.090 (0.212)
Missing	0.279 (0.123)*	0.276 (0.123)*
Education (ref. Less than high school)		
High school diploma	0.946 (0.298)**	0.632 (0.336)+
Some college	1.116 (0.319)***	0.718 (0.381)+
College degree	1.755 (0.357)***	1.247 (0.433)**
Birth Cohort (ref. 1950-1959)		
1960-1969	0.606 (0.356)+	0.521 (0.354)
1970-1979	0.264 (0.423)	0.214 (0.421)
1980-1989	-0.115 (0.475)	-0.256 (0.472)
Education x Birth Cohort		
High school diploma x 1960-1969	-0.850 (0.395)*	-0.743 (0.395)+
High school diploma x 1970-1979	-0.825 (0.462)+	-0.782 (0.455)+
High school diploma x 1980-1989	-0.805 (0.520)	-0.659 (0.514)
Some college x 1960-1969	-0.943 (0.416)*	-0.848 (0.406)*
Some college x 1970-1979	-0.790 (0.477)+	-0.757 (0.472)
Some college x 1980-1989	-1.152 (0.545)*	-1.014 (0.535)+
College degree x 1960-1969	-0.869 (0.450)+	-0.768 (0.438)+
College degree x 1970-1979	-0.553 (0.498)	-0.485 (0.488)
College degree x 1980-1989	-1.029 (0.578)+	-0.864 (0.569)

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001.

Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Table A5 – Estimated coefficients from multilevel event history models of marital separation

	Divorce	
	Single-process	Multi-process
Constant	-5.734 (0.172)***	-5.872 (0.213)***
Log of marriage duration	-0.086 (0.041)*	-0.081 (0.041)*
Previously married	-0.128 (0.111)	-0.367 (0.136)**
Previously cohabited (ref. no partner)		
Current partner only	0.021 (0.086)	0.089 (0.133)
Previous partner(s) only	0.390 (0.173)*	0.414 (0.229)+
Current and previous partner(s)	0.136 (0.112)	0.084 (0.146)
Fertility status (ref. no children)		
Currently pregnant	-0.898 (0.087)***	-0.888 (0.088)***
Child(en): Age < 5	-0.122 (0.053)*	-0.108 (0.053)*
Child(en): Age [5;18)	-0.001 (0.060)	0.018 (0.061)
Child(en): Age +18	-0.280 (0.095)**	-0.284 (0.098)**
Race (ref. white)		
Black	0.616 (0.072)***	0.544 (0.077)***
Other	0.269 (0.160)+	0.253 (0.162)
Current region of residence (ref. South)		
Northeast	-0.286 (0.106)**	-0.342 (0.108)**
North Central	0.023 (0.078)	-0.010 (0.079)
West	0.100 (0.090)	0.078 (0.091)
Alaska, Hawai, Foreign country, Missing	-0.153 (0.112)	-0.153 (0.112)
Age at start of marriage	-0.141 (0.034)***	-0.119 (0.037)**
Age^2 at start of marriage	0.002 (0.001)***	0.002 (0.001)**
Education enrollment (ref. not enrolled)		
Enrolled	0.228 (0.138)+	0.228 (0.138)+
Missing	0.113 (0.069)	0.108 (0.069)
Education (ref. Less than high school)		
High school diploma	-0.047 (0.133)	0.053 (0.167)
Some college	0.051 (0.150)	0.177 (0.206)
College degree	-0.529 (0.182)**	-0.361 (0.250)
Birth Cohort (ref. 1950-1959)		
1960-1969	0.619 (0.190)**	0.595 (0.197)**
1970-1979	1.106 (0.244)***	1.060 (0.251)***
1980-1989	0.860 (0.421)*	0.723 (0.427)+
Education x Birth cohort		
High school diploma x 1960-1969	-0.220 (0.208)	-0.249 (0.214)
High school diploma x 1970-1979	-0.575 (0.267)*	-0.639 (0.273)*
High school diploma x 1980-1989	-0.027 (0.455)	-0.032 (0.458)
Some college x 1960-1969	-0.475 (0.226)*	-0.497 (0.229)*
Some college x 1970-1979	-0.989 (0.283)***	-1.041 (0.287)***
Some college x 1980-1989	-0.564 (0.466)	-0.572 (0.467)
College degree x 1960-1969	-0.492 (0.267)+	-0.523 (0.275)+
College degree x 1970-1979	-0.959 (0.316)**	-1.026 (0.320)**
College degree x 1980-1989	-1.379 (0.568)*	-1.423 (0.566)*

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001.

Estimation: 50,000 MCMC chains, after a burn-in of 5,000.

Education Model

As explained in the Method section of the article, the model for education decisions includes the sequential transitions from one level of education to another, i.e. No education to high-school diploma, from high-school diploma to some college, from some college to college graduation. We include as covariates in the education model: log duration, race, partnership status, fertility status, region of residence and birth cohort (the distribution of the covariates in the education sample are summarized in Table A6). In addition, the effects of the covariates are allowed to differ by education transitions.

Table A6 – Distribution of covariates for the education model

Variable	N-E	H-S	S-C
Race			
White	50.86	52.21	56.74
Black	45.65	44.44	39.98
Others	3.49	3.34	3.28
Birth cohort			
1950-1959	29.51	28.69	25.05
1960-1969	25.69	25.37	24.40
1970-1979	21.28	21.69	24.45
1980-1989	23.52	24.25	26.09
Partnership status‡			
Single	80.89	60.58	50.53
Married	16.37	35.48	43.87
Cohabiting	2.74	3.95	5.61
Current fertility status‡			
No children	54.14	36.61	29.28
Currently pregnant	10.47	9.75	7.93
Child(en): Age < 5	22.22	31.04	28.47
Child(en): Age [5;18)	23.69	36.81	46.07
Child(en): Age +18	8.60	10.96	16.08
Current region of residence‡			
Northeast	10.21	12.97	11.85
North Central	22.68	21.92	22.54
South	46.80	46.44	43.36
West	10.85	11.40	16.27
Alaska, Hawai, Foreign country, Missing	9.46	7.27	5.98
Number of 6-month intervals	51,130	108,437	60,873
Number of women	6,072	5,472	3,664

Note: ‡ Time-varying covariates.

The estimated coefficients from the single-process and multi-process models are summarized in Table A7.

Table A7 – Estimated coefficients from multilevel event history models of education transitions

	Education	
	Single-process	Multi-process
No Education (Constant)	-5.790 (0.087)***	-5.812 (0.087)***
Log of time since 16	1.823 (0.048)***	1.827 (0.048)***
Race (ref. white)		
Black	-0.196 (0.045)***	-0.191 (0.046)***
Other	-0.223 (0.112)*	-0.217 (0.116)+
Partnership status (ref. single)		
Cohabiting	-1.301 (0.179)***	-1.205 (0.181)***
Married	-0.699 (0.081)***	-0.654 (0.083)***
Fertility status (ref. no children)		
Currently pregnant	0.002 (0.053)	0.013 (0.053)
Child(en): Age < 5	-1.369 (0.062)***	-1.354 (0.063)***
Child(en): Age [5;18)	-6.320 (0.198)***	-6.337 (0.223)***
Child(en): Age +18	-7.747 (0.414)***	-7.743 (0.436)***
Current region of residence (ref. South)		
Northeast	0.272 (0.063)***	0.279 (0.063)***
North Central	0.021 (0.052)	0.029 (0.052)
West	0.070 (0.065)	0.070 (0.066)
Alaska, Hawai, Foreign country, Missing	-0.305 (0.075)***	-0.292 (0.074)***
Birth Cohort (ref. 1950-1959)		
1960-1969	0.083 (0.055)	0.084 (0.056)
1970-1979	0.219 (0.058)***	0.221 (0.058)***
1980-1989	0.220 (0.057)***	0.226 (0.057)***
High-School (Constant)	-5.966 (0.081)***	-5.990 (0.081)***
Log of time since H-S	0.366 (0.024)***	0.361 (0.024)***
Race (ref. white)		
Black	-0.257 (0.051)***	-0.248 (0.053)***
Other	-0.137 (0.127)	-0.135 (0.130)
Partnership status (ref. single)		
Cohabiting	-0.443 (0.107)***	-0.354 (0.109)**
Married	-0.418 (0.055)***	-0.375 (0.058)***
Fertility status (ref. no children)		
Currently pregnant	-0.120 (0.064)+	-0.115 (0.064)+
Child(en): Age < 5	-0.742 (0.049)***	-0.735 (0.050)***
Child(en): Age [5;18)	-1.065 (0.061)***	-1.050 (0.060)***
Child(en): Age +18	-1.572 (0.119)***	-1.550 (0.120)***

	Education	
	Single-process	Multi-process
(cont'd)		
Current region of residence (ref. South)		
Northeast	0.131 (0.071)+	0.138 (0.070)*
North Central	0.132 (0.057)*	0.138 (0.058)*
West	0.194 (0.070)**	0.197 (0.070)**
Alaska, Hawai, Foreign country, Missing	-0.247 (0.089)**	-0.236 (0.090)**
Birth Cohort (ref. 1950-1959)		
1960-1969	0.374 (0.063)***	0.380 (0.064)***
1970-1979	0.829 (0.066)***	0.842 (0.066)***
1980-1989	1.124 (0.066)***	1.138 (0.066)***
Some college (Constant)	-2.731 (0.099)***	-2.776 (0.099)***
Log of time since S-C	-5.243 (0.215)***	-5.354 (0.214)***
Race (ref. white)		
Black	-0.819 (0.079)***	-0.806 (0.080)***
Other	-0.400 (0.194)*	-0.389 (0.196)*
Partnership status (ref. single)		
Cohabiting	-0.283 (0.181)	-0.212 (0.181)
Married	0.099 (0.089)	0.142 (0.091)
Fertility status (ref. no children)		
Currently pregnant	-1.023 (0.147)***	-1.021 (0.147)***
Child(en): Age < 5	-0.994 (0.112)***	-0.990 (0.111)***
Child(en): Age [5;18)	-0.432 (0.112)***	-0.409 (0.112)***
Child(en): Age +18	-0.481 (0.259)+	-0.473 (0.259)+
Current region of residence (ref. South)		
Northeast	0.216 (0.098)*	0.226 (0.099)*
North Central	-0.109 (0.087)	-0.099 (0.086)
West	-0.257 (0.106)*	-0.255 (0.107)*
Alaska, Hawai, Foreign country, Missing	-0.281 (0.170)+	-0.267 (0.171)
Birth Cohort (ref. 1950-1959)		
1960-1969	-0.062 (0.098)	-0.051 (0.097)
1970-1979	0.467 (0.096)***	0.484 (0.095)***
1980-1989	0.412 (0.097)***	0.436 (0.096)***

Note: + p<0.10 * p<0.05 ** p<0.01 *** p<0.001.

[i] We allow for cross-correlation between the random effects term between the competing risks transition even in the single-process specification. For instance, we estimate jointly the transition from single to either cohabiting or marriage. We apply the same technique to the competing risks between dissolution and marriage from the state of cohabitation. However, in the single-process estimation, the cross-correlations are set to zero between processes, i.e. Partnership formation transitions, outcomes of cohabitation and outcomes of marriage. The random error matrix takes the following form:

$$\begin{pmatrix} \sigma^2_{S1} \\ \sigma^2_{S2} \\ \sigma^2_{C1} \\ \sigma^2_{C2} \\ \sigma^2_{M} \end{pmatrix} \sim N \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \begin{pmatrix} \sigma^2_{S1} & 0 & 0 & 0 & 0 \\ \sigma_{S1S2} & \sigma^2_{S2} & 0 & 0 & 0 \\ 0 & 0 & \sigma^2_{C1} & 0 & 0 \\ 0 & 0 & \sigma_{C1C2} & \sigma^2_{C2} & 0 \\ 0 & 0 & 0 & 0 & \sigma^2_{M} \end{pmatrix}$$

[ii]For each model, the starting values are taken from the estimation of the models using IGLS (Iterative Generalized Least Squares) algorithm. The MCMC (Monte Carlo Markov Chain) estimation settings include a burn-in period of 5000 iterations followed by a monitoring period of 50000 iterations.

[iii] Out of our final sample, 474 women enter the dataset after age 16, for these individuals, we have to assume that they do not experience any cohabitation events between age 16 and 18.

[iv] The PSID provides two sources of information to measure the union status of household members. The first one is the legal marital status, which provides information on whether the respondents are officially married. This variable is only available for the years 1978 onwards (in the previous years the marital status 'married' is applied to both married and long-term cohabiting couples). The second source of information for respondents' union status can be taken from the relationship of each household member to the household head. This variable is available for all years of the PSID but the categories are not consistent over time. For the years 1968-1982, the variable does not provide a distinction between wives and cohabiting partners. From thereafter, the relationship to head variable includes distinctive categories for wives and cohabiters: wife (legal wife), "wife" (long-term cohabiters, which means more than a survey year) and first-year cohabiters (for which almost know information is collected until they become "wife"). We combine both measures to determine the union status variable distinguishing cohabitation from legal marriage (Gemici and Laufer 2011; Ozcan 2008). In the years 1968-1982, we consider that the couple is cohabiting when the legal marital status is single but there is a wife in the household. From 1983 onwards, we confirm the union status by combining both measures and discard the few units where both measures contradict each other. In addition, we do further checks of the marital status with the marital history file.

[v] In order to reduce the size of the sample, we group the time intervals into 6-month intervals and the risk of experiencing a transition is weighted by the number of months of the interval in which the event occurs (Steele et al. 2005). For example, if a respondent stays unpartnered for thirteen months before experiencing a first marriage, we will have three time intervals: two time intervals of six months, and a last interval of 1 month. The first two intervals have a weight of one while the last one has a weight of 1/6.

[vi] This information is asked for respondents from 1985 onwards. For those respondents that have exited the sample before 1985, we impute the education dates according to the variables years of education.

[vii] The category `high-school diploma' also includes GED recipients.

[viii] The category `some college' includes one-year or two-year college degrees.
[ix] The category 'college degree' includes either a minimum of sixteen years of education or a bachelor diploma and above.
[x] Questions about race were asked only to the head of the household until 1985, then, from 1985 onwards, the question was extended the spouse's head but not to other members of the household. For spouses that have never been head and that exit the PSID sample prior to 1985, we assume that they have the same race as their partners. Also, for respondents that have never been head, we impute their race from their parents' whenever possible.
[xi] We exclude the Latino and immigrant samples from the analyses because these sub-samples were added later on in the survey. Furthermore, the Latino sample added in 1990 had to be dropped in 1995 due to lack of sufficient funding. In 1997, a small Immigrant sample was aggregated to the original PSID (Gouskova et al. 2008). As a consequence, the ethnicity variable can be used mostly to do Black and White comparisons when using the PSID.
[xii] We merge the missing values for region to the category "Alaska/Hawai/Foreign country" because few observations are missing the region of residence.