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The Reversed Gender Gap in Education and Assortative Mating in Europe

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Abstract While in the past men received more education than women, the gender gap in education has turned around: in recent years, more highly educated women than highly educated men are reaching the reproductive ages. Using data from the European Social Survey (rounds 1–6), we investigate the implications of this reversed gender gap for educational assortative mating. We fit multilevel multinomial regression models to predict the proportions of men and women living with a partner of a given level of education, contingent on respondents' own educational attainment and on the cohort-specific sex ratio among the population with tertiary education at the country level. We find that highly educated women tend to partner more often "downwards" with less educated men, rather than remaining single more often. Medium educated women are found to partner less often "upwards" with highly educated men. For men, there is no evidence that they are more likely to partner with highly educated women. Rather, they are found to be living single more often. In sum, women's advantage in higher education has affected mating patterns in important ways: while women previously tended to form unions with men who were at least as highly educated as themselves, they now tend to live with men who are at most as highly educated. Along the way, advanced education became a bonus on the mating market for women as well as for men.

Keywords Education · Assortative mating · Gender · Marriage market

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1 Introduction

A major social development in the second half of the twentieth century has been the dramatic increase in participation in higher education, in particular among women. One consequence of this development is that differences in the relative educational attainment of men and women have changed. In the past, men were typically more educated than women, but in recent years, women excel men in terms of participation and success in higher education. This holds for almost all European countries (Vincent-Lancrin 2008), but also for North America (Diprete and Buchmann 2006) and many other parts of the world (Esteve et al. 2012; Schofer and Meyer 2005). Figure 1 illustrates this reversal for Europe, Canada, and the USA, by plotting the share of women among all students in tertiary education. While not all individual countries may be identifiable in the graph, it shows just how massive the upward trend has been: while in 1971 only Bulgaria had reached gender parity in higher education, about a third of these countries had crossed the 50% line by 1985. In 2009, all countries but Switzerland had a female majority in higher education. This implies that, in recent years, there are more highly educated women than men reaching the reproductive ages.

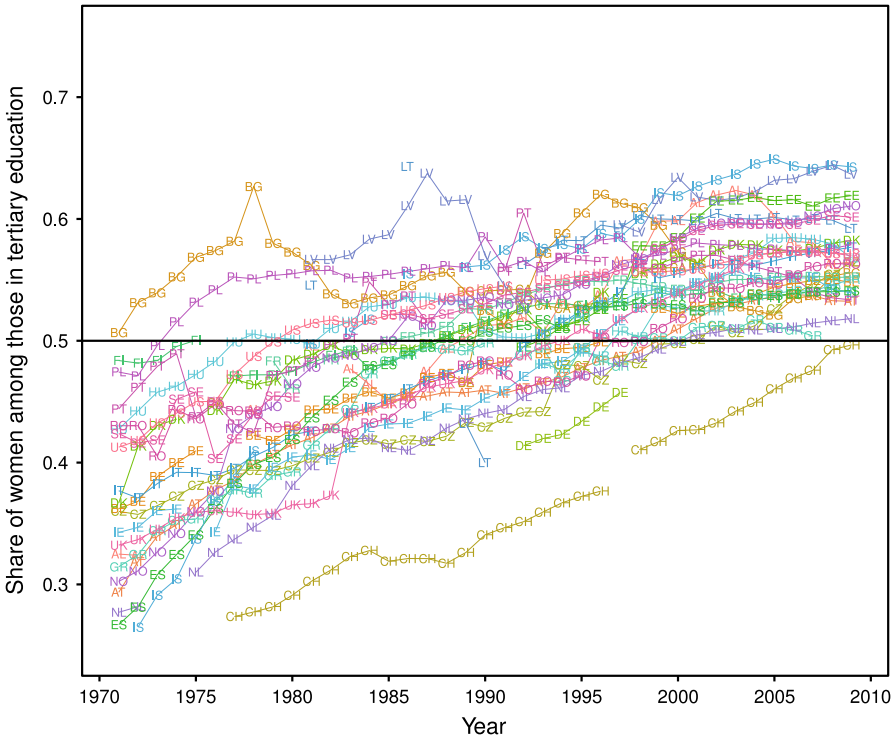

Fig. 1 Female students enrolled in tertiary education as the share of all those in tertiary education, 1971–2009. *Source*: UNESCO Institute for Statistics (http://data.uis.unesco.org/#, accessed on 23.10.2015)

The trend shown in Fig. 1 is highly relevant for demography, given that education—and women's education in particular—is strongly related to many dimensions of demographic behaviour. Despite this relevance, empirical research on the consequences of the shifting gender balance in higher education is rare (Van Bavel 2012). The evidence from the few existing studies suggests that, at the national level, an increase in the educational attainment of women compared to that of men tends to be associated with a decrease in educational hypergamy (he is more educated than she) and an increase in hypogamy (he is less educated than she). That is, in countries where women are on average more educated than men, hypogamy is becoming more prevalent than hypergamy (Esteve et al. 2012; Grow and Van Bavel 2015; Schwartz and Han 2014).

In the current article, we contribute to research on the consequences of the reversed gender gap in education by studying how it is associated with educational assortative mating in Europe. We go beyond earlier work in three ways. First, earlier studies have looked at marital sorting among people who are currently in a union, excluding people who are not living in a union. To the extent that variation in the composition of the marriage market also affects who remains single, the results of these studies may not be representative for union formation patterns in the total population. In this paper, we include single people along with people who were living in a union at the time of data collection. Second, most research has examined patterns of assortative mating among married couples. Given that unmarried cohabitation is on the rise and by now has attained a status similar to marriage in many European countries (Hiekel et al. 2014), an exclusive focus on marriage would miss an important part of the demographic picture. We therefore include both married couples and couples living in unmarried cohabitation in our analysis. Accordingly, from here on we also use the term "mating market" instead of "marriage market" and by that refer to the pool of potential partners for both marriage and unmarried cohabitation. Third, earlier research has examined macro-level patterns of assortative mating. In this article, we provide more detailed insights into the effect of the composition of the mating market on individuals' mating decisions by using micro-level data. We use multilevel modelling to assess how the educational composition of the mating market affects the likelihood that individuals partner with somebody with a similar or different educational level, rather than stay single.

To study assortative mating at the micro level, we use data from rounds 1–6 of the European Social Survey, which enables us to include 28 European countries in our analyses. To capture the educational composition of the different national mating markets, we use data provided by the International Institute for Applied Systems Analysis/Vienna Institute of Demography (Samir et al. 2010; Lutz et al. 2007) and calculate cohort-specific sex ratios for the highly educated, which we include as country-level covariates in our multilevel analyses. To develop hypotheses about the effects that changes in the relative educational attainment of men and women might have on assortative mating, we employ partner search theory (England and Farkas 1986; Oppenheimer 1988). This theory is particularly suitable for our purposes, because it explicitly links the structure of the mating

market with individual mating decisions, both in terms of entry into union and partner selection.

Our findings indicate that the reversed gender gap in education is associated with a major shift in educational assortative mating: while hypergamy was more prevalent when men had advanced degrees more often than women, hypogamy has now become more prevalent. In countries and cohorts where highly educated women outnumber highly educated men, the former tend to partner with less educated men more often rather than stay single. This is bound to affect family dynamics, as discussed in the concluding section.

2 Background and Hypotheses

2.1 Education and the Partner Search Process

Partner search theory assumes that individuals have preferences for partners with certain characteristics. It conceptualizes the search for such partners as taking place on a marriage market. The information that people have about the composition of this market is typically imperfect, and therefore, they often do not know whether and when they will encounter a partner with the desired characteristics (Lewis and Oppenheimer 2000). This can make it difficult to weigh the potential benefits and costs of extending the search. Extending the search can be beneficial, because it can increase the likelihood of meeting somebody who is closer to the desired ideal than the currently available alternatives. Yet, extending the search can also induce direct and indirect search costs. An example of direct costs is the time individuals need to invest in the search and the emotional risk involved in asking others for a date. An example of indirect costs are the opportunities that are foregone when potential mates are passed on and therefore are not available for a relation at later points in time (Oppenheimer 1988).

The use of partner search theory requires assumptions about the preferences that guide the partner search behaviour of men and women. According to Becker's (1981) economic approach, heterosexual marriage represents a form of trade in which men and women engage because there is more to gain from marriage than from remaining single. In societies in which men tend to be the main breadwinners and female labour market participation is low, marriage tends to involve a trade of paid work by men for unpaid care and house work by women. In such a context, men's economic resources are positively related to marriage: women tend to prefer to marry men with good labour market prospects. These are typically men with high educational attainment. Men, on the other hand, aim to find a wife who can take care of kids and household chores. In a marriage along these gender stereotypical lines, advanced education hardly represents trading value on the marriage market for women, since men are not chiefly looking for such a characteristic in their future spouses. As a consequence, women are likely to prefer highly educated men, whereas men are likely to prefer women who are less educated than themselves, which is congruent with the traditional mating pattern of female educational hypergamy (Blossfeld 2009; Esteve and Cortina 2006; Schwartz 2013).

With the shift from a male breadwinner towards a dual-earner society, gender roles have changed in Western contexts, albeit changes in time spent in the labour market and in the household have been asymmetric. Women have increased their hours spend on paid work much more than men have increased their hours on domestic tasks (England 2006, 2010). Yet, overall, women's labour force participation and men's participation in the household have increased and women's income potential has become a more important determinant for the living standard of families (Sweeney 2002). As a result, men have been found to increasingly favour women with appealing economic characteristics (Lichter et al. 1992; Qian and Preston 1993; South and Lloyd 1992). In line with this, Torr (2011) observed that in the USA a reversal in the effect of women's educational attainment on the likelihood of marriage has taken place. While in the past highly educated women were the least likely to marry, today they are the most likely to marry. For Europe, the educational gradient seems to vary considerably between countries (Dykstra and Poortman 2010; Kalmijn 2013; Wiik and Dommermuth 2014).

Overall, studies suggest that changes in the importance of women's educational attainment for the economic well-being of families may have increased the similarity in men's and women's preferences, so that both women and men may now prefer a partner who has attained at least the same educational level (Blossfeld and Drobnič 2001; Blossfeld and Timm 2003; Kalmijn 1991a, b; Mare 1991; Oppenheimer 1988; Schwartz and Mare 2005; South 1991; Sweeney 2002).

2.2 Marriage Market Constraints and Partner Search Outcomes

Building on the notion of the marriage squeeze (Glick et al. 1963; Akers 1967; Schoen 1983), partner search theory posits that the supply of opposite sex members with the desired characteristics affects the ease with which individuals meet potential partners. People who experience a shortage of desired partners and therefore have difficulties in finding a partner have two potential strategies. On the one hand, they might extend their search and postpone union formation in the hope to find the "ideal" partner in the future, but risk not finding a partner at all. On the other hand, extending partner search is costly and people might therefore choose to lower their aspirations and settle for a partner who is "less than ideal". If individuals apply the first strategy, this can lead to an increase in the number of singles among those who experience a shortage of potential partners. If individuals apply the second strategy, this can lead to an increase in the number of matches that are not completely aligned with individuals' preferences. Evidently, different individuals might apply different strategies and their strategies might even vary over time (Oppenheimer 1988). It is therefore possible that an unfavourable composition of the marriage market leads to both an increase in the share of singles and a change in the characteristics of the matches that form among those who are affected.

Guttentag and Secord (1983) posited that a marriage squeeze has divergent implications for male and female marriage. More precisely, they posited that when women outnumber men in the local marriage market, marriage rates would not only be low for women but also for men. The latter expectation contradicts a gender-neutral marriage squeeze hypothesis, which would predict high marriage rates for

men in case of an abundant supply of potential female partners. The reason given by Guttentag and Secord (1983) is that when women outnumber men, men have more bargaining power and can secure sexual relationships without commitment. Lower male marriage rates in case of a high supply of women were indeed found by Angrist (2002), Uecker and Regnerus (2010), and Warner et al. (2011). However, other scholars reported that the supply of women had a positive (Lloyd and South, 1996) or a very weak or insignificant effect (Albrecht and Albrecht 2001; Cready et al. 1997) on male marriage rates.

While marriage squeeze research initially focused on marriage rates as such, more recent research in this tradition also focused on the effects on marital sorting (see De Hauw et al. 2014 for a literature review). In the USA, Lichter et al. (1995) examined whether a shortage of men with certain characteristics affected the characteristics of the men women marry. They observed that when men outnumbered women in local marriage markets, women tended to marry high-status men. But when men were in short supply, women chose to forgo marriage, rather than to lower their marital preferences and marry a man with low socio-economic status. Lewis and Oppenheimer (2000) found that the higher the supply of equally or more educated potential partners, the less likely it is for both men and women that they marry down educationally. Focusing on re-partnering after divorce in Belgium, Theunis et al. (2015) recently reported that for men a high supply of highly educated single women on the marriage market increases their chance to re-partner with a highly educated woman after divorce.

The foregoing studies were conducted at the individual level. Research that has focused on the aggregate level consistently suggests that changes in the educational composition of the marriage market are correlated with shifting patterns of educational assortative mating. These results hold regardless of how the composition of the marriage market is assessed, e.g. by the sex ratio (Albrecht et al. 1997; Qian 1998), by the index of female educational advantage (Esteve et al. 2012; Grow and Van Bavel 2015), or by harmonic-mean models (Qian 1998).

So far, most studies in this line of research have focused on marriage only, but there are exceptions. Qian and Preston (1993) and Qian (1998) included cohabiting couples in their analyses and concluded that although the rise in cohabitation has somewhat offset the decline in marriage, findings for cohabiting couples are similar to the findings for married couples.

2.3 The Education-Specific Mating Squeeze: Hypotheses

Based on theory and earlier empirical work on partner search and assortative mating, we may expect that highly educated women as well as less educated men are suffering an education-specific mating squeeze when there is an imbalance in tertiary education to the advantage of women. For highly educated heterosexual women, the supply of highly educated potential mates will be too limited. For less educated heterosexual men, the fact that women now often have more advanced degrees than men implies that they may face a shrinking number of potential mates, given that women tend to prefer a partner with at least the same educational attainment. Highly educated men, in contrast, are expected to be "in high demand".

The consequences of the reversed gender gap in education for educational assortative mating may therefore be expected to diverge between women and men.

With respect to homogamy, highly educated women will face a shrinking number of equally educated men, so we expect that a high female advantage in tertiary education is associated with lower homogamy among highly educated women (*Hypothesis 1f*). Highly educated men, for their part, benefit from an abundance of women with similar education. For them, we expect that an excess of highly educated women is associated with stronger homogamy (*Hypothesis 1m*).

Expectations with respect to heterogamy diverge between women and men as well. In the past, men's educational advantage has fostered educational hypergamy, but as women gained more education than men, hypergamy has become less feasible. Today, women's educational advantage is likely to facilitate educational hypogamy. If people are willing to enlarge their field of eligible partners by lowering their aspirations about the education of their partners, we may expect that hypogamy will be on the rise. For women, we may then expect that a high female advantage in education is associated with a higher likelihood to be in a union with a man who is less educated than herself, but with a lower likelihood to be in a union with a man who is more educated (*Hypothesis 2f*). For men, we expect that a female advantage in education is associated with a higher likelihood to be in a union with a partner who is more educated than himself and a lower likelihood to be in a union with a partner who is less educated (*Hypothesis 2m*). Alternatively, if people insist on finding a partner who is at least as much educated as oneself, we would expect that the traditional pattern of hypergamy stands strong and that the excess of highly educated women translates in higher rates of singlehood among women with advanced education as well as among men with less education.

3 Method

3.1 Analytical Approach

Most research on assortative mating has applied log-linear analysis to contingency tables (e.g. Hamplova 2009; Schwartz and Mare 2005). An important limitation of this approach is that people who are not in a union cannot be included in the analysis. If the reversal of the gender gap in education leads to a differential selection into union and singlehood, this will bias the estimates of its effect on educational sorting, since only a selective group is included in the analysis. In order to account for singlehood, we applied multilevel multinomial logistic regression to investigate the factors that affect the likelihood of being single versus living with a low, medium, or highly educated partner.

Multilevel modelling (Snijders and Bosker 1999) allows us to test whether variation in the gender balance in higher education across European countries is associated with variation in patterns of union formation and assortative mating. In both analyses, individuals (level 1) were nested within countries (level 2) and we included measures that enabled us to control for the educational composition of the national mating market. To assess whether a gender imbalance in higher education

in a given country had differential effects for members of different educational categories, we included an interaction term between our mating market measure and individuals' own educational attainment. We conducted all analyses separately for men and women, because we expected that men and women would differ in their opportunities for realizing their partner preferences. We specified random slopes for respondents' age and education in addition to a random intercept in all models.

3.2 Data

We employed data from two sources. The first was the European Social Survey (ESS), which is a cross-national, individual-level survey that is conducted every two years and is currently available for the period 2002–2012.[1] We pooled the information of all six available rounds (2002, 2004, 2006, 2008, 2010, and 2012) and analysed 28 countries: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, and UK (see Appendix 1 for details of the country samples). The data set contains information on both cohabitation and marriage. We distinguished between respondents who were not living with a partner (to whom we refer as "single") and those who were cohabiting (married or unmarried) at the time of the interview. We analysed the current union status of respondents who were born between 1950 and 1969 and who were between 40 and 59 years of age at the time of survey. We focused on union status from age 40 onwards to assess the likelihood of union formation, rather than its timing.

The second data source was country-level data on the educational attainment of men and women provided by the International Institute for Applied Systems Analysis/Vienna Institute of Demography (IIASA/VID). The IIASA/VID data provide reconstructions (for the period 1970–2000) and projections (for the period 2005–2050) of the distribution of educational attainment in 5-year intervals for 5-year age groups in a large number of countries. In order to obtain yearly measures, we linearly interpolated the numbers of individuals for the different levels of educational attainment between 1970 and 2000. The data enabled us to approximate the educational composition of the mating market on which respondents were looking for a partner and to include corresponding covariates in our individual-level analysis, as we describe below.

3.3 Measures

3.3.1 Dependent Variable

Our dependent variable has four categories: "living single" (0), "living with a low educated partner" (1), "living with a medium educated partner" (2), and "living with a highly educated partner" (3).

[1] European Social Survey Round 1–6 Data (2002–2012). Norwegian Social Science Data Services, Norway—Data Archive and distributor of ESS data for ESS ERIC.

Our measure of educational attainment was based on the International Standard Classification of Education (ISCED-97), which the ESS employs and which has been harmonized across the different countries and waves that are included in the survey (Schneider 2010). We classified individuals as low educated when they had obtained a degree lower than secondary education (ISCED 1 and 2), medium educated when they completed upper or post-secondary education (ISCED 3 and 4), and highly educated when they completed tertiary education (ISCED 5). This categorization reduces the amount of detail in measuring educational attainment somewhat, but facilitates comparison of countries with different educational systems.

Note that we operationalize assortative mating in terms of the partner's level of education, rather than in terms of homogamy, hypogamy, and hypergamy as done in earlier research. We preferred this approach because the lowest/highest educated cannot form hypogamous/hypergamous unions, respectively. Our categorization also provides more detailed insights into the kind of educational matches that are formed. As a robustness check, we also conducted analyses based on the classification of couples in terms of homogamy, hypergamy, or hypogamy. These analyses yielded results that are consistent with those reported below.

3.3.2 Main Explanatory Variables

Our first explanatory variable was respondent's educational attainment, measured with three categories described above.

The second explanatory variable represented the gender balance in higher education in the country and birth cohort of the respondent. It was measured in the year when the respondent turned 30 years of age, i.e. at an age when the vast majority of individuals has usually completed fulltime education. Specifically, using IIASA/VID data, we calculated for each respondent the sex ratio among highly educated women and men who were about the same age as the respondent in the year in which he/she turned 30. Given that men tend to be 2–3 years older than their female partners, we displaced the male age interval upwards by two years. We thus divided the number of highly educated women who were 25–34 years old (F_{High}) by the number of highly educated men who were 27–36 years old (M_{High}) for the year in which the respondent was 30 years old.[2] We chose to divide the number of women by the number of men (rather than dividing the number of men by the number of women, which is more common in demography), so that an increase in this measure indicates that the number of highly educated women on the mating market increases relatively to that of highly educated men. We took the log of this sex ratio (i.e. $\log(F_{\text{High}}/M_{\text{High}})$) to make the measure symmetric around the value of zero, which represents a balanced mating market. A positive (negative) value means

[2] The IIASA/VID data are based on five-year age groupings (e.g., 25–29 years, 30–34, etc.). We therefore had to approximate the number of highly educated men who were 27–36 years old in a given year. We did so by taking the number of highly educated men of men who were 30–34 years old in a given year and added to this 60% of the number of men who were 25–29 years old and 40% of the number of men who were 35–39 years old.

highly educated women are more (less) numerous than highly educated men. For brevity, we refer to this measure also simply as "the sex ratio".

Note that our sex ratio measure only focuses on the gender imbalance in tertiary education and that we examine how low, medium, and highly educated respondents are affected by this aspect of the mating market. The reason is that in the European context, the important changes in the relative educational attainment of men and women have occurred in the distinction between the college-educated and those with less education. In addition, sex ratios for the highly educated correlate strongly with sex ratios for the medium and the low educated, as illustrated in Appendix 2, Fig. 5. Furthermore, we report in Appendix 2 (Tables 6, 7) the results of a robustness check that used the index of female educational advantage proposed by Esteve et al. (2012) as an alternative measure. This index takes into account all educational categories and not just one category, which would be relevant, for example, if we would want to measure gender inequalities in education among non-Western countries, but may be too broad to capture changes on college-educated mating markets. Despite this difference between the measures, the results from the additional analysis are consistent with the ones from our preferred model specification, reported below.

3.3.3 Control Variables

Parental education is associated with social class. It therefore affects individuals' prospects on the mating market and also tends to affect their partner preferences (Blackwell 1998). We wanted to check whether it is the educational level attained by men and women themselves which matters for educational assortative mating, or that the sorting is rather explained by the parental background, as indexed by father's and mother's attainment level. We therefore controlled for the educational attainment of respondents' parents, using the same operationalization that we used for measuring respondents' own educational attainment. We would expect that children of parents with low educational background would be most likely to match with a partner who has a similarly low attainment level and less likely to match with a partner who has a high educational level. We controlled separately for mother's and father's education since it could be that mother's education matters more for women while father's education matters more for men.

We also controlled for possible cohort effects by including information about respondents' birth cohort in the analysis (dummy coded based on respondents' year of birth in five-year intervals between 1950 and 1969). Finally, we controlled for respondents' age. To facilitate interpretation and to enhance the precision of the estimates, we centred this variable around the age of 40 years.

4 Results

4.1 Descriptive Results

Table 1 shows that the largest share of respondents were married, followed by respondents who were single and respondents who were living in unmarried

Table 1 Descriptive information for male and female respondents, pooled data across all countries

	Men	Women
Partnership status		
Married	72.9%	70.4%
Unmarried cohabitation	7.4%	6.2%
Single	19.6%	23.5%
Single respondents		
Widowed	4.9%	16.9%
Divorced or separated	45.5%	55.4%
Never married	49.6%	27.8%
Education respondent		
Low	24.1%	27.3%
Medium	51.0%	47.8%
High	25.0%	24.9%
Education partner		
Low	25.2%	27.0%
Medium	50.5%	49.2%
High	24.3%	23.8%
Assortative mating		
Hypergamy (M > F)	20.8%	18.0%
Homogamy (M = F)	63.5%	63.8%
Hypogamy (M < F)	15.7%	18.2%
Education father		
Low	56.4%	59.1%
Medium	32.8%	30.4%
High	10.7%	10.5%
Education mother		
Low	69.1%	69.7%
Medium	25.6%	24.8%
High	5.3%	5.5%
Birth cohort		
1950–1954	24.4%	23.5%
1955–1959	29.8%	29.9%
1960–1964	29.1%	29.6%
1965–1969	16.6%	17.5%
Age (range 40–59)		
Mean	48.71	48.59
SD	5.18	5.21
Sex ratio		
Mean	1.02	1.03
SD	0.29	0.29
N weighted	34,921	40,557

cohabitation. More specifically, 72.9% of the men and 70.4% of the women were married, and only 7.4% of the men and 6.2% of the women were living in unmarried cohabitation. The percentage of singles was higher for women (23.5%) than for men (19.6%). This difference is possibly due to the fact that mortality and re-partnering rates are higher for men than for women, especially at older ages. Accordingly, widowhood is more common among women than among men, so that 16.9% of the female singles were widowed, while only 4.9% of the male singles were widowed. Also the percentage of divorced singles was higher among women than among men: 55.4% of the single women and 45.5% of the single men were divorced or separated. Men, on the other hand, were more likely to remain unmarried throughout the life course: 49.6% of the single men were never married, while only 27.8% of the single women were never married.

In all cohorts taken together, of those men and women who were in a union, the majority (about 64% for both sexes) was in a educational homogamous union. About 21% of the men were in a union with a less educated woman while 16% were in a union with a more educated woman. Among women, 18% were with a more educated man and about the same percentage were with a less educated man.

Comparing the educational attainment of respondents and their parents illustrates the rapid expansion of education over the generations. Table 1 shows that about 75% of all respondents and their partners had attained at least medium education. Among their parents, by contrast, only 43% of the fathers and 31% of the mothers had attained at least medium education.

Figure 2 describes the types of unions formed in three different cohorts. The figure plots patterns of educational sorting, separately for respondents born in the 1950s, 1960s, and 1970s. The figure shows that while hypergamy was more common among respondents born in the 1950s, hypogamy was more prevalent among respondents born in the 1970s. Homogamy was dominant across all cohorts.

4.2 Multilevel regression results

Tables 2 and 3 present our estimates of the regression coefficients, standard errors, and variance components of the multilevel multinomial models. Table 2 shows the results for women and Table 3 the ones for men. Next to the models shown in these tables, we also explored alternative versions in which we included different sets of variables (e.g. with and without educational level of father and mother). Different specifications did not result in major changes in the effects of the other variables in the model. We therefore only present the full models that include all predictors. To further clarify the effects of the gender imbalance in higher education on assortative mating, Fig. 3 plots the predicted probabilities for the different outcomes of our multilevel multinomial models against the share of women among the highly educated. A value above 0.5 on the *x*-axis means that the gender imbalance in higher education is reversed to the advantage of women.

Our first set of hypotheses focuses on the level of homogamy for men and women with advanced education, respectively. Hypothesis 1f states that a stronger excess of highly educated women is associated with lower homogamy among them, while Hypothesis 1m formulates the reverse expectation for highly educated men: the

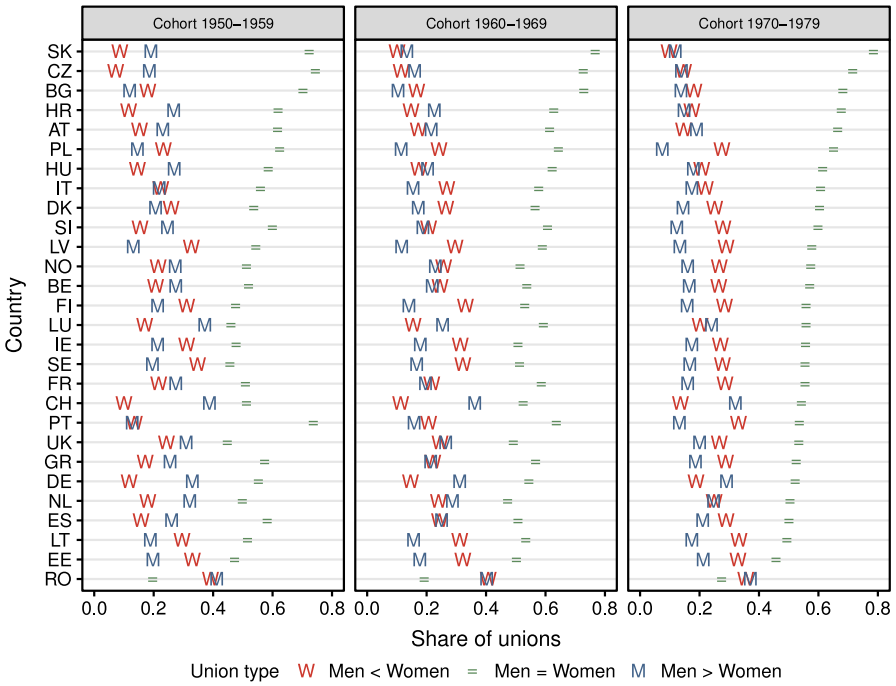

Fig. 2 Share of homogamous (=), hypergamous (M), and hypogamous (W) unions (married or unmarried cohabitation), by birth cohort and country. *Source:* ESS1–6

higher the supply of highly educated women, the stronger homogamy is expected to be among highly educated men. Our results only support the female version of the hypothesis. More precisely, for highly educated women, the odds to be living with a highly educated partner rather than to be living single were not significantly associated with our sex ratio measure: the sign of the estimated coefficient (−0.182) is negative, in line with Hypothesis 1f, but it is not statistically significant. However, if we switch the reference category from being single to being partnered with a medium educated man, the decline of homogamy is statistically significant: with the reversed gender gap in education, the likelihood that a highly educated woman is living with a highly educated partner strongly declined when compared to the rising likelihood that she is living with a medium educated partner. Figure 3 clearly illustrates this: the bottom panel on the right-hand side shows that the probability to match with a highly educated man declined while the probability to match with a medium educated one increased.

For highly educated men, the odds to be living with a highly educated partner, if anything, were slightly lower in countries and cohorts where highly educated women strongly outnumbered male peers, irrespective of whether we compare it with singlehood or with being partnered to a medium educated woman. This runs against Hypothesis 1m, although this result is statistically not significant. All in all, we have no evidence that the female advantage in education is associated with stronger homogamy among men, but we do have evidence that it is associated with

Table 2 Multilevel multinomial logistic regression model of being in union with a low, medium, or highly educated man versus being single (ref.)

Women	Model 1		
	Low	Medium	High
Intercept	1.353**	0.630**	−0.947**
	(.232)	(.203)	(.263)
Age	−0.047	−0.034**	−0.059**
	(.011)	(.010)	(.011)
Cohort (ref. = Cohort 50–54)			
Cohort 55–59	−0.238**	−0.069	−0.242**
	(.091)	(.061)	(.072)
Cohort 60–64	−0.371*	−0.116	−0.464**
	(.182)	(.100)	(.110)
Cohort 65–69	−0.649*	−0.136	−0.574**
	(.258)	(.143)	(.171)
Education father (ref. = low)			
Medium	−0.848**	−0.032	0.099
	(.104)	(.051)	(.064)
High	−1.041**	−0.536**	0.261**
	(.157)	(.056)	(.043)
Education mother (ref. = low)			
Medium	−0.562**	−0.112**	0.108
	(.087)	(.035)	(.062)
High	−0.392**	−0.477**	0.095
	(.144)	(.086)	(.073)
Education (ref. = low)			
Medium	−0.929**	0.611**	1.091**
	(.118)	(.094)	(.132)
High	−2.020**	−0.092	2.078**
	(.211)	(.091)	(.132)
Sex ratio × education			
Sex ratio × low	−0.010	−0.278	−1.187
	(.460)	(.391)	(.619)
Sex ratio × medium	0.401	0.327	−1.074*
	(.429)	(.316)	(.434)
Sex ratio × high	1.386**	1.247**	−0.182
	(.504)	(.309)	(.466)
Variance intercepts	0.910**	0.331**	0.528**
Variance age	<.001	<.001*	<.001
Variance education	0.255**	0.017*	0.048*

Results for *women* in 28 countries in 2002–2012, born 1950–1969, and who were between ages 40–59 at the time of survey

* $p < 0.05$; ** $p < 0.01$ (weighted $n = 36{,}073$)

weaker homogamy among highly educated women, as they partner "down" more often rather than stay single. For women and men alike, homogamy is and remains particularly strong among highly educated women and men, as indicated by the large and statistically significant coefficients for highly educated respondents living

Table 3 Multilevel multinomial logistic regression of being in a union with a low, medium, or highly educated woman versus being single (ref.)

Men	Model 2		
	Low	Medium	High
Intercept	1.213**	0.283	−1.142**
	(.255)	(.179)	(.239)
Age	−0.015	−0.004	−0.026*
	(.012)	(.010)	(.011)
Cohort (ref. = Cohort 50–54)			
Cohort 55–59	−0.307**	−0.034	−0.121*
	(.067)	(.070)	(.053)
Cohort 60–64	−0.470**	−0.132	−0.311**
	(.119)	(.108)	(.098)
Cohort 65–69	−0.574**	−0.181	−0.363**
	(.182)	(.145)	(.134)
Education father (ref. = low)			
Medium	−0.487**	0.063	0.154**
	(.095)	(.040)	(.052)
High	−0.657**	−0.398**	0.360**
	(.124)	(.077)	(.079)
Education mother (ref. = low)			
Medium	−0.919**	−0.007	0.179**
	(.104)	(.036)	(.059)
High	−0.547**	−0.285*	0.405**
	(.149)	(.117)	(.089)
Education (ref. = low)			
Medium	−0.632**	0.936**	1.089**
	(.086)	(.092)	(.113)
High	−1.458**	0.654**	2.542**
	(.145)	(.113)	(.165)
Sex ratio × education			
Sex ratio × low	−1.306**	−0.165	−0.339
	(.383)	(.310)	(.353)
Sex ratio × medium	−1.767**	−0.209	0.015
	(.397)	(.248)	(.377)
Sex ratio × high	−2.093**	−0.468	−0.550
	(.460)	(.338)	(.399)
Variance intercepts	0.888**	0.256**	0.656**
Variance age	<.001	<.001	<.001
Variance education	0.133**	0.041*	0.095**

Results for *men* in 28 countries in 2002–2012, born 1950–1969, and who were between ages 40–59 at the time of survey

* $p < 0.05$; ** $p < 0.01$ (weighted $n = 31{,}216$)

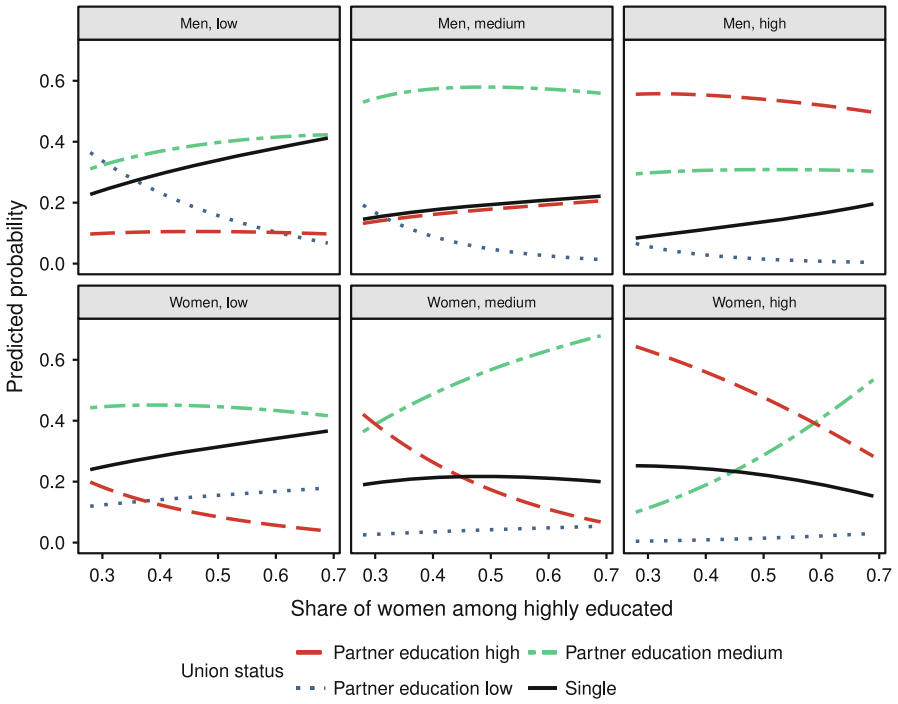

Fig. 3 Model-based predicted probabilities of being in a union (married or unmarried cohabitation) with a low, a medium, a highly educated partner or being single for low, medium, and highly educated men (*top row*) and low, medium, and highly educated women (*bottom row*) against the share of females among the highly educated. *Note:* Age is fixed at 40, cohort = 1965–69, and educational level of mother and father = medium

with a highly educated partner (2.078 and 2.542 for female and male respondents, respectively).

While we did not formulate a hypothesis about homogamy among the less educated, we do find a statistically significant result for low educated men. For these men we find that the chance of being in a homogamous union was negatively related to our sex ratio measure. That is, as the share of women with an advanced degree increases, the likelihood that a low educated man is living with an equally low educated woman decreases.

The second set of hypotheses focuses on heterogamy: we expect that a female advantage in education is associated with less hypergamy and more hypogamy. Hypothesis 2f states that women are expected to be less likely to be with a man who has more education than she, but more likely to be with a man who has less education, as the sex ratio among the higher educated is more strongly skewed to the advantage of women. The results indeed support this hypothesis: the parameters for Model 1 indicate that our sex ratio measure tends to be negatively associated with the likelihood that a woman is living with a male partner who has more education and positively with living with a male partner who has less education than her. The statistically significant parameters relate to the lower likelihood of medium

educated women to live with a highly educated partner (−1.074) and the higher likelihood of highly educated women to live with a low (1.386) or medium (1.247) educated partner.

For men, Hypothesis 2m states that a female advantage in education is associated with a lower likelihood to live with a less educated partner and a higher likelihood to live with a more educated partner. This is only partly supported by the results of Model 2 in that the sex ratio is only associated in a statistically significant way with the odds to be living with a low educated woman. As the relative number of highly educated women increases, medium and highly educated men were less likely to partner with a low educated woman, indicating a weakening of hypergamy. The other coefficients, relating to partnering with medium or highly educated women, are statistically not significant. If anything, for low educated men, women's increased advantage in education is associated with a lower chance to partner "up". Even if the latter results are statistically not significant, they seem to go against the significant finding from Model 1 that highly educated women are more likely to be with a medium or low educated partner. We come back to this apparent contradiction in the discussion.

Figure 3 further clarifies the observed mating patterns. The results for male respondents are shown in the upper row of panels. They indicate that with an increasing number of highly educated women on the mating market, the probability that men were living single increased, especially among the low educated. Furthermore, the probability of being partnered with a low educated woman decreased with the growing advantage of women in education.

The lower row of panels in Fig. 3 displays the results for female respondents. They show that the probability that a highly educated woman is matched with a highly educated man decreases as the share of women among the highly educated increases. Rather than staying single more often, highly educated women clearly partnered more often with medium educated men. For medium and highly educated women, any decrease in the probability to be partnered to a highly educated man was compensated by an increase in the probability to be partnered with a medium educated man rather than by a higher risk of remaining single. The probability to be single increased only among low educated women. Among highly educated women, the likelihood to be single decreased slightly. All in all, we do not find evidence that women refrain from union formation rather than partnering downwards when faced with a shortage of highly educated men. Instead, women seem to adjust their mate choice according to the mating market opportunities and partner down more often. However, the probability that a highly educated woman partnered with a low rather than medium educated man remained very low.

Looking at the estimates for the other covariates in Tables 2 and 3, the effects of education confirm that the tendency towards homogamy remains generally strong. The likelihood of being in a union with a highly educated partner was clearly the highest for highly educated respondents, the likelihood of being with a medium educated partner was the highest for medium educated respondents, and the likelihood of being with a low educated partner was the highest for low educated respondents. Furthermore, we observe that a heterogamous union with a medium educated woman was more likely for a highly educated than for a low educated

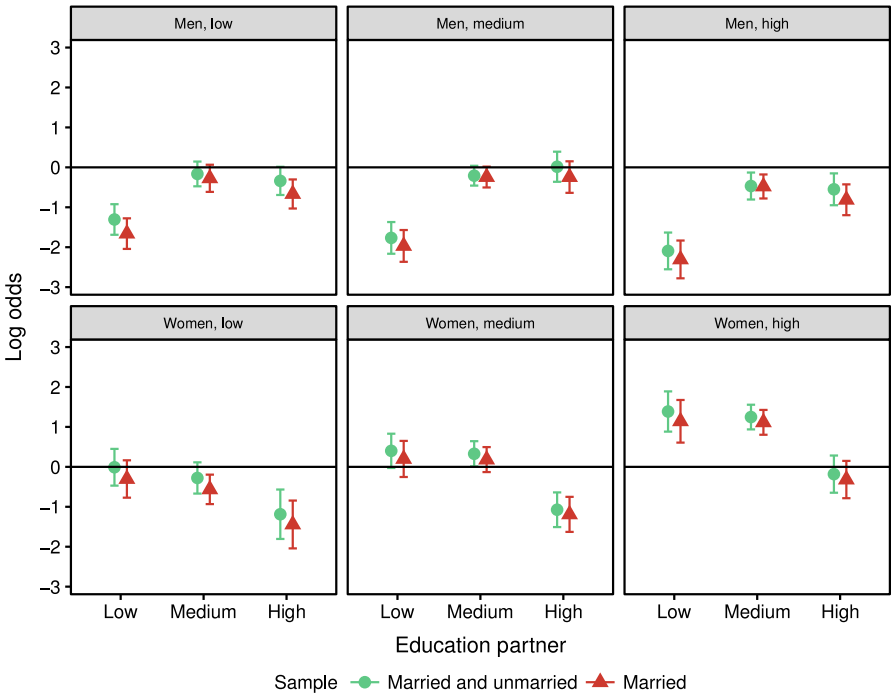

Fig. 4 Effects of the log of the sex ratio for the highly educated on the log odds of being in a union (married or unmarried cohabitation) with a low, a medium, or a highly educated partner versus being single (*bullet points*) and the effects of the log of the sex ratio for the highly educated on the log odds of being married to a low, a medium, or a highly educated partner versus being single (*triangles*). *Source:* ESS1–6. (Color figure online)

male respondent. This is still in line with traditional hypergamy. For female respondents, in contrast, we see that the tendency to be living with a medium educated partner did not differ in a statistically significant way between highly and low educated women.

In addition to the effects of own level of educational attainment, there are significant effects of both fathers' and mothers' educational levels on educational sorting. Men were less likely to partner with somebody with a lower educational level than their father and mother. Compared to women with low educated parents, women with medium or highly educated parents were less likely to be in a union with a low or medium educated man. When we excluded the variables related to parental education from the model (results not shown here), the results for the other variables remained largely the same. The major difference was the following: while the effect of our sex ratio measure for female respondents with low education on the odds to be living with a highly educated partner was negative but not statistically significant in Model 1 presented in Table 2, it did turn significant and a bit stronger after excluding parental education ($b = -1.325$; $p < .05$). This suggests that the negative effect for women of low education on partnering with a highly educated man has an intergenerational aspect, perhaps related to the low social class

background of these women. There are no indications that it is the mother's or the father's education that matters for male or female respondents in particular. Both play a role for men and women.

For the other control variables, the negative sign of the parameter estimate for age in the sample of women implies that older women were less likely to be in a union, controlling for cohort. Furthermore, the coefficients for age indicate that older women were less likely to live with a medium or a highly educated man (rather than being single). For men, only the likelihood to be living with a highly educated woman decreased with age. Finally, the coefficients for birth cohort, comparing more recent cohorts to the reference cohort born between 1950 and 1954, are all negative. This implies that members of more recent cohorts were less likely to be living with any partner.

We repeated the foregoing analyses with a focus on married couples, to assess how robust the results were to the exclusion of unmarried cohabitation. Figure 4 plots the sex ratio effects on being in a union (in the form of married or unmarried cohabitation) and the sex ratio effects on being married. The figure illustrates that there were no substantive differences between the results of the two analyses. Yet, the fact that the estimates for union formation are situated somewhat higher than the estimates for marriage shows that the likelihood of being married is somewhat smaller than the likelihood of being in a union.

5 Conclusion and Discussion

In twentieth-century Europe, the dominant pattern of educational assortative mating was that women tended to be at most as highly educated as their husbands. This traditional pattern was compatible with the gender imbalance in higher education in favour of men. This gender gap started to diminish in the 1970s, and turned to the advantage of women in the mid-1990s. With more highly educated women than men entering the mating market, the old pattern of female educational hypergamy and male hypogamy could clearly not persist. Therefore, this study set out to investigate how the new gender imbalance in higher education has affected patterns of educational assortative mating in Europe.

Given that men and women face different constraints in encountering potential partners with a given level of education, we formulated gender-specific hypotheses. With respect to homogamy, we expected that the excess of highly educated women would be associated with less homogamy among highly educated women and more homogamy among highly educated men. We found support for the hypothesis about women but not for the one about men. As highly educated women came to outnumber highly educated men, the former more often chose a partner with less education rather than to stay single, so the likelihood of forming a homogamous match declined for highly educated women. For highly educated men, our estimate of the effect of the reversed gender gap is negative as well, indicating a weakening of homogamy, which runs against expectations, but it is not statistically significant. For women and men alike, the tendency for homogamy is and remains strong, particularly among the highly educated.

The finding that the tendency for homogamy among highly educated men is not reinforced by the reversed gender gap is surprising, as partner search theory leads us to expect that highly educated men would represent ever more desirable matches, making it more likely for them to find a similarly educated match. Yet, what we find instead is that highly educated men show a declining tendency to be living with a partner of *any* level of educational attainment. This finding could be explained by a decreasing inclination among highly educated men to commit to any partner, as they are in high demand and are in the position to wait and see whether a more attractive partner comes along. This finding is therefore more in line with the prediction made for men by Guttentag and Secord (1983) in case of an oversupply of women, rather than by the predictions based on the marital search theory that informed our hypothesis.

While we did not develop a priori hypotheses for homogamy among people with less education, our results indicated that low educated men partner less often with low educated women in countries and cohorts where women largely outnumber men in higher education. In fact, we found a general tendency among men to partner less often with low educated women. This might be the result of a general decline in the number of low educated women on the mating market, but it might also be caused by an increase in men's preferences for better educated women.

With respect to heterogamy, we expected that the reversed gender gap in education would be associated with a lower tendency for hypergamy and more hypogamy. This expectation was largely supported by the data. Among women, the reversed gender gap was found to be associated with a higher likelihood of making hypogamous and a lower likelihood of making hypergamous matches. With an increasing number of highly educated women on the mating market relative to men, medium educated women partner less often with highly educated men and highly educated women partner more often with medium or low educated men. This suggests that, in Europe, medium and highly educated women tend to adjust to the demographic reality on the mating market rather than adhering to the traditional norm where he was supposed to have at least as much education as she.

The results for male respondents also point to a weakening of hypergamy: medium and highly educated men partner less often with low educated women. Yet, on the other hand, we did not find evidence that low or medium educated men became more likely to partner with women who have attained a higher educational level. Hence, the results may sound contradictory for women and men: as women increasingly outnumber men among the highly educated, we find a stronger tendency to partner "down" among highly educated women; however, among men, we do not find the corresponding stronger tendency to partner "up". There may be several reasons for this. One reason is that male and female respondents may find a partner outside the population covered by our sample, for example in younger or older cohorts. Another reason is that singlehood may vary between men and women depending on the level of educational attainment. The results of our multinomial model suggest that this may indeed apply: highly educated women tend to react to the reversed gender gap in education by partnering down, while low educated men (rather than partnering up) tend to stay single more often. Finally, our results are also subject to sampling error. Nevertheless, all results of our multilevel analysis are

consistent with the conclusion that the reversed gender gap in education is associated with more hypogamous and less hypergamous unions. This is also consistent with the aggregate patterns of homogamy and heterogamy across cohorts depicted in Fig. 2.

When interpreting the foregoing results, it is important to keep in mind that we focused on the current union status (i.e. at the time of data collection). Our results are therefore affected by patterns of union formation as well as by patterns of union dissolution (Schwartz and Mare 2012). While unions have become less stable over time, older cohorts have been exposed longer to the risk of union dissolution. A number of studies have reported that marriages in which the wife is more educated than the husband have the highest risk to dissolve (Bumpass, Martin, and Sweet 1991; Clarkwest 2007; Schwartz 2010), but this difference seems to decline in recent cohorts, at least in the USA (Schwartz and Han 2014). If divorce and separation are particularly likely among hypogamous couples, we might have underestimated women's likelihood of entering a hypogamous union. With the data that we have used in the current study, we cannot assess to what extent this might have affected our results.

Apart from the educational composition of mating markets, there are many country-specific factors that might influence educational assortative mating and that are omitted from our analysis. Future research could provide further insights based on detailed country comparisons that take specific cultural and temporal differences into account. One factor is that the pace and timing of the reversal of the gender gap in education differs by country, as shown in Fig. 1. It might be the case that men's and women's partnering behaviour responds differently to shifts in the sex ratio among the highly educated depending on whether the reversed gender gap is recent or has been there for a long time. Since we were looking at relatively recent cohorts, where the gender gap in higher education was already reversed in half of the countries at the beginning of the observation period, we were unable to address such more long term factors. But the fact remains that the tendency for hypogamy is positively associated with a female advantage in education across cohorts and countries (i.e. the level at which the sex ratio among the highly educated was measured). One explanation for this is that the social status attached to having a tertiary degree may vary considerably between the countries included in our analysis. It could be that highly educated women are more likely to partner "down" in countries and cohorts where highly educated women outnumber male peers because education matters less for socio-economic status than other factors such as occupation. This remains to be investigated. Future studies should also try to include explicit measures of partnering preferences, since men's and women's partnering preferences may also correlate with the gender balance in education.

While our study is unable to shed light on the micro- and macro-level mechanisms responsible for it, our results do show that changes in the relative educational attainment among men and women have had important implications for observed macro-level patterns of assortative mating. We have shown that educational hypogamy has become more prevalent than hypergamy, confirming a pattern found on the macro-level and on a broader geographical scale by Esteve et al. (2012). The latter study did not include singles, while our study did. Our

results suggest that, in contrast to what might be expected, the reversed gender gap in education is not associated with a higher risk of singlehood among highly educated women. Rather than staying single more often, women choose to partner with men with lower educational attainment. It is rather men who are staying single more often. The latter falls out of the focus of this paper but merits further investigation.

The decline of hypergamy and the rise of hypogamy are bound to have important implications for family dynamics in the twenty-first century. While husbands were typically expected to be the main contributors to the family income in the past, the proportion of families where the wife is the main earner may be expected to rise, even if men tend to select more lucrative fields of education and even if the motherhood penalty on women's relative earnings remains high (Klesment and Van Bavel 2015). For couples where the wife has a higher earning potential than the husband, the balance of income effects and opportunity costs involved in childbearing decision may change (Van Bavel 2012).

All in all, our results are consistent with the view that, along with the reversal of the gender gap in education, advanced education has become a bonus for women on the mating market, more in line with what was already the case for men. While women with advanced education were less likely to be in a union than women with less education in older cohorts, the situation has reversed in more recent cohorts. The position of less educated men on the mating market was already unfavourable and got worse with the reversal of the gender gap in education. Participation in advanced education has expanded so much in Europe that the low educated women and men alike represent a group which is increasingly negatively selected. It could be that low educated women and men increasingly face difficulty in partnering "up", or even finding a partner at all, not so much because of their low degree as such in absolute terms but rather because of their unfavourable relative position in the population's education distribution.

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Appendix 1: Number of Cases by Gender and Country

See Tables 4 and 5.

Table 4 Number of female respondents per country and ESS round

Country	ESS1	ESS2	ESS3	ESS4	ESS5	ESS6	Total
AT	402	468	534	0	0	0	1404
BE	228	256	314	309	296	283	1686
BG	0	0	292	493	441	387	1613
CH	281	292	323	378	267	235	1776
CZ	179	443	0	399	387	284	1692
DE	422	455	499	531	522	479	2908
DK	170	210	226	293	259	237	1395
EE	0	288	248	296	321	374	1527
ES	189	208	273	396	294	277	1637
FI	251	249	259	366	267	303	1695
FR	238	297	351	379	308	0	1573
GR	369	389	0	476	543	0	1777
HR	0	0	0	291	283	0	574
HU	195	258	279	266	266	0	1264
IE	314	422	300	333	449	431	2249
IT	205	240	0	0	0	0	445
LT	0	0	0	0	349	0	349
LU	179	217	0	0	0	0	396
LV	0	0	0	418	0	0	418
NL	378	356	355	367	404	318	2178
NO	236	251	276	246	227	238	1474
PL	266	234	260	259	272	273	1564
PT	195	305	403	435	407	397	2142
RO	0	0	0	441	0	0	441
SE	194	247	285	275	242	239	1482
SI	192	191	258	219	257	207	1324
SK	0	200	277	327	350	317	1471
UK	236	252	367	429	446	373	2103
Total	5319	6728	6379	8622	7857	5652	40,557

Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), United Kingdom (UK)

Table 5 Number of male respondents per country and ESS round

Country	ESS1	ESS2	ESS3	ESS4	ESS5	ESS6	Total
AT	344	343	415	0	0	0	1102
BE	223	230	262	303	249	265	1532
BG	0	0	181	344	381	301	1207
CH	273	280	297	285	262	212	1609
CZ	182	417	0	364	375	336	1674
DE	365	385	485	560	523	463	2781
DK	178	197	250	269	282	255	1431
EE	0	205	194	236	218	281	1134
ES	162	195	251	375	279	238	1500

Table 5 continued

Country	ESS1	ESS2	ESS3	ESS4	ESS5	ESS6	Total
FI	235	249	261	364	299	318	1726
FR	189	245	332	348	293	0	1407
GR	218	268	0	328	320	0	1134
HR	0	0	0	229	273	0	502
HU	210	161	187	241	228	0	1027
IE	232	245	243	283	293	316	1612
IT	165	222	0	0	0	0	387
LT	0	0	0	0	173	0	173
LU	165	239	0	0	0	0	404
LV	0	0	0	259	0	0	259
NL	293	250	285	351	316	315	1810
NO	278	264	297	287	261	261	1648
PL	256	230	251	254	265	257	1513
PT	149	207	243	266	249	211	1325
RO	0	0	0	327	0	0	327
SE	219	252	248	270	202	237	1428
SI	168	163	192	183	213	179	1098
SK	0	210	236	296	313	278	1333
UK	233	244	323	384	367	285	1836
Total	4737	5701	5433	7406	6634	5008	34,919

Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), United Kingdom (UK)

Appendix 2: Index of Female Educational Advantage and Education-Specific Sex Ratios

Esteve et al. (2012) proposed a measure to examine the connection between the increase in women's educational attainment relatively to men's and the decrease in hypergamy: the index of female educational advantage (F). This index represents the probability that the educational attainment of a woman picked randomly from the population is higher than the education of a man picked randomly from the population. It is defined as

$$F = \frac{p_f^3\left(p_m^1 + p_m^2\right) + p_f^2 p_m^1}{1 - \left(p_f^1 p_m^1 + p_f^2 p_m^2 + p_f^3 p_m^3\right)},$$

where p_f^h and p_m^h are, respectively, the proportions of women and men in educational category h (with 1 = low, 2 = medium, and 3 = high). As this index is a probability measure, it takes on values between zero and one. When $F = 0.5$, the educational distributions for women and men are identical, while values above/below 0.5 indicate a higher/lower level of education for women than for men.

Figure 5 illustrates the changes in the relative educational attainment of men and women between 1980 and 2000 by country, and plots the education-specific sex ratios and the index of female educational advantage among 25–34-year-old women

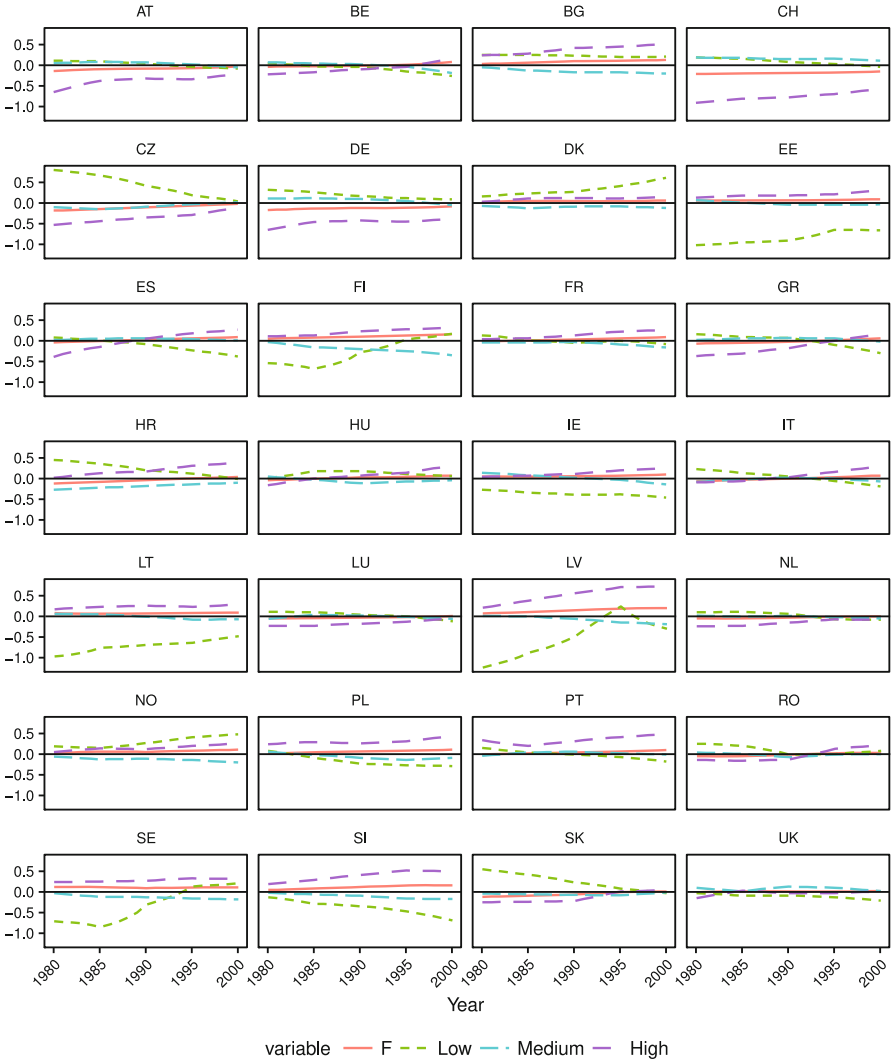

Fig. 5 Log of the sex ratio for the low, medium, and highly educated and the index of female educational advantage (*F*) based on the numbers of women aged 25–34 and men aged 27–36 years between 1980 and 2000. *Source*: IIASA/VID. (Color figure online)

and 27–36-year-old men, based on the IIASA/VID data. The green dotted line represents the log of the sex ratio (number of females divided by the number of males) for the low educated. The blue dash dotted line represents the log of the sex ratio for the medium educated and the purple dashed line represents the log of the sex ratio for the highly educated. The solid red line represents the index of female educational advantage, centred around the value zero (i.e. by $F - .5$). As a result, a value above 0 on the *y*-axis for the education-specific sex ratios and the index of

Table 6 Multilevel multinomial logistic regression model of being in union with low, medium, or highly educated men versus being single (ref.)

Women	Model 5		
	Low	Medium	High
Intercept	1.371**	0.638**	−0.934**
	(.222)	(.203)	(.269)
Age	−0.045	−0.034**	−0.058**
	(.012)	(.010)	(.010)
Cohort (ref. = Cohort 50–54)			
Cohort 55–59	−0.272**	−0.065	−0.262**
	(.080)	(.063)	(.071)
Cohort 60–64	−0.434**	−0.111	−0.500**
	(.149)	(.102)	(.107)
Cohort 65–69	−0.769**	−0.131	−0.625**
	(.213)	(.144)	(.170)
Education father (ref. = low)			
Medium	−0.845**	−0.030	0.102
	(.104)	(.051)	(.064)
High	−1.038**	−0.535**	0.264**
	(.157)	(.056)	(.044)
Education mother (ref. = low)			
Medium	−0.564**	−0.111**	0.108
	(.087)	(.035)	(.062)
High	−0.393**	−0.476**	0.096
	(.144)	(.086)	(.073)
Education (ref. = low)			
Medium	−0.946**	0.606**	1.096**
	(.117)	(.095)	(.130)
High	−2.059**	−0.122	2.064**
	(.204)	(.099)	(.135)
Index (F) centred × education			
Index (F) × low	1.536	−1.434	−2.298
	(1.969)	(1.541)	(2.415)
Index (F) × medium	4.559*	0.945	−2.411
	(2.123)	(1.202)	(1.740)
Index (F) × high	8.427**	4.247**	0.383
	(2.358)	(1.270)	(1.671)
Variance intercepts	0.908**	0.343**	0.617**
Variance age	<.001	<.001*	<.001
Variance education	0.239**	0.023*	0.058**

Results for *women* in 28 countries in 2002–2012, born 1950–1969, and who were between ages 40–59 at the time of survey

* $p < 0.05$; ** $p < 0.01$ (weighted $n = 36{,}073$)

Table 7 Multilevel multinomial logistic regression of being in a union with low, medium, or highly educated women versus being single (ref.)

Men	Model 6		
	Low	Medium	High
Intercept	1.222**	0.274	−1.138**
	(.245)	(.179)	(.225)
Age	−0.016	−0.005	−0.026*
	(.012)	(.010)	(.011)
Cohort (ref. = Cohort 50–54)			
Cohort 55–59	−0.291**	−0.019	−0.134**
	(.063)	(.068)	(.050)
Cohort 60–64	−0.450**	−0.106	−0.333**
	(.106)	(.100)	(.087)
Cohort 65–69	−0.530**	−0.135	−0.399**
	(.163)	(.133)	(.113)
Education father (ref. = low)			
Medium	−0.488**	0.062	0.154**
	(.095)	(.040)	(.052)
High	−0.656**	−0.398**	0.360**
	(.124)	(.076)	(.079)
Education mother (ref. = low)			
Medium	−0.917**	−0.006	0.179**
	(.103)	(.036)	(.059)
High	−0.548**	−0.285*	0.407**
	(.148)	(.117)	(.089)
Education (ref. = low)			
Medium	−0.627**	0.940**	1.081**
	(.086)	(.089)	(.123)
High	−1.450**	0.670**	2.555**
	(.150)	(.111)	(.171)
Index (F) centred × education			
Index (F) × low	−5.249**	−1.087	0.791
	(1.640)	(1.363)	(1.516)
Index (F) × medium	−7.120**	−1.684	0.957
	(1.668)	(1.114)	(1.489)
Index (F) × high	−8.319**	−2.591	−1.544
	(1.954)	(1.387)	(1.579)
Variance intercepts	0.840**	0.259**	0.**
Variance age	<.001	<.001	<.001
Variance education	0.144**	0.039*	0.095**

Results for *men* in 28 countries in 2002–2012, born 1950–1969, and who were between ages 40–59 at the time of survey

* $p < 0.05$; ** $p < 0.01$ (weighted $n = 31{,}216$)

female educational advantage means that the gender balance in education is to the advantage of women. The index of female educational advantage ranges from −0.5 to 0.5, whereas the education-specific sex ratios have no limit.

Consistent with the enrolment data depicted in Fig. 1 in the main part of the article, the sex ratio among the highly educated and the index of female educational advantage increased in all countries, such that by 2000 the gender imbalance in education had turned around in all countries, except for Switzerland, Germany, and Austria. The sex ratio for the low and medium educated show no clear trend. Since the goal of this paper is to capture the consequences of this overwhelming increase in female educational attainment, we limited the sex ratio measure to that for higher education. Moreover, there is some incongruence in the operationalization of the low and medium educated in the two data sources. The IIASA/VID data comprise information about four educational categories: no education, primary education (ISCED 1), secondary education (ISCED 2, 3, and 4), and tertiary education (ISCED 5), while we preferred to classify respondents in the ESS data as low educated when they had obtained a degree lower than secondary education (ISCED 1 and 2), medium educated when they completed upper or post-secondary education (ISCED 3 and 4) and highly educated when they completed tertiary education (ISCED 5). In other words, in the IIASA/VID data the low educated includes only men and women with a degree less than lower secondary, which is a very small proportion of the population in most European countries. The incongruence in the operationalization also applies to the measurement of the index of female educational advantage. This is one additional reason why we prefer the results based on the sex ratio for the highly educated.

Despite our clear preference for our sex ratio measure, we assessed the sensitivity of our results to the choice of the mating market measure used. Tables 6 and 7 present the results of the multinomial multilevel models for women and men, respectively, using the index of female educational advantage instead of the sex ratio for the highly educated. We centred the index of female educational advantage around zero, so that a value of zero represents an equal educational distribution for women and men. A positive value indicates that the gender balance in education has reversed to the advantage of women. The only difference we observe between the results based on the sex ratio for the highly educated and the results based on the index of female educational advantage is that when using the index of female educational advantage the likelihood for medium educated women of being partnered with low educated men becomes significant, while their likelihood of being partnered with a highly educated men is not significant anymore. The direction of both effects and, thus, the interpretation remains the same. Gains in women's educational attainment relative to men's increase the likelihood that medium educated women partner with a low educated man and decrease the likelihood that medium educated women partner with highly educated men.

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