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Divorce and Diverging Poverty Rates: A Risk-and-Vulnerability Approach

Objective: This study offers a new approach to analyzing life course inequalities and applies it to the link between divorce and poverty.

Background: Previous research has suggested that divorce drives cumulative inequality between education groups during the life course. Two pathways play a role in this process: the educational gradient in the risk of divorce and the educational gradient in economic vulnerability to divorce. Both pathways should be studied simultaneously to understand how divorce drives inequality.

Method: The authors used administrative data from the Netherlands, following the marriage cohorts 2003 to 2005 (N = 179,018) during a period of 10 years. Decomposition analyses estimated the contributions of the gradients in divorce risk and vulnerability to poverty differences during the life course.

Results: In the 10 years following marriage, the fraction of the educational difference in poverty explained by divorce was 12% in the overall population and 26% in mothers. Among childless men and women, divorce increased poverty differences due mainly to greater economic vulnerability of the lower educated. Among mothers, divorce increased poverty differences due to both higher risk and greater vulnerability of the lower educated. Among fathers, divorce was unrelated to poverty.

Conclusion: Divorce is a major driver of cumulative inequality during the life course.

Divorce rates in Europe and the United States have increased markedly during the past half century and have stabilized at high levels (Amato & James, 2010; Kennedy & Ruggles, 2014). A growing literature links divorce to economic inequality (Haskins, 2015; Lundberg, Pollak, & Stearns, 2016; McLanahan, 2004). Implicit in this literature is the idea that higher educated individuals are concentrated in an advantageous life course trajectory of postponed family formation and marital stability. Lower educated individuals, in contrast, are concentrated in an adverse trajectory of early family formation and divorce. Consequently, higher educated individuals are believed to accrue the continuous economic benefits of a stable marriage, whereas lower educated individuals are believed to incur prolonged economic losses following divorce.

These arguments suggest that divorce is a driver of cumulative inequality between education groups during the life course (Dannefer, 1987; Ferraro & Shippee, 2009). One pathway

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in this process is the educational gradient in the risk of divorce, as lower educated individuals are more likely to experience a divorce (Härkönen & Dronkers, 2006; Martin, 2006). Another pathway is the educational gradient in vulnerability to divorce, as lower educated individuals may be more likely to fall into poverty following divorce (Smock, 1994; Vandecasteele, 2010).

However, existing literature has not fully addressed the degree to which divorce drives the life course divergence in poverty rates. Previous studies have focused either on stratified risk or on stratified vulnerability, but not on both pathways. A focus limited to risk ignores the possibility of unequal consequences of divorce for poverty. Conversely, a focus limited to vulnerability ignores the possibility of an unequal risk of divorcing in the first place.

The present study is the first to assess both pathways simultaneously, resulting in a fuller picture of how divorce contributes to the life course divergence in poverty rates between education groups. We introduce an approach that accounts for both the gradient in divorce risk and the gradient in divorce vulnerability. We then applied this approach to longitudinal administrative data from the Netherlands to examine how educational differences in both pathways contributed to poverty divergence between education group throughout the early and middle stages of the adult life course. The main benefit of these administrative data compared to survey data is the absence of (selective) attrition, addressing a problem faced by many studies on divorce and poverty. Moreover, the large case numbers and long observation window allowed us to analyze differences across important subgroups. We investigated the role of divorce in poverty divergence not only for the overall population but also separately for mothers, fathers, childless women, and childless men.

Our study has implications for policy and for stratification research in general. If poverty rates diverge because of an educational gradient in risk, this could warrant policies that address the reasons behind elevated divorce risks in lower educated individuals or that weaken the overall link between divorce and poverty. If poverty rates diverged because of an educational gradient in vulnerability, this could warrant policies that protect lower educated divorcees from falling into poverty or that alleviate divorce-inducing strains in general. Furthermore, the distinction between risk and vulnerability easily extends to

other research on the role of critical life events in generating social inequalities.

Theoretical Background
Divorce and Poverty

Divorce implies changes of great economic significance. The most important change concerns the loss of partner income. Most partners partially pool their incomes during marriage (Heimdal & Houseknecht, 2003), and access to this income is barred upon divorce. Another change concerns the loss of economies of scale. These amount to almost one third of the total expenditures compared to singles (Browning, Chiappori, & Lewbel, 2013). Divorce poses an additional challenge when children are involved. Their cost of living is primarily borne by the resident parent.

Numerous empirical studies have demonstrated the economic consequences of divorce for men and women with and without children (e.g., Hoffman & Duncan, 1988; Holden & Smock, 1991; Kalmijn, 2005; Leopold & Kalmijn, 2016; Poortman, 2000; Tach & Eads, 2015). Men tend to experience little changes in their economic situation. They might be more likely to receive unemployment or disability benefits following divorce, but these effects are short lived. Spousal alimony and child support typically consume only a small part of their incomes. Women, in contrast, rely heavily on partner income. When children are involved, they also become the resident parents in the large majority of cases. Increases in employment or the receipt of child support are usually insufficient to compensate for the loss of partner income. Hence, women experience sizable drops in household income, per capita income, and income-to-needs ratios. As a consequence, many women and especially mothers fall into poverty following divorce.

Economic losses, and in particular falling below the poverty line, pose a serious threat to the well-being of families. Income poverty is closely related to material deprivation. Average rates of income poverty are similar to those of subjective poverty and material deprivation, individual income poverty is a good predictor of material hardship, and poor households are much more exposed to moderate and extreme deprivation than nonpoor households (Bradshaw & Finch, 2003; Willitts, 2006). Income poverty

is also related to a range of other adversities. Among adults, poverty has been associated with lower emotional well-being, more signs of depression, poorer self-rated health, and higher mortality rates among adults (Backlund, Sorlie, & Johnson, 1999; Kahneman & Deaton, 2010; Kennedy, Kawachi, Glass, & Prothrow-Stith, 1998; Mackenbach et al., 2004; Martikainen, Adda, Ferrie, Smith, & Marmot, 2003). Among children, poverty has been associated with poorer parent-rated and self-rated health, fewer years of completed schooling, and lower earnings in adulthood (Currie, Shields, & Price, 2007; Duncan, Yeung, Brooks-Gunn, & Smith, 1998; Duncan, Ziol-Guest, & Kalil, 2010). These studies have shown that the effects of economic losses are strongly nonlinear. Income losses entail increasingly more adversities as one moves down the income distribution, whereby falling into poverty is particularly detrimental.

For these reasons, researchers and policymakers interested in addressing economic inequalities have paid specific attention to poverty. Welfare policies aimed at reducing poverty are widespread: Housing benefits, subsidized services, family allowances, social insurance, and income tax credits are common across the industrialized world (Kenworthy, 1999). Family policies also aim at reducing poverty. This is particularly the case in Anglo-Saxon countries such as the United States, but also in continental European countries such as the Netherlands and Switzerland (Thévenon, 2011). In light of the adversities associated with poverty and its relevance for policy, the current study focused on poverty as the main outcome of interest. In additional analyses, we looked at the entire income distribution to complete the picture.

The links between divorce and poverty vary across the life course. Although in many countries poverty rates are fairly stable by age, transitions in and out of poverty fluctuate more and are particularly common during the early and middle stages of the adult life course (Kangas & Palme, 2000; Rank & Hirschl, 1999). As divorce has become a common experience in these life course stages, we consider social inequality in divorce risk and divorce vulnerability as a driver of divergence in poverty rates between education groups during the life course. Only consideration of both pathways allows us to assess the extent to which divorce drives divergence in poverty rates. Limiting the study to the risk gradient would assume that divorce consequences are

equal across education groups, ignoring differential vulnerability, whereas limiting the study to the vulnerability gradient would condition the population on divorcees, ignoring the differential risk of divorcing in the first place.

In this study, we defined inequalities along educational lines because education is a relatively stable indicator of social status during the adult life course in contrast to other indicators such as employment status, income, or occupational prestige. Moreover, educational attainment is less endogenous to divorce than these alternative indicators (Ross & Wu, 1996).

Educational Gradient in Risk

Goode (1962, 1963) has provided an explanation as to why the risk of divorce differs between socioeconomic strata. His core premise is that marriages in lower strata experience more internal strain. Such strain could stem from economic hardship, problems in the social network, or greater substance abuse, among other things (Trail & Karney, 2012). As long as the normative barriers to divorce are sufficiently low, the marital strain of lower strata should express itself in the form of higher divorce rates. The result would be a negative gradient in divorce risk, whereby lower strata are more likely to divorce.

Empirical evidence supports Goode's prediction. Normative barriers to divorce are an important explanation of variation in the educational gradient in divorce across countries (Härkönen & Dronkers, 2006; Matysiak, Styrc, & Vignoli, 2014). In those countries in which barriers to divorce are lower, as indicated by higher divorce, extramarital childbearing, cohabitation, and female labor market participation rates, the educational gradient in divorce risk is more negative.

Studies have further shown that, currently, most countries exhibit a negative gradient in divorce risk. Lower educated individuals are at a higher risk of divorce in Germany (Cooke, 2006), Finland (Jalovaara, 2003), Japan (Raymo, Bumpass, & Iwasawa, 2004), the Netherlands (De Graaf & Kalmijn, 2006), South Korea (Park & Raymo, 2013), the United Kingdom (Berrington & Diamond, 1999), and the United States (Martin, 2006), among other countries. In most countries, this negative gradient is substantial. For example, of all U.S. women married between 1990 and 1994, 14% of those with a master's degree divorced within 10 years compared with

38% of those who completed high school and 46% of those without a high school diploma (Martin, 2006).

The role of parenthood in the risk gradient has not been examined in these studies. It therefore remains unclear whether the risk gradient varies between parents and childless couples. With an eye on the economic consequences of divorce, this is an important question, as growing up in poverty entails long-term consequences for both adults and their children.

Educational Gradient in Vulnerability

A negative educational gradient is also expected for vulnerability to divorce in terms of falling into poverty. First, lower educated individuals are overrepresented in the lower tail of the income distribution. The loss of partner income therefore disproportionately increases their probability of falling below the poverty line. Second, lower educated individuals have poorer prospects of economic recovery from divorce. The two main recovery strategies are repartnering and (re)employment. Repartnering is somewhat less common among lower educated individuals, although the differences are small and may be conflated with income (Shafer & James, 2013). Employment is also a less viable strategy for lower educated individuals because there is less labor demand for them and because their lower earning capacity yields fewer gains from increasing their labor supply.

Empirical evidence on the vulnerability gradient is mixed. A number of studies have included an interaction of education and divorce as a control variable. These studies have been inconsistent, finding that the economic consequences of divorce are more severe for the lower educated (Brewer & Nandi, 2014; Mauldin, 1991; McKeever & Wolfinger, 2001; Poortman, 2000; Smock, 1994; Vandecasteele, 2010), for the higher educated (Bernardi & Boertien, 2016; Jansen, Mortelmans, & Snoeckx, 2009; Smock, Manning, & Gupta, 1999; Vandecasteele, 2011), or finding no educational difference (Uunk, 2004). Reasons for these inconsistent findings could be the use of different outcomes, as vulnerability in terms of losing income is different from vulnerability in terms of falling below the poverty line, variation in the observation windows, as especially longer term recovery may diverge between education groups, or selective panel attrition, as more vulnerable

divorcees tend to drop out yet the degree of selectivity varies across panels. Only one study has explicitly focused on the vulnerability gradient. Tach and Eads (2015) examined relative losses in disposable household income among mothers who divorced. They found little educational differences, albeit with some variation across cohorts. Translating these results to poverty instead of relative income losses would suggest a negative educational gradient in vulnerability.

The roles of gender and parenthood in the vulnerability gradient have not been explored to date, but it is likely that both are important. Regarding gender, lower educated women more often specialize in unpaid housework than higher educated women (Craig & Mullan, 2011). The resulting depreciation of their human capital renders them particularly vulnerable to divorce, suggesting that the negative educational gradient in divorce vulnerability is stronger among women than men. Regarding parenthood, child custody represents a barrier to employment and implies that the postdivorce household income is shared with more household members. It is typically granted to women, even more so in families with lower incomes (Cancian, Meyer, Brown, & Cook, 2014). This suggests that the vulnerability gradient is most negative among mothers, less negative among childless men and women, and least negative among fathers. Empirical evidence on these subgroups is scarce, however. One study has found a stronger negative gradient among men than among women (Poortman, 2000), yet another study found no gender differences (Jansen et al., 2009). A study accounting for parenthood found that mothers were always economically vulnerable to divorce, irrespective of education, whereas fathers and childless men and women were vulnerable only if they were lower educated (Brewer & Nandi, 2014).

The Dutch Context

All divorces in the Netherlands are considered no-fault. When children are involved, legal custody is by default exercised jointly, although in practice the majority of children reside with their mother (De Graaf, 2005). The average divorce procedure takes 1 month in bilateral, $3\frac{1}{2}$ months in unilateral but uncontested, and 11 months in contested cases (Ter Voert, 2009). Our analysis therefore accounted for the possibility that couples separated in advance of the legal divorce.

Poverty rates are relatively low in the Netherlands. In 2009, the poverty rate defined as a disposable income below 60% of the national median was 13.3% (Organisation for Economic Co-operation and Development [OECD], 2018b). This was somewhat lower than the poverty rates in Germany (15.7%) and the United Kingdom (17.4%) and far lower than the United States (23.4%). Dutch poverty rates differ considerably by education level, although the differences are small when compared with other European countries (EuroStat, 2018). Poverty increases slowly during the early and middle stages of the life course, from about 5% at age 18% to 8% at age 35 (Statistics Netherlands, 2018). This life course increase differs from the decreases observed in Germany and especially the United Kingdom and the United States (Kangas & Palme, 2000; Rank & Hirschl, 1999).

Regarding the risk of divorce, the Netherlands has witnessed an increase that was almost entirely driven by the lower educated. As a result, the positive educational gradient in divorce risk that existed for the 1942 to 1964 Dutch marriage cohorts has reversed into a negative educational gradient for later cohorts (De Graaf & Kalmijn, 2006). Marriage and divorce rates are now similar to those in other European countries (OECD, 2018a). The 2009 crude marriage and divorce rates in the Netherlands were 4.4 and 1.9, respectively, comparable to Germany (4.6 and 2.3) and the United Kingdom (4.3 and 2.0), but lower than in the United States (6.8 and 3.5). Hence, the educational gradient in the risk of divorce probably plays a similar or even larger role in other contexts.

Regarding economic vulnerability to divorce, the Dutch welfare state is relatively generous with corporatist features. Maternity leave is universally available at a 100% replacement rate and a similar duration as in other European countries. Paid parental leave is also universal and is high in amount but short in duration when compared with other European countries. Child allowances have a universal and a means-tested component and are average when compared with other European countries (Saraceno & Keck, 2010). All of these schemes are more extensive than in the United States. In addition, social assistance provides a means-tested scheme for all residents in the Netherlands, topping up income to 70% of the full-time minimum wage. Partner alimony and child support provide two other schemes that are partially means tested, taking account of predivorce and postdivorce incomes as well as the number of children (Expert Group Alimony Norms, 2013). These means-tested schemes are designed to alleviate losses in the lower part of the income distribution. Hence, the educational gradient in vulnerability to divorce may play a larger role in less-generous welfare states.

DATA AND METHOD

Data

We used individual-level administrative data spanning the years 2003 to 2015. These data comprise information about all individuals with a Dutch social security number, which is granted to every citizen at birth and to everyone else with legal residence in the Netherlands. They combine information from the municipal registers, secondary and tertiary education registers, social insurance bank, and revenue service. The data can be requested via Statistics Netherlands (https://www.cbs.nl/en-gb/our-services/customised-services-microdata). The code is available on the Open Science Framework (https://osf.io/mkcq5/).

Our study population comprised all individuals who entered their first marital union between the ages of 18 and 35. The lower age bound represents the minimum age of marriage. The upper bound represents the age at which most first marital unions in the Netherlands have formed and in which labor market careers and families are typically established (Mulder, Clark, & Wagner, 2006). Experiments with higher age bounds did not change the results. From this population, we selected all individuals married in 2003, 2004, or 2005 ($N = 346{,}793$). We included only individuals outside of full-time education because students are very different in terms of nuptial and fertility behaviors (Ní Bhrolcháin & Beaujouan, 2012) and because poverty among students is a temporary phenomenon that is not indicative of long-term economic well-being ($N = 328{,}354$). We further restricted the study population to individuals for whom educational attainment was available ($N = 206{,}261$). We then removed individuals with missing information on income or the number of children during 1 or more years. This resulted in a study population of 179,018 individuals. They were followed for 10 years after the year of marriage, resulting in 1,969,198 person-year observations.

We focused on marital unions only because they could be more reliably identified than cohabiting unions. Moreover, marriage continues to be the preferred type of union in the Netherlands, as most first unions are marital unions and the majority of cohabiting unions eventually transition into marital unions (Mills, 2004). Nonetheless, the focus on marital unions may be selective. We therefore performed a robustness check using all cohabiting unions to see if the selectivity of marriage influenced the results.

Our large study population enabled us to shed light on various subgroups. We defined the following four subgroups: childless men, childless women, fathers, and mothers. Childless men and women were defined as individuals who did not have children before divorce or within 10 years of marriage. Fathers and mothers were defined as individuals who had at least one child before divorce or within 10 years of marriage, including children born before marriage (12.9% of the study population), also if the children were allocated to the partner following divorce. The main benefit of these definitions was that the composition of the subgroups remained stable during the time since marriage. A downside was that the subgroups could not be directly compared, as the probability of becoming a parent depended in part on the duration of the marriage. The distribution for the four subgroups was 9,313 childless men (5.2%), 10,798 childless women (6.0%), 74,595 fathers (41.7%), and 84,312 mothers (47.0%).

Measures

Marital status was measured as being in a marriage or not. Divorce was measured using binary indicators for the year before, the year of, and the year after divorce as well as linear time since divorce. Educational attainment was measured as the highest category of completed education observed in the observation window of a person. The categories were lower secondary education or less (International Standard Classification of Education [ISCED] 0–2; Dutch: *basis, voortgezet, mbo-1*), upper or postsecondary education (ISCED 3–4; *mbo-2, 3, 4, havo, vwo*), and tertiary education (ISCED 5–8; *hbo, wo, doctor*). The lowest category comprised individuals who either dropped out of education or did not continue beyond compulsory education. The intermediate category comprised those

who completed upper secondary education or vocational postsecondary education, but did not enter college. The highest category comprised those who obtained a professional or academic college degree. Gender was coded as man or woman. The measure of children gives the maximum number of biological, adopted, or stepchildren present in the household in a given year regardless of age.

Disposable household income was measured as the annual sum of earnings, business income and property income after taxes, and transfers. In 0.4% of the cases it was negative because of negative business income or overdue tax payments or transfers. It was top-coded and bottom-coded at, respectively, ± 1 million euros. Disposable household income was equivalized using the square root scale, which is often used in income research and easy to implement (e.g., Atkinson, Rainwater, & Smeeding, 1995; Solt, 2016). That is, each person in the household was assigned the total household income divided by the square root of the household size to correct for economies of scale. Our key outcome of interest, poverty, was a binary indicator of having an equivalized income below 60% of the annual median of the entire Dutch population. This measure of relative poverty is widely used and consistent with the European Commission's definition of poverty. Note that income was measured after addition and subtraction of all taxes and transfers registered by the Dutch revenue service. It thus included partner alimony, which is registered, but not child support, which is not registered. To see if the omission of child support affected the results, we performed a robustness check using a correction for child support entitlements and obligations.

The definition of time was chosen in accordance with our analytic purposes. Life course research typically defines time as age. However, our goal was to measure poverty within the population at risk of experiencing a divorce. The onset of divorce risk differs across individuals as they marry at different ages. To measure time consistently across individuals, we therefore defined "time" as the time since entry into marriage. Time intervals were specified in years because income taxes are filed annually.

Analytic Strategy

In a first step, we examined the educational gradient in the risk of divorce. This was done using

life tables. The life tables showed the divorce hazard during the time since marriage, conditional on not yet being divorced. We estimated the tables separately for each education group, whereby educational differences in the hazard rates expressed the gradient in divorce risk.

Next, we examined the educational gradient in vulnerability to divorce. This was done using linear probability regression models. The models showed the changes in poverty before and after divorce. We estimated the models separately for each education group, whereby educational differences in the coefficients β expressed the gradient in divorce vulnerability. The vulnerability process was modeled as follows:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it}$$
$$+ \beta_4 X_{4it} + \gamma \boldsymbol{T}_{it} + \varepsilon_{it}$$

where Y_{it} denotes a binary poverty indicator of individual i at time since legal divorce t; α an intercept; X_{1it}, X_{2it}, and X_{3it} indicators of the year before, the year of, and the years after divorce; X_{4it} linear time since divorce, $\boldsymbol{T}$ time since marriage dummies, and ε_{it} a normally distributed error term with mean zero. This specification implies that divorce-related poverty was modeled to start 1 year before the divorce, allowing us to capture the consequences of separations that preceded legal divorce, followed by a sudden change in the year of divorce, and a vertically shifted linear trend in the years after divorce. These divorce-related poverty changes are net of changes related to marriage duration. We tested several other functional forms, such as quadratic and logarithmic specifications of time since divorce, but the current specification proved most parsimonious while adequately describing the vulnerability process.

After estimating the gradients in risk and vulnerability, we examined how they contributed to the overall difference in poverty rates between lower and higher education groups. This was done using the Kitawaga method (Kitagawa, 1955), also known as the Blinder-Oaxaca method (Blinder, 1973; Oaxaca, 1973). The Kitagawa method decomposes the overall poverty difference between lower and higher education groups into three main components, to which a fourth components can be added (Winsborough & Dickinson, 1971). The main benefit of this fourfold decomposition is that the contributions of risk and vulnerability to poverty difference can be fully disentangled.

This allows for counterfactual poverty scenarios in which either the risk or the vulnerability component is changed while holding constant the other component (Iams & Thornton, 1975). Another consideration in this decomposition is the reference group. Comparisons between education groups can be made from the viewpoint of either the lower or the higher educated. We set the higher education group as the reference group, assuming that policymakers prefer to reduce the poverty difference by lifting the lower educated out of poverty rather than increasing poverty among the higher educated (Jones & Kelley, 1984). We also performed a robustness check using the lower educated as the reference group.

The decomposition was conducted as follows. The overall poverty difference was defined as

$$R = \overline{Y}_L - \overline{Y}_H = (\alpha_L + \beta_L \overline{X}_L + \gamma_L \boldsymbol{T}_L)$$
$$- (\alpha_H + \beta_H \overline{X}_H + \gamma_H \overline{\boldsymbol{T}}_H)$$

where the subscript L denotes the lower educated and H the higher educated, $\overline{X}$ the divorce risk variables with scores obtained from the life tables, and β the divorce vulnerability coefficients obtained from the regression analyses. Educational differences in $\overline{\boldsymbol{T}}$ were due merely to different observation periods and therefore set to zero. Rearranging this equation, the overall poverty difference was then defined as follows:

$$R = (\alpha_L - \alpha_H) + (\gamma_L - \gamma_H)\overline{\boldsymbol{T}}$$
$$+ \beta_H(\overline{X}_L + \overline{X}_H) + (\beta_L - \beta_H)\overline{X}_H$$
$$+ (\beta_L - \beta_H)(\overline{X}_L - \overline{X}_H)$$

The first row represents the part of the poverty difference that is unrelated to divorce (or "intercept component"). The second row represents the part of the poverty difference that is attributed to the educational gradient in divorce risk (or "endowment component"), and the part that is attributed to the educational gradient in divorce vulnerability (or "coefficient component"). The third row represents the part that is attributed to the simultaneous occurrence of the educational gradients in divorce risk and divorce vulnerability (or "interaction component"). The intercept component was not of interest in the present study and therefore not further analyzed. The endowment component and the coefficient component were the main estimands of

interest, indicating the separate contributions of the educational gradients in divorce risk and vulnerability to the educational difference in poverty rates. The sum of the endowment, coefficient, and interaction components gives the joint contribution of the gradients in divorce risk and vulnerability to the poverty difference. It should be noted, however, that the interaction component is not an interaction in the statistical sense (Iams & Thornton, 1975). It simply indicates that the joint contribution of risk and vulnerability to the poverty difference is less than the sum of their separate contributions. Hence, it does not have a substantive interpretation and is best thought of as a residual expression (Skopek & Leopold, 2018).

In addition to their contribution to the overall poverty difference, we examined how the contributions of the educational gradients in risk and vulnerability unfolded during the life course. To accomplish this, we decomposed the poverty difference at each time point since entry into marriage. That is, we applied multiple cross-sectional Kitagawa decompositions to longitudinal data (Skopek & Leopold, 2018). We used these decompositions to simulate three sets of counterfactual poverty trajectories for the lower educated. The first set predicted their poverty rates if they had had the same divorce risk as the higher educated. The second set predicted their poverty rates if they had had the same vulnerability to divorce as the higher educated. The last set predicted their poverty rates if they had had both the same risk of and the same vulnerability to divorce as the higher educated. Poverty lines remained unchanged and linked to annual median incomes in the entire Dutch population to avoid simulated changes in median incomes. We thus obtained a detailed picture of how the stratified experience of divorce shaped poverty trajectories during the life course.

Our analysis did not include control variables consistent with our aim of providing a population-level description of the associations between education, divorce, and poverty "as is." To illustrate, consider the possibility that lower educated individuals marry younger and that younger age at marriage is associated with higher divorce risk. Controlling for age at marriage would cancel out this substantive difference. However, we were not interested in a scenario in which different education groups were equal on all characteristics relevant to divorce

but, rather, in the actual risk gradient resulting from existing differences in these characteristics. Similarly, controlling would change the vulnerability gradient in undesirable ways. Although the relationship between divorce and poverty might be confounded by characteristics associated with educational attainment, these differences were precisely the reason for expecting a vulnerability gradient. Control variables would be appropriate only if we were interested in the mechanisms underlying educational differences in vulnerability, but those mechanisms were outside the scope of this study. Finally, variables related to our selection of the study population, such as marriage cohort or period, might influence educational differences in risk or vulnerability. We did not control for marriage cohort because our population covered marriages between 2003 and 2005 and cohort effects were unlikely in this small range. In additional analyses (not shown), we used period dummies to control for changes across calendar years. These dummies reduced poverty rates in some years, but changes between education groups were negligible.

Results

Descriptive Results

Differences in poverty. Table 1 presents descriptive statistics at entry into marriage. Educational differences were most pronounced with respect to employment, children, and poverty. Lower educated individuals, and especially lower educated women, less often worked in paid employment, had more children, and had higher poverty rates upon entering their first marriage. Whereas only 2% of the higher educated lived in poverty when they entered marriage, this percentage was 5% for the intermediately educated, and 13% for the lower educated. This means that the lower educated started their marriages with poverty rates seven times as high as those of the higher educated.

The poverty rates of the different education groups diverged substantially during the time since marriage. This is shown in the upper panel of Figure 1. The lower educated were more likely to live in poverty from the outset, and their probability of living in poverty increased at a steeper rate than that of the higher educated. The higher education group had a poverty rate of 2% in the year of marriage, which increased to 3% 10 years later. The corresponding increases

Table 1. *Descriptive Statistics at Entry Into Marriage*

Variable	All	Men			Women		
		Lower	Middle	Higher	Lower	Middle	Higher
Age	28.65	28.51	28.84	30.10	26.49	27.17	28.81
	(3.73)	(3.97)	(3.72)	(3.10)	(4.50)	(3.89)	(3.26)
Born abroad	0.09	0.22	0.10	0.06	0.20	0.09	0.07
	(0.29)	(0.41)	(0.30)	(0.24)	(0.40)	(0.29)	(0.25)
Employed	0.92	0.85	0.95	0.98	0.67	0.87	0.96
	(0.27)	(0.35)	(0.23)	(0.15)	(0.47)	(0.34)	(0.21)
Full-time equivalent	0.85	0.84	0.93	0.95	0.56	0.74	0.85
	(0.27)	(0.32)	(0.21)	(0.15)	(0.39)	(0.31)	(0.23)
Children: 0	0.74	0.67	0.72	0.79	0.58	0.71	0.79
	(0.44)	(0.47)	(0.45)	(0.41)	(0.49)	(0.46)	(0.41)
Children: 1	0.20	0.23	0.21	0.17	0.29	0.23	0.17
	(0.40	(0.42)	(0.40)	(0.37)	(0.45)	(0.42)	(0.38)
Children: 2	0.05	0.08	0.06	0.04	0.11	0.06	0.04
	(0.22)	(0.26)	(0.23)	(0.19)	(0.31)	(0.24)	(0.19)
Children: 3+	0.01	0.02	0.01	0.01	0.03	0.01	0
	(0.10)	(0.15)	(0.11)	(0.08)	(0.16)	(0.09)	(0.07)
Total household income	36,214	28,857	31,707	40,517	28,392	32,405	(41,119
	(16,390)	(13,441)	(12,826)	(16,763)	(13,869)	(13,580)	(18,078)
Equivalized household income	2,3825	18,065	20,578	27,168	17,406	20,934	27,522
	(10,558)	(7,073)	(7,578)	(11,032)	(7,644)	(8,225)	(11,763)
Below poverty line	0.04	0.11	0.05	0.02	0.14	0.05	0.02
	(0.20)	(0.32)	(0.22)	(0.13)	(0.35)	(0.22)	(0.14)
N	179,018	9,989	30,448	43,471	11,639	33,816	49,655

Note. Mean values in the study population. Standard deviations are shown in parentheses.

were from 5% to 10% among the intermediate education group, and from 13% to 22% among the lower education group.

However, the middle and lower panels of Figure 1 reveal important differences between subgroups. Among childless individuals, poverty differences were small and increased little over time. Among parents, in contrast, poverty differences were large and increased considerably. This was best visible among mothers. The poverty rate of lower educated mothers nearly doubled from 15% in the year of marriage to 26% 10 years later, a much worse trajectory than that of higher educated mothers and a divergence unparalleled in other subgroups.

Educational gradient in risk. The first pathway by which divorce could contribute to poverty divergence was the negative educational gradient in the risk of divorce. Lower educated individuals may have experienced a steeper increase in poverty rates because they divorced more often than higher educated individuals.

Figure 2 confirms the existence of a strong educational gradient in the risk of divorce. The figure shows the divorce hazard, or the probability of experiencing a divorce in a given year among those who had not yet divorced, during the time since marriage. Lower educated individuals had higher divorce hazards during the entire observed marriage duration. This applied to all subgroups (although no direct comparisons can be made between subgroups). Among childless individuals, the average divorce hazard rate was 5.7% for the higher educated compared with 6.8% for the intermediately educated and 7.1% for the lower educated. Among parents, these hazards rates were 0.8%, 1.7%, and 2.5%, respectively. Overall, a lower educated individual was about 2.5 times as likely as a higher educated individual to experience a divorce in any given year of the marriage.
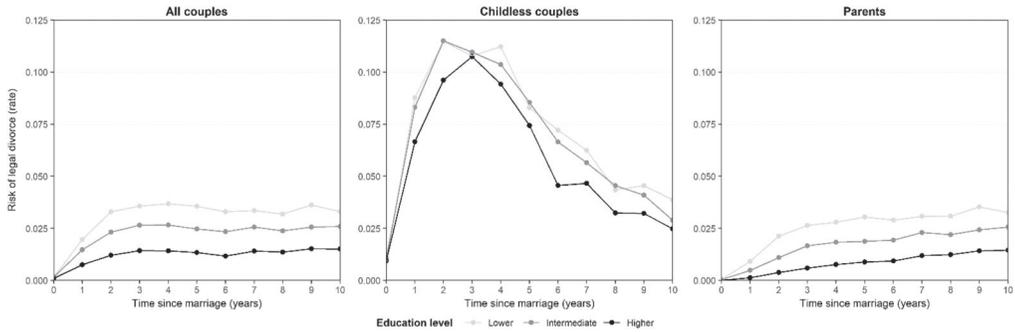
Educational gradient in vulnerability. The other pathway by which divorce could contribute to poverty divergence was a negative educational

FIGURE 1. OBSERVED POVERTY TRAJECTORIES.
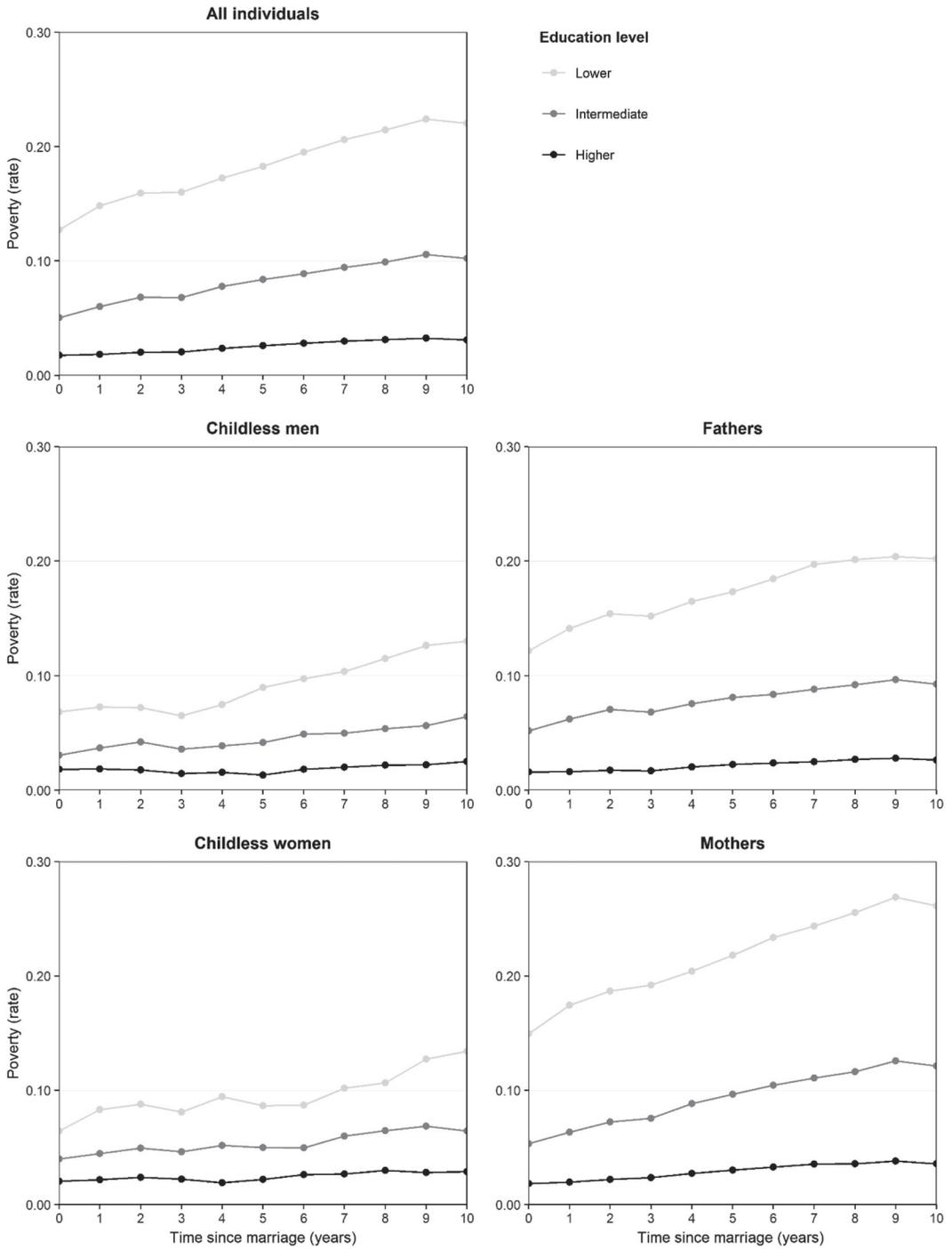
Note. The distribution over the four subgroups was 9,313 childless men (5.2%), 10,798 childless women (6.0%), 74,595 fathers (41.7%), and 84,312 mothers (47.0%).

FIGURE 2. DIVORCE HAZARDS BY MARRIAGE DURATION.

gradient in vulnerability to divorce. Lower educated individuals may have experienced a steeper increase in poverty rates because they were more likely to fall into poverty when they divorced.

Figure 3 confirms the existence of an educational gradient in vulnerability to divorce. The figure shows the poverty rates in the years before, during, and after legal divorce, holding constant the time since marriage. Lower educated individuals already had higher poverty rates prior to divorce, but their relative position worsened greatly during and after divorce. This was observed for most subgroups. Among childless women, the poverty rate increased from 3% 2 years prior to divorce to 7% in the year of legal divorce for the higher educated, from 4% to 12% for the intermediately educated, and from 8% to 17% for the lower educated. Among childless men, the increases were similar. For parents, in contrast, there were large gender differences. Mothers, and especially lower educated mothers, were very likely to become poor upon divorce. Their poverty rate increased from 6% 2 years prior to divorce to 23% in the year of legal divorce for higher educated mothers, from 15% to 49% for intermediately educated mothers, and from 27% to 58% for lower educated mothers. This means that more than half of all recently divorced lower educated mothers lived in poverty. Fathers experienced little change in poverty upon divorce. If anything, their poverty rates slightly decreased.

The gradient in vulnerability to divorce extended through the postdivorce period. Figure 3 shows that poverty differences that opened up at divorce persisted throughout subsequent years. Although there was a general tendency toward recovery, this recovery appeared to take longer for lower education groups, whose situation deteriorated most upon divorce. In other words, the losses related to divorce appeared to be prolonged for the lower educated. These educational differences were particularly strong among childless women and mothers.

Formal Decompositions

In the next step of our analysis, we conducted several decompositions to examine the extent to which the educational gradients in divorce risk and divorce vulnerability contributed to poverty differences and their divergence during the life course. Divorce vulnerability was modeled using the specification set out in the Methods section, which closely approximated the vulnerability process. We started by decomposing the overall poverty difference between lower and higher education groups averaged during the entire observation period. The lower education group formed the reference category. Table 2 presents the results of this decomposition.

Cross-sectional results for the overall population. The left column of Table 2 shows the decomposition results for all subgroups combined. The poverty rate in this overall study population was 2.5% among the higher education group and 18.3% among the lower education group, amounting to an overall poverty difference of 15.8 percentage points. Educational gradients in divorce risk and vulnerability contributed to this poverty difference, albeit not to a large extent. If the lower educated had had the same risk of divorce as the

FIGURE 3. POVERTY RATES BY DIVORCE DURATION.
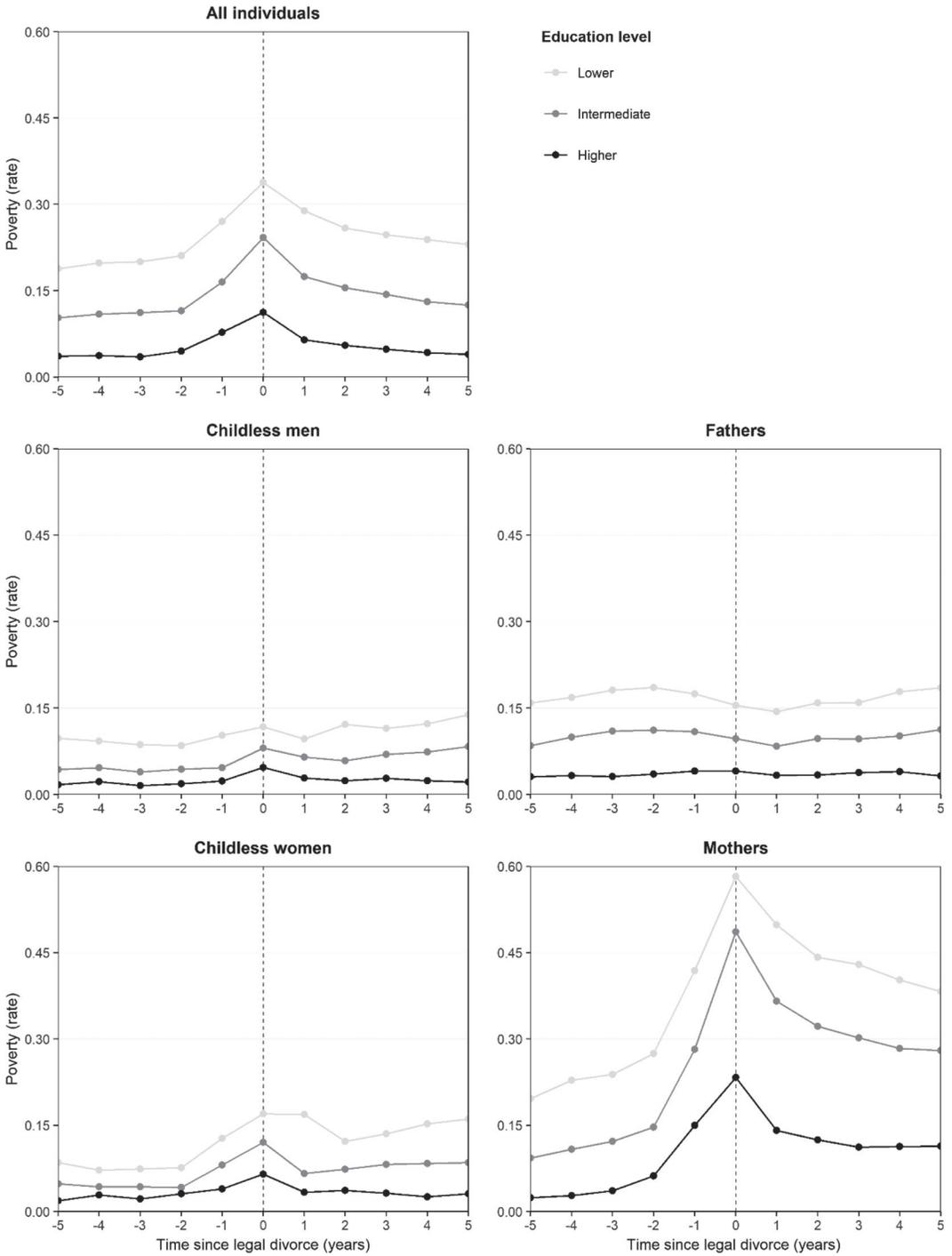
Note. Estimates were obtained from linear probability regressions of the binary poverty indicator on time since legal divorce dummies, holding time since marriage dummies constant.

Table 2. *Kitagawa Decomposition of the Overall Difference in Poverty Rates*

	All	Childless men	Childless women	Fathers	Mothers
Poverty higher educated	0.025***	0.019***	0.025***	0.022***	0.029***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Poverty lower educated	0.183***	0.092***	0.096***	0.172***	0.217***
	(0.002)	(0.005)	(0.004)	(0.003)	(0.003)
Poverty difference	−0.158***	−0.074***	−0.071***	−0.151***	−0.188***
	(0.002)	(0.005)	(0.005)	(0.003)	(0.003)
Risk gradient	−0.009***	−0.005***	−0.003*	0.003***	−0.028***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Vulnerability gradient	−0.009***	−0.020***	−0.033***	0.006***	−0.023***
	(0.001)	(0.004)	(0.004)	(0.001)	(0.001)
Divorce total	−0.013	−0.021	−0.033	0.005	−0.035
	(0.001)	(0.004)	(0.004)	(0.001)	(0.001)
N persons	114,754	5,443	6,486	48,017	54,808
N person-years	1,262,294	59,873	71,346	528,187	602,888

Note. By construction, the divorce total equals the sum of the gradient in divorce risk, the gradient in divorce vulnerability, and an interaction term. The interaction term, which accounts for the fact that gradients in divorce risk and vulnerability occur simultaneously, is not of substantive interest to our study and therefore not shown. For simplicity, time since marriage dummies and group intercepts are not shown. Standard errors are shown in parentheses. See Table S1 in the online Supporting Material for a complete overview of the estimates underlying the overall decomposition.

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

higher educated, their poverty rate would have dropped by 0.9 percentage points. If they had had the same vulnerability to divorce as the higher educated, their poverty rate would also have dropped by 0.9 percentage points. If they had had both the same risk and vulnerability as the higher educated, their poverty rate would have dropped by 1.3 percentage points. In other words, the stratified experience of divorce explained 8.2% (1.3 percentage points) of the overall poverty difference between the lower and higher education groups averaged during the entire observation period.

Cross-sectional results for childless individuals. A different picture emerged when we zoomed in on the subgroups. Among childless men, the poverty difference between the lower and higher education groups was 7.4 percentage points. Divorce contributed to this difference largely through the gradient in vulnerability. If lower educated childless men had been as invulnerable to divorce as higher educated childless men, the poverty difference would have diminished by 2.0 percentage points smaller. The gradient in risk played a lesser role in this subgroup (0.5 percentage points). Jointly, the stratified experience of divorce, and in particular the vulnerability pathway, accounted for more than

a quarter (2.1 percentage points) of the poverty difference among childless men.

The role of the gradient in vulnerability to divorce was even more important in the second subgroup considered: childless women. Their poverty difference of 7.1 percentage points would have diminished by 3.3 percentage points if lower educated childless women had been as invulnerable to divorce as higher educated childless women. Similar to childless men, the gradient in the risk of divorce hardly played a role in this subgroup (0.3 percentage points). Jointly, the stratified experience of divorce accounted for almost half (3.3 percentage points) of the poverty difference among childless women.

Cross-sectional results for parents. The results differed for parents. Among fathers, divorce hardly contributed to poverty differences. If anything, lower educated fathers economically benefited from divorce as compared to higher educated fathers. Among mothers, however, divorce contributed substantially to poverty differences between education groups. Both the risk and the vulnerability pathway played an important role. The poverty difference of 18.8 percentage points between higher and lower educated mothers would have diminished by 2.8 percentage points if lower educated mothers

had had the same divorce risk as higher educated mothers. The poverty difference would have diminished by 2.3 percentage points if lower educated mothers had had the same divorce vulnerability as higher educated mothers. Jointly, the stratified experience of divorce accounted for almost one fifth (3.5 percentage points) of the poverty difference among childless women.

Longitudinal results. As a final step, we decomposed the poverty difference at each time point to see how risk and vulnerability played out over time. These decompositions confirmed the previous findings. The lower educated were more likely to fall into poverty upon divorce, and this gradient in vulnerability contributed substantially to the overall poverty difference. Among mothers, the higher divorce risk of the lower education also contributed. Importantly, the longitudinal decompositions showed that the importance of risk and vulnerability increased over time. In other words, the continuous exposure to a higher divorce risk and the accumulation of its economic consequences widened the poverty differences between education groups as the life course unfolded, in line with the idea of cumulative inequality.

The results from these decompositions are illustrated in Figure 4. The "counterfactual risk" curves indicate the changes in poverty among the lower educated if they had had the same risk of divorce as the higher educated. The "counterfactual vulnerability" curves indicate the changes in poverty among the lower educated if they had had the same vulnerability to divorce as the higher educated. The "counterfactual risk and vulnerability" curves indicate the changes among the lower educated if they had had both the same divorce risk and divorce vulnerability as the higher educated. The figure clearly shows that, in contrast to all other subgroups, poverty divergence among fathers was influenced neither by the gradient in divorce risk nor by the gradient in divorce vulnerability. Among childless men and women, poverty rates diverged mainly because of the gradient in divorce vulnerability. Among mothers, poverty rates diverged because of both the gradient in divorce risk and the gradient in divorce vulnerability.
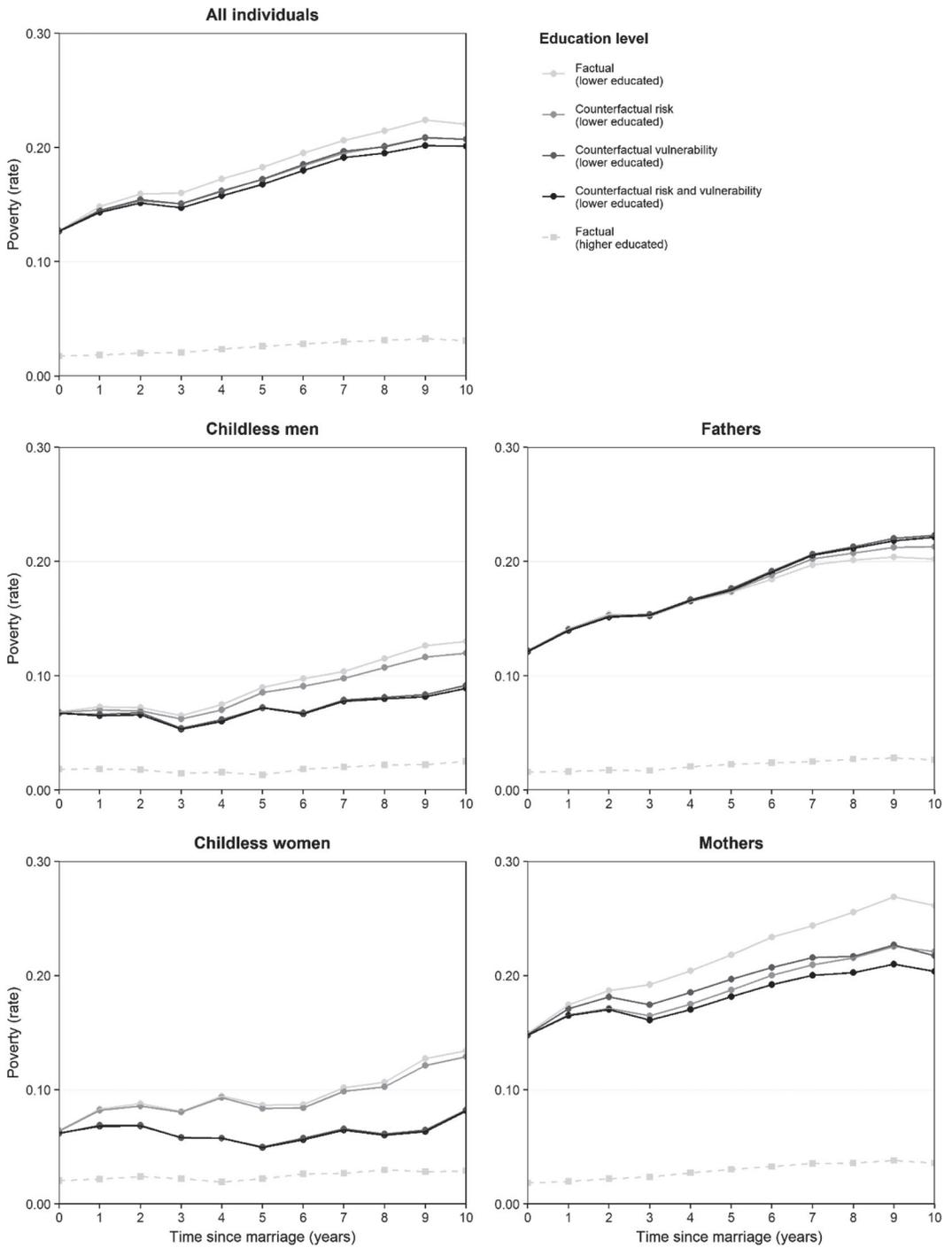
Robustness Checks

We conducted several robustness checks. The results of these are available online as Supporting Material (Figures S1–S7). The first check concerned our focus on legal divorce rather than separation. Legal divorce may be preceded by separation, which implies that household income may change prior to legal divorce. Hence, we predicted the year of separation based on changes in the number of nonchild household members as reported in the tax return files. We then repeated the analysis using predicted year of separation instead of observed year of legal divorce (Figure S1). This confirmed the main findings. The only notable difference was in line with our expectations: Poverty rates increase exactly in the year of separation, rather than in the year before legal divorce.

The second robustness check concerned our decision to analyze the married population rather than the entire cohabiting population. This decision was motivated by data quality and by the persistent popularity of marriage in the Netherlands. To assess the selectivity of our focus on marriage, we selected all first-observed cohabiting unions using the Statistics Netherlands cohabitation file (https://www.cbs.nl/en-gb/our-services/customised-services-microdata). This file identified cohabitation since 1995 on the basis of marital status, joint taxation, joint social security entitlements, and parenthood, with some cases being imputed. We then repeated the analysis using all cohabiting unions (Figure S2). This showed a different pattern regarding poverty rates, which did not diverge during the life course but, rather, remained constantly large. Yet it confirmed the findings regarding the gradients in divorce risk and vulnerability and showed that the poverty difference would diminish if the lower educated had the same risk or vulnerability as the higher educated.

The third robustness check concerned the reference group in the decomposition analysis. We conducted the decomposition from the viewpoint of the higher education group, assuming that policymakers prefer to reduce the poverty difference by lifting the lower educated out of poverty. Alternatively, policymakers may view the low poverty rates among the higher education group as resulting from unjust privilege that needs to be addressed. Hence, we repeated the analysis using the lower education group as the reference group (Figure S3). This showed the

FIGURE 4. SIMULATED POVERTY TRAJECTORIES UNDER COUNTERFACTUAL RISK AND VULNERABILITY.

same picture in reverse, albeit with slight differences in the relative importance of risk and vulnerability. However, these differences were too small to affect our conclusions.

The fourth robustness check concerned child support. Transfers between expartners take the form of spousal alimony and child support. Spousal alimony is registered by the Dutch revenue service and was therefore included in our income data. Child support is not registered, so our data might overestimate poverty among divorced mothers. Hence, we approximated child support entitlements and obligations using the norms set out by the Dutch Expert Group on Alimony Norms (2013). These norms stipulate monthly payments based on the joint income before divorce, individual incomes after divorce, and number of children involved. They can voluntarily be complied with in undisputed cases and are judicially enforced in disputed cases. We added and subtracted approximate child support from the divorcees' incomes. We then repeated the analysis (Figure S4). This resulted in slightly lower poverty rates among divorced mothers in all education groups and among divorced fathers with lower education. However, these differences were too small to affect our conclusions.

The fifth robustness check concerned the relationship between poverty and income. A fall into poverty could result both from being closer to the poverty line and from losing more income upon divorce. Our focus on a binary poverty outcome masked such differences. To obtain a fuller picture, we examined risk and vulnerability along the entire predivorce income distribution (Figures S5 and S6). This showed that lower educated individuals had a higher risk of divorce for any given predivorce income. In addition, lower educated divorcees had a higher probability of falling into poverty for any given predivorce incomes. Predivorce income itself, however, was also strongly predictive of the probability of falling into poverty. One of the reasons that lower educated divorcees were more likely to fall into poverty could thus be their concentration around the poverty line. Hence, we reestimated the educational gradient in vulnerability while holding constant predivorce income (Figure S7). We specified the relationship between poverty and predivorce income using restricted cubic splines to allow for nonlinearities (Harrell, 2001). This showed that about half of the educational differences in

poverty at divorce were due to differences in predivorce income. This applied to all subgroups, although predivorce income was somewhat more important for childless men than for childless women and mothers. All in all, these results suggest that lower educated divorcees suffered more from divorce both because they had lower predivorce incomes and because divorce hit them harder.

Conclusion

Previous research has suggested that divorce is linked to economic inequality (Haskins, 2015; Lundberg et al., 2016; McLanahan, 2004). According to this view, divorce is a major driver of life course inequality between education groups. Although this is an influential idea in the demographic and sociological literature, studies have not directly assessed whether and how divorce drives economic inequality between education groups and its growth during the life course.

This study represents a first step toward closing this gap, focusing on the divergence in poverty rates throughout the early and middle stages of the adult life course. To assess the role of divorce more fully than previous studies, we introduced an approach that considers two pathways: the gradient in risk and the gradient in vulnerability. Using administrative data from the Netherlands ($N = 179{,}018$), our results confirmed that both pathways contributed to inequality during the life course. The lower educated not only divorced more often (the risk pathway), but were also hit harder by a divorce in terms of its consequences for poverty (the vulnerability pathway). Among childless men and women, the vulnerability pathway contributed more to poverty divergence than the risk pathway. Among mothers, risk and vulnerability both contributed to divergence in poverty rates. Among fathers, divorce was unrelated to poverty.

The contribution of divorce to the divergence in poverty rates was substantial. In the 10 years following marriage, up to two percentage points (12%) of the poverty difference between lower and higher educated individuals was explained by educational gradients in the risk of divorce, vulnerability to divorce, or both. Zooming in on subgroups, the largest numbers were observed for mothers and childless women (six percentage points or 26%). These findings were robust

to an alternative definition of divorce, to decomposition from the viewpoint of the lower educated rather than the higher educated, and to conditioning on the entire cohabiting population rather than the married population only. They were also robust to a correction for child support, which in reality is often underpaid (Huang, Mincy, & Garfinkel, 2005). Further examination showed that although lower educated individuals were mainly drawn from the lower end of the predivorce income distribution, they were also more likely to fall into poverty when predivorce income was held constant.

These findings demonstrate that divorce is a major driver of cumulative inequality between social groups. Compared to the higher education group, the lower education group marries in a disadvantaged economic position and falls further behind as it faces the adversities of divorce. Consequently, a focus on divorce is warranted for policies that aim at reducing economic inequality. When evaluating different policy options, the links between risk and vulnerability must be considered. For example, those who depend on their partner's income may feel reluctant to divorce, and those who anticipate divorce may take action to minimize economic losses. Furthermore, the contribution of the risk gradient increases with the economic consequences of divorce, and the contribution of the vulnerability gradient increases with the incidence of divorce (Härkönen, 2018). A reduction in either risk or vulnerability will therefore directly and indirectly diminish the contribution of divorce to cumulative inequality. Risk-oriented policies, such as extended joint taxation or stricter divorce legislation, are unlikely to be successful, as they do not address the reasons for divorce and may trap people in bad marriages (Huston & Melz, 2004; Stevenson & Wolfers, 2006). Vulnerability-oriented policies may be more effective. These policies could be universal by providing an income safety net around the poverty line or could address the specific mechanisms underlying the (gendered) educational gradient in vulnerability by strengthening the labor market attachment of lower educated women and by promoting shared child-care arrangements (Leopold & Kalmijn, 2016). Our study is a first step toward understanding the role of risk and vulnerability, but further investigation of these pathways and their interactions is necessary.

Several questions remain. First, we studied relative income poverty. Although this measure is available for the entire population, it may not perfectly capture material deprivation. A different picture might emerge when using more fine-grained measures, such as subjective poverty or the inability to purchase basic necessities (Bradshaw & Finch, 2003). Second, this study did not identify the causal effects of divorce on poverty. Different mechanisms could underlie such causal effects, including the age of union formation, educational homogamy, labor market participation, child-care arrangements, and institutional support. Particularly relevant is the rise in shared residence arrangements after divorce (Cancian et al., 2014), which alleviates part of the economic burden carried by the main resident parent, but which is difficult to observe in administrative data. Third, our analysis focused on the Netherlands. The Netherlands has a risk gradient similar to other Anglo-Saxon and Western European countries, but different from countries in Southern Europe and Latin America where the risk gradient is absent or even reversed. In addition, the Netherlands has a weaker vulnerability gradient and especially a lower poverty rate than other countries. Simulations have suggested that the relationships between education, family dynamics, and poverty are relatively weak in the Netherlands when compared with other countries (Härkönen, 2018). Future research of risk and vulnerability can shed more light on these issues.

Our approach sets an agenda for research on the stratification of life events. The cumulative inequality literature posits that life events such as divorce and unemployment are critical drivers of socioeconomic inequalities (Dannefer, 1987; Ferraro & Shippee, 2009). Analyzing these inequalities using a risk-and-vulnerability approach yields concrete benefits. First of all, previous research has focused either on unequal risk (Härkönen & Dronkers, 2006) or on unequal vulnerability (McKeever & Wolfinger, 2001). Our approach integrates these pathways. Furthermore, a risk-and-vulnerability approach enables clear links between the analysis and policy perspectives. Recent work on poverty provides a good example of these linkages (Brady, Finnigan, & Hubgen, 2017). A final benefit is the feasibility of the approach. As shown in the present study, the distinction between risk and vulnerability can be implemented using decomposition analysis. This

facilitates a full assessment of the extent to which life events drive social inequalities.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1. Risk-and-vulnerability estimates underlying the Kitagawa decomposition of the overall poverty difference

Figure S1. First robustness check: Poverty rates by predicted separation duration

Figure S2. Second robustness check: Simulated poverty trajectories under counterfactual risk and vulnerability in the cohabiting population

Figure S3. Third robustness check: Simulated poverty trajectories under counterfactual risk and vulnerability from the viewpoint of the lower educated

Figure S4. Fourth robustness check: Poverty rates by divorce duration after correcting for child support

Figure S5. Fifth robustness check: Risk of divorce along the income distribution

Figure S6. Fifth robustness check: Poverty rates along the income distribution

Figure S7. Fifth robustness check: Poverty rates by divorce duration, holding constant predivorce income

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