

EUROPEAN UNIVERSITY INSTITUTE, FLORENCE
DEPARTMENT OF POLITICAL AND SOCIAL SCIENCES

EUI Working Paper **SPS** No. 2003/5

**Can the Similarity in Divorce Risks of West-German Siblings
be Explained by Parental Divorce and
by Other Family Characteristics?**

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Printed in Italy in May 2003
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Can the Similarity in Divorce Risks of West-German Siblings be Explained by Parental Divorce and by Other Family Characteristics?

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* This article was begun during the author's engagement as a visiting scholar at the Max Planck Institute of Human Development in Berlin, from October 1998 to February 1999. I wish to thank Karl-Ulrich Mayer for his hospitality and for the data used in this paper. The article was subsequently finalised at the European University Institute in San Domenico di Fiesole in Italy in 2002 and 2003. I also thank Inge Sieben and Suet-ling Pong for their helpful comments on an earlier version. All correspondence to the author: European University Institute, Department of Political and Social Sciences, Via dei Roccettini 9, I-50016 San Domenico di Fiesole, Italy. E-mail: jaap.dronkers@iue.it.

Abstract

There is a clear intergenerational transmission of divorce risks: children of divorced parents divorce significantly more often than comparable children of non-divorced parents. The aim of this article is to find out whether a similarity in divorce risks of siblings exists, and if so, whether it can be explained by measured characteristics of parents and children. We use data from the West-German section of the German Life History Study. Our analyses show that there clearly exists a similarity in the divorce risks of siblings from West-German families. This can be partially explained by the measured characteristics of the siblings and parents. However the percentage of variance at the family level remains substantial (29% to 33%) after controlling for measured characteristics. The effect of parental divorce becomes insignificant after controlling for the measured sibling and parental characteristics. This result contradicts most non-siblings studies of the intergenerational transmission of divorce risks, in which a significant effect of parental divorce is found. The results indicate that unmeasured mechanisms such as socialisation by parents and siblings, and the common genetic and social heritage of siblings can partly explain the similarity in the divorce risks of siblings.

1. Introduction

There is a clear intergenerational transmission of divorce risks in many different societies: children of divorced parents divorce significantly more often than comparable children of non-divorced parents. Several mechanisms within the family and common characteristics of the involved children can explain the existence of the relation between parental and children's divorce risks (McLanahan & Bumpass, 1988).

1. *Stress*. The stress which accompanies parental divorce is a 'push' factor which induces the children to leave the parental home early, to get married early, and to have children at a young age more frequently.
2. *Socialisation in parental family*. The conditions of socialisation in the parental home lead to the children developing certain attitudes and ways of behaving, which subsequently render them less able to maintain their relationships, or teach them to leave an unsatisfactory relationship at an earlier stage.
3. *Economic deprivation*. The economic circumstances that follow a parental divorce affect the lives of the children in a negative way (with respect to educational and occupational attainment). Reduced economic circumstances can increase the risk of these children of divorced parents getting divorced themselves.
4. *Stigmatisation* (Spruijt, 1993). The stigma of parental divorce will affect the life opportunities of their children in a negative way and thus their chances of maintaining their own marriages. This stigmatisation mechanism should be less important for younger cohorts, due to the normalisation of divorce in modern societies.
5. *Genetic heritage*. Parents and children share particular heritable personality traits, which can promote or hinder divorce in both the parents and their children. (McGue & Lykken, 1992; Cramer, 1993).

However it is not yet clear whether this transmission cannot be explained by the common background of parents and children, which cannot be measured with age of leaving home, age at marriage, age of first child, educational attainment, occupational level, and generation. It is necessary to estimate the importance of a common background for intergenerational transmission of divorce risks relative to the importance of the measured characteristics of the individuals. If the common background of parents and children remains important after controlling for these measured characteristics, socialisation by parents and siblings and the common genetic and social heritage of siblings will emerge as more convincing explanations of the intergenerational transmission of divorce risks. Divorce is in that case less an individual decision taken by individuals than a consequence of more general social and genetic characteristics of the involved persons. The policy towards divorce could differ as a consequence of either explanation.

We can partly estimate the importance of the unmeasured common background of parents and children by analysing the similarity in the divorce-risks of siblings and by trying to explain this similarity by the measured characteristics of parents and their offspring. Analysing similarities between the behaviour patterns of siblings in relation to parental characteristics, such as divorce, is a good means of investigating the relative importance of families and of individuals within these families, as has been shown by many recent sibling studies (de Graaf & Huinink, 1992; Eijck, 1996; Sieben, 2001). Another important advantage of sibling studies is that we do not need to measure all relevant characteristics of parents and children before reliably estimating the relative importance of family and children for the explanation of divorce.

2. Literature review

There is only one study of the effect of parental divorce on siblings (O'Connor, Plomin, Caspi & DeFries, 2000), and that is a comparison between biological children and adopted children of divorced and non-divorced parents. McGue & Lykken (1992) and Jockin, McGue & Lykken (1996) studied the effect of family factors on divorce by analysing twins and non-twin siblings. Until now, there has been only one non-clinical investigation of the relation between parental divorce and the divorce risks of siblings (Dronkers & Hox, 1998). That study drew upon data from the National Social Science Family Survey of Australia of 1989-1990, using multilevel analysis (MLN) in order to distinguish between the individual level (respondent and sibling) and the family level (parents). Dronkers & Hox concluded from their analyses that there is a similarity in the divorce risks of siblings in Australia. The joint measured parental characteristics (family size; father's occupational status; country of birth; mother's and father's educational level; family form; mother's work) and the overlap in measured characteristics of siblings (age of first marriage; number of children; age at birth of first child; political affiliation; occupational status; years of education; gender) do not explain this similarity. Thus, intergenerational transmission and measured socio-economic background do not sufficiently account for the similarity in divorce risks of siblings. Dronkers and Hox found that a large common variance in divorce risks between siblings remained after controlling for these measured factors (34%). However they did not control for the censored duration of the marriages, and the results of their findings should therefore be treated with caution.

A higher similarity in the divorce risks of siblings can be explained with reference to four different factors. These provide indicators for the measured characteristics of parents and siblings that need to be included in the analyses:

1. *Intergenerational transmission of divorce risks.* A consequence of a significant intergenerational transmission of divorce risks is a similarity in the divorce

risks of siblings from the same family, because the parental divorce increases the divorce risks of all their offspring. If the intergenerational transmission mechanism is an important explanation of the similarity in the divorce risks of siblings, this similarity should decrease significantly after controlling for parental divorce.

2. *Socialisation in parental family.* Because siblings receive more or less equal socialisation from their parents, there is a high likelihood that they will develop common attitudes to marriage and divorce, common behaviour patterns and common solution repertoires for marital problems. This common heritage renders them more or less able to maintain their relationships, teaching them either to leave an unsatisfactory relationship at an early stage or to make an extra effort to maintain and improve it. This leads to a similarity in the divorce risks of siblings. An aspect of socialisation within the parental family is the common religious socialisation of siblings. If religious socialisation is a good proxy for parental transmission of values, the similarity in the divorce risks of siblings should decrease significantly after controlling for parental religion. If age at first marriage is a good proxy for parental socialisation of attitudes and behaviour towards marriage, the similarity in the divorce risks of siblings should decrease significantly after controlling for age at first marriage.
3. *Socialisation by siblings.* Siblings influence each other through imitation and interaction while living together in the parental home, and this influence continues after their departure. They have more attitudes, behaviour patterns and problem-solution repertoires in common than comparable individuals raised in different families. Furthermore, siblings can learn from the success or failure of each other's marriages. This will lead to similar divorce risks among siblings.
4. *Common socio-economic background of parents* (family size, father's occupation, and father's and mother's education). The common socio-economic background of their parents renders siblings more similar in their

educational level and the number of children they produce than non-siblings. If level of education and number of children influence the divorce risks of siblings, these will be more similar than the divorce risks of comparable individuals raised in different families. If their common socio-economic background is an important explanation of the similarity in the divorce risks of siblings, this similarity should decrease significantly after controlling for the measured socio-economic background of parents and the number of children and educational level of the siblings.

5. *Common genetic and social heritage.* Siblings share a number of genetically and socially transmissible personality traits that can either enhance or reduce their prospects of divorce, giving rise to similar divorce risks.

Thus, the similarity in divorce risks of siblings can be explained by measured common characteristics of parents (parental divorce, family size, father's occupation, father's and mother's education, parents' religion), by overlaps in measured characteristics of the siblings (year of birth, age at marriage, education, number of children), and by unmeasured common characteristics of the siblings (degree of parental conflict, parental socialisation with respect to attitudes, behaviour and problem-solution repertoires, socialisation by siblings; common genetic and social heritage). However, it remains possible that the similarity in divorce risks of siblings cannot be fully explained by measured common parental characteristics and the overlap in measured characteristics of the siblings. If this is the case, we will find, after controlling for the measured characteristics of parents and siblings, a significant similarity in divorce risks of siblings, indicated by the remaining degree of variance in the divorce risks of siblings at the family level.

The aim of this article is to establish whether there is a similarity in the divorce risks of siblings, and if so, to what degree this similarity can be explained by measured characteristics of parents and children.

The main questions posed by this article are:

1. Is there a similarity in the divorce risks of siblings from West-German families?
2. Can jointly measured parental characteristics and the overlap in measured characteristics of siblings explain this similarity in the divorce risks of siblings?

3. Data and Measures

We have drawn upon data from the West-German section of the German Life History Study (GLHS)¹. For further information on these data, see Brückner and Mayer (1998). GLHS is a random sample of the German population born between 1929 and 1961 and still living in the '90s, collected by the Max Planck Institute for Human Development in Berlin. We use only the 1929-30, 1939-40, 1949-50, 1954-56 and 1959-61 birth cohorts from the GLHS, because the 1919-20 birth cohort lacks information about the cause of paternal absence during the youth of the respondent². We had to restrict ourselves to those variables that were available for both the respondents and their brothers and sisters³. We deleted all respondents, together with their brothers and sisters, who were still younger than 25 or had died before they had reached the age of 25⁴. This was justified by the requirement that the respondents from the various birth cohorts had to be older than 25 at the moment of the interviews; otherwise they would not have had reasonable time to marry and subsequently divorce. We also deleted all respondents (and their brothers and sisters) who were not yet married and respondents (and their brothers and sisters) whose missing values were irreparable. To conclude this “cleansing”, we deleted all families containing only one married, divorced or widowed sibling, because these “one-married-child families” cannot be used to estimate the relation between divorce risks of

siblings. The final sample contained 6625 siblings (respondents and their brothers and sisters) in 2223 families. In the following text we use the term ‘sibling’ for all persons born in the same parental family, that is, the respondents and their brothers and sisters. The respondent supplied all information on family and brothers ‘and sisters’ characteristics⁵. This may have resulted in an unrecognised overestimation of the resemblance between siblings.

Six sibling characteristics, which can have different values for siblings (that is, respondents and their brothers and sisters) from the same family, are used at the individual-level in the analyses of this paper. The percentages, means or standard deviations for the total population of siblings, for siblings from different parental family forms and for siblings of three different marriage cohorts, are given in Table 1.

Divorce of siblings. Four possible family forms could be distinguished: single, divorced, widowed and married. As previously mentioned, all single siblings were deleted. We only distinguish between married (including widowed) or divorced siblings. In order to keep the comparability between respondents and their brothers and sisters as high as possible, we used only the information on the formal marriages of the respondents and not the information on their possible relations outside the formal marriage. This was done on the assumption that the respondents had restricted themselves mostly to the formal marriages of their brothers and sisters. If a respondent had two or more marriages, we coded him or her as divorced if one of these marriages had ended in a divorce or a separation⁶. The combinations of these decisions will also have led to an unknown underestimation of the degree of divorce of the brothers and sisters compared to the degree of divorce of the respondents. Accordingly, our dependent variable is whether a sibling (respondents and their brothers and sisters) has been divorced or not.

Gender of siblings.

Educational level of siblings. We have used the final diploma in general secondary education. The variable is an ordinal scale running from no diploma in secondary education to a diploma in the highest type of secondary school, which enables entrance to tertiary education ('Abitur' or 'Fachhochschulreife'). Vocational training was excluded because there were many missing values for the brothers and sisters.

Number of children of siblings.

Length of marriage of siblings. For the non-divorced siblings (including widowed), the length of marriage represents the difference between the year of interview and the year of their first marriage. For the divorced siblings, the length of marriage represents the difference between the year of their first divorce or separation and the year of their first divorce or separation. Because we did not know the year of first divorce or separation of the divorced brothers and sisters of the respondent, we estimated the probable length of their terminated marriages. To begin with, we derived the parameters for this estimation from a least square multivariate regression with 'length of marriage' of the divorced respondents as dependent variable and all relevant family and respondents variables as independent variables⁷. We followed this by estimating the probable length of the terminated marriages of the divorced brothers and sisters with these parameters and the known values for these divorced brothers and sisters with an unknown year of their first divorce or separation. Using these estimated values, we could increase the valid values of 'length of marriage' of divorced respondents and their divorced brothers and sisters. Due to missing values in the independent variables, we could not apply this estimation procedure to all siblings. Those with missing values had been deleted from the data-file, as mentioned before.

Age at first marriage of siblings. This is the difference between the year of birth and year of the first marriage.

Marriage cohort of siblings. Germany's turbulent history (war, division, migration) has had a profound effect on its birth and marriage patterns. As a consequence, there is no continuous succession of generations with regard to the development of birth and marriage patterns. Following Wagner (1997: 260), we have constructed from 'year of first marriage' three marriage cohorts: married before 1962; married between 1962 and 1974; married after 1974.

Five parental characteristics, which have the same value for all siblings from the same family, are used at the family-level in the analyses of this paper. We use all relevant variables about the siblings that were available from the German Life History Study. Their percentages, means or standard deviations are given in Table 1, for the total population of siblings, for siblings from different parental family forms and for siblings of the three different marriage cohorts.

Parental family form. Respondents could indicate whether they had lived without their father⁸ for a period longer than 3 months before reaching the age of 16. If this was the case, the respondent was asked for the reasons for the father's absence. We have used these reasons to construct four family forms: parents divorced⁹, death of father¹⁰; father in war¹¹, father never absent before the age of 16¹². If the father had been absent for more than one period, and for different reasons, 'divorce' always took priority over the other family forms in the coding of the variable. In the same way, 'death of father' took priority over 'father in war'. This operationalisation of a family form can lead to an underestimation of the actual level of divorced parents and widowed mothers, because the divorce or the death of the father could have happened after the respondent's 16th year of age. In particular, if the respondent was not the youngest sibling, the younger siblings could still have been younger than 16 years at the moment their parents divorced or their father died. This underestimation of the level of parents divorcing with children younger than 16 might lead to an underestimation of the measured effect of parental divorce on the divorce risk of the siblings.

Parental religion. Respondents gave information about their current religion and whether they had changed their religion earlier in their lives. Based on this information, we constructed the earliest religion of the respondent. We assume that this earliest religion is a valid indicator of the parental religion. A transition from a Protestant to Catholic church (or vice versa) is rare and the same holds for the transition from ‘no religion’ to a Christian church. We have three dichotomous variables: Protestant, other religions, and no religion. Catholic is the omitted reference variable.

Educational levels of father and mother separately. This is indicated by his or her highest diploma in general secondary education. It is an ordinal scale running from ‘no diploma in secondary education’ to the highest type of secondary education¹³, which enables entrance to the tertiary level. We did not include parental vocational training because it was often too difficult to estimate its level.

Number of siblings. This runs from 2 to the highest number (13).

4. Methods

We combine two aspects of our data in these analyses: the censored nature of the duration of marriage and the multilevel structure of the individual siblings within their families. Since marriage duration until divorce is known only in the case of marriages dissolved before the survey (non-censored cases) but does not include marriages still existing (censored cases), conventional procedures such as simple table analyses or multivariate regression analyses cannot be used. We use multilevel analysis (MLN) in order to distinguish between the individual level (respondent and sibling) and the family level (parents), in the same way as Dronkers & Hox (1998). These multilevel analyses are more appropriate for sibling analysis than the more commonly used LISREL (Hauser & Wong, 1989;

Eijck, 1996), because multilevel analysis can more easily handle different analytical levels and thus avoid the statistical pitfalls of the nested nature of data on individuals in families (Van der Velden & Bosker, 1991; Sieben, 2001). Another advantage of multilevel analysis is that it is able to handle dichotomous dependent variables better than LISREL, which, as a multivariate technique, assumes interval dependent variables. Divorce is by definition a dichotomous variable. A disadvantage of multilevel analysis is that only cases with valid values in all used variables can be included in the analysis. In order to avoid the deletion of too many cases without a valid length of marriage, we estimated this length (as indicated above). Another disadvantage of multilevel analysis is that in practice it is not able to handle data with many right-censored cases. We have partly solved this problem by applying the quadratic spline technique, which makes it possible to estimate a smooth function of length of marriage with divorce risk (Snijders & Bosker, 1999: 216-218). The negative side of the spline technique solution is that it cannot be combined with the variable marriage cohort, because of multicollinearity between length of marriage and marriage cohort. However, the marriage cohort of the sibling is an important control variable, because divorce levels rise in younger marriage cohorts. We therefore present two series of multilevel analyses, one with length of marriage and the other with marriage cohort. The multilevel-analysis software used was MlwiN 1.1 (Rasbash et al, 2000). Because of the small average number of cases within each separate family and our binary dependent variable, we used PQL and RIGLS, the appropriate estimation methods within multi-level analysis. Multi-level analyses of equations with random slopes for the different family variables was not possible, due to the relatively small numbers of siblings with each family.

5. Descriptive results

Table 1 gives the characteristics of the 2223 families and 6625 individual siblings (that is respondents and their brothers and sisters) with divorced and non-divorced parents. The differences are generally in line with the literature.

Divorced parents are less often Catholic than non-divorced parents.

Parental educational level hardly differs between divorced and non-divorced level, although the standard deviation of educational level is larger for divorced parents.

The average number of siblings in the parental family is clearly lower if the parents are divorced, compared to that of non-divorced parents. The same holds for the standard deviation: it is smaller if the parents are divorced.

Siblings of divorced parents are more often divorced themselves than siblings of non-divorced parents (11.2% versus 6.1%), but a part of this difference might be explained by characteristics of both parents and siblings.

The educational level of siblings with divorced parents is lower than that of siblings with non-divorced parents.

The majority of siblings with divorced parents have married after 1974, but this might be explained by the increasing divorce rate in Germany.

Siblings with divorced parents marry at a younger age (nearly one year) than children of non-divorced parents, despite the fact that the age of marriage increases in the younger marriage cohorts.

The duration of the marriages of siblings with divorced parents is shorter. This might be caused by their higher divorce risks, but also by their concentration in the younger cohorts, which still have shorter marriage duration due to the censoring of their durations.

The average number of children of siblings with divorced parents hardly differs from that of siblings with non-divorced parents.

Table 2 shows the relation between parental divorce and divorce of (one of the) siblings. The second column shows that 15.1% of the siblings from parental families with 2 siblings and non-divorced parents are divorced against 23.7% of the siblings from parental families with 2 siblings but divorced parents. In parental families with 3 siblings these percentages are 16.4% and 28.0% respectively. We can conclude from this that there is a similarity in the divorce risks of siblings, related to their parents' divorce. However Table 2 clearly shows the problems with traditional table-analyses: there are too few divorced large families for this type of analysis. A further advantage of multilevel analyses is that all individual siblings remain included in the analyses.

6. Individual and family variance in divorce risks

6.1 Length of marriage as control variable

Table 3 shows the results of our multilevel analyses with two levels (the first and lower individual level of the siblings and the second and higher family level) and with length of marriage as the control variable.

The start model 0 is an empty model with no independent variable and only a constant. The significant random variance at the family level is .61 and the random variance at the individual level of an automatically scaled 1.00. This model 0 teaches us that 37.9% of all variance in divorce risks of these siblings is at the family level $[\frac{.61}{(.61 + 1.00)}]$ and that 62.1% is at the individual level. This is another strong indication that the divorce risks of siblings are related. But measured individual and parental characteristics, of which the siblings have more in common than non-siblings, might explain this relation.

Model 1 has only parental divorce as an independent variable. The addition of this variable, although it is significant, can hardly explain the

similarity in the divorce risks of the siblings. There is still 37.5% of the remaining variance at the family level, the rest (62.5%) is at the individual sibling level.

The inclusion of 'length of marriage' partially explains the similarity in the divorce risks of siblings, as shown by Model 2. The function of divorce and length of marriage is a skewed parabola, reaching its peak at 8 years of marriage, remaining stable at this high level until 16 years of marriage duration, and then decreasing slowly to a very low level at 50 years of marriage. Following Snijders & Bosker (1999: 216-218), we made four functions of length of marriage: length marriage (linear function), length marriage² (quadratic function), length marriage² $t > 8$ (quadratic function for $t > 8$ and 0 for $t \leq 8$) and length marriage² $t > 16$ (quadratic function for $t > 16$ and 0 for $t \leq 16$). The coefficients of all these functions of length of marriage cannot be interpreted in isolation from each other. Together they represent the function of length of marriage. The inclusion of length of marriage leaves 33.8% of the remaining variance at the family level, while the other 66.2% is at the individual sibling level. The communality of the individual lengths of marriage of siblings can explain this decline of the variance at the family level. Stated differently, this communality in the length of marriages of siblings produces part of the similarity in the divorce risks of siblings. This communality in length of marriages is the consequence of the restricted period in which most families are formed (thus the small differences in age between siblings) and of the small standard deviation of age at marriage. Most siblings are therefore more or less in the same phase of their marriages and thus have equal divorce risks. Furthermore, if several siblings from a divorced family were divorced during the same phase of their marriage (which is often the case), they will have comparable lengths of marriage. This communality is far more important for the similarity of divorce risks than parental divorce, as Model 2 also shows. The

parameter of parental divorce becomes insignificant by the inclusion of length of marriage in the equation.

In Model 3 we introduce the other sibling characteristics into the equation. The $-2\log(\text{lh})$ parameter clearly shows that Model 3 is an improvement on Model 2. The effect of length of marriage (especially the linear function) becomes smaller in Model 3, but is still significant. From this, and from the slight improvement of the $-2\log(\text{lh})$ parameter of Model 3, we conclude that the independent variables added in Model 3 have a large common variance with length of marriage. The age at first marriage has its usual negative effect on divorce risk, showing that an early marriage increases the risk of divorce. This well-known effect can be explained either by impulsive marriages (motivated for instance by romantic love, or forced by pregnancy) or by acceptance of one of the first marriage proposals received after an inadequate perusal of the marriage market. Having children decreases only the divorce risk in relation to no children, if the number of children does not exceed two. The divorce risks of siblings with three or more children are equal to the divorce risk of siblings without children. Having three or more children might be an indication of a more impulsive marriage and thus one at higher risk of divorce. Higher educated siblings in particular divorce less than those educated to a lower level. This result suggests that, in a society where it has become normal and accepted, divorce can become for the less educated a solution for their problems in marriages and relationships, because they lack the possibilities to solve them. Conversely, in a society where divorce is not yet normal and accepted (for instance that of the siblings' parents), divorce is still a solution only available to the higher educated, because they have enough possibilities to overcome the obstacles to divorce (Dronkers, 2002). After controlling for sibling characteristics, the parameter of parental divorce becomes almost zero, indicating that parental divorce is irrelevant in explaining the similarity in divorce risks of siblings. The level of variance at the family level of Model 3

(26.5%) indicates that there is such a similarity, although it has become smaller by inclusion of sibling characteristics.

In Model 4, we introduce the other parental characteristics into the equation. The $-2\log(lh)$ parameter is far lower than that of Model 3a. The parameters of length of marriage, educational level of siblings and number of children of siblings hardly change with the introduction of other parental characteristics into the equation. The parameter of parental divorce increases, but does not become significant. A possible explanation, already mentioned, is the underestimation of parental divorce, due to the measurement of this parental characteristic as related to the youth of the respondent and not to the youth of the other siblings. Most surprisingly, we find significant effects of mother's widowhood and father's participation in war. These effects are mostly not significant in other German studies on divorce (Engelhardt, Dronkers & Trappe, 2002; Engelhardt & Diekmann, 1999; Wagner, 1997). A possible explanation is that children of widows (often war-widows) and children of fathers who participated in war, have divorce risks related to length of marriage that deviate from the skewed parabola model in our analyses. For instance they divorce less often in the first 16 years of their marriage, but they divorce more often after that period. This deviance from the skewed parabola model might be caused by the traumatic experiences of war and parental death, which prompted them to delay their divorce far longer than those born after the war and thus lacking these war-related experiences. This possible explanation is supported by an analysis using Model 4 but without the four 'length of marriage' variables. In that analysis (not shown here) the effect of parental divorce is significant and positive, while the effects of mother's widowhood and father's participation in war have become insignificant. Parental religion does not effect the divorce risks significantly, although the coefficients have the expected sign. Perhaps parental religion during the youth of the respondent is a bad predictor of the actual religious values of their adult children, due to the strong de-facto secularisation

of German public and private life. Father's education (especially higher secondary education or more) has a positive significant effect on the sibling divorce risk, contrary to the negative effect of the educational level of the siblings. This results in the following combinations: siblings with high-educated fathers, but who have a lower educational level themselves (downwardly mobile) have higher divorce risks than others; siblings with low-educated fathers but who have a high education themselves (upwardly mobile) have lower divorce risks than others. However these combinations might also be explained by a special combination in our data of two generations, for which divorce had a different meaning. For the younger generation, married after 1950, divorce was a real option and maintaining the marriage increasingly became a challenge requiring educational resources. For the older generation, married before 1945, divorce was a very difficult option requiring educational resources. The insignificant effect of mother's education might be caused by the lower variance in this variable. Controlling for these parental characteristics increases the remaining variance at the family level to 33.3%. This means that these parental variables more efficiently explain the divorce risks of individual siblings within families than the average divorce risks of siblings between families.

6.2 Marriage cohort as control variable

Table 4 gives the results of our multilevel analyses with two levels, but this time with marriage cohort as the control variable. We do not show models 0 and 1 because they are equal to those in Table 3.

Including marriage cohort in Model 2a hardly improves the equation given the slight increase of the $-2\log(\text{lh})$ compared with that of Model 1. However the inclusion of marriage age decreases the amount of variance on the family-level to 33.8%, the same level as in Model 2. The parameter of parental divorce remains significant after the inclusion of marriage cohort.

In Model 3a the other characteristics of the siblings are included. The parameters of the educational level of siblings are not significant, while those of the number of children are significant. These results are more or less the opposite of the results of Table 3 with length of marriage as control variable. This can be explained by the different meaning of length of marriage and marriage cohort. The other sibling variables have more or less the same parameters in Models 3 and 3a, but that of parental divorce remains significant. The degree of variance at the family level is still 30%, and thus slightly higher than in Model 3.

In Model 4a we add the other parental characteristics. The much higher $-2\log(lh)$ of Model 4a compared to Model 3a indicates that this addition is important for the explanation of the divorce risks of siblings. The main difference between the results of Models 4 and 4a are the insignificant parameters of mother's widowhood, father's war experience and siblings' educational level and the significant parameter of three or more children. However, the effect of parental divorce has become insignificant by this addition of the other parental characteristics. After the addition of all measured parental characteristics, there is still 28.6% variance at the family level of the total variance, which is slightly lower than that of Model 4.

7. Discussion

Our analyses show that there clearly exists a similarity in the divorce risks of siblings from West-German families. Siblings from the same family tend to have more equal divorce risks than comparable non-siblings. It is good to note that the opposite is also true: siblings of the same family tend to have more equal opportunities to stay married than comparable non-siblings.

Part of the similarity in divorce risks of West-German siblings can be explained by the commonality of the measured characteristics of the siblings,

such as length of marriage, marriage cohort, educational level, number of children and age at first marriage. However these measured characteristics leave a considerable amount of the variance at the family level unexplained. The same holds after addition of the measured parental characteristics (widowhood, father's war participation, father's educational level, and number of siblings). Although they explain a significant amount of the total variance of divorce risks of siblings, the percentage of variance at the family level is still large (between 29% and 33%). The answer to our second question is therefore that the joint measured parental characteristics and the overlap between measured characteristics of siblings cannot explain a substantial part of the similarity in the divorce risks of siblings.

The direct transmission of parental divorce to the siblings is mainly a function of the comparable length of their marriage, the marriage cohort and the unmeasured common family background. If one controls for the length of marriage, no extra effect of parental divorce is left. Stated differently, parental divorce tends to lead to short marriages (which is a negative effect), but over and above that it does not increase the divorce risks of siblings. The effect of parental divorce becomes insignificant also if we control for marriage cohort and measured sibling and parental characteristics. This result contradicts most non-siblings studies of the intergenerational transmission of divorce risks, in which a significant effect of parental divorce is found. The significant effect of parental divorce in non-sibling studies could result from neglect of the unmeasured common variance at the family level, which can lead to an overestimation of the effect of parental divorce.

Although these analyses of the West-German siblings deviate slightly from an analysis of divorce risks of Australian siblings (Dronkers & Hox, 1998), the resemblance in results is striking, especially with regard to the amount of variance at the family level (34% in the Australian case)¹⁴.

These results indicate that unmeasured mechanisms, such as socialisation by parents and siblings and the common genetic and social heritage of siblings can partially explain the similarity in the divorce risks of siblings.

Table 1: The variables, their means and standard deviations or percentages for the total population of siblings, siblings with divorced parents and non-divorced parents

Variables	Total	Divorced parents	Non-divorced parents
N family =2223			
Parents divorced	3,7%	100%	-
Death father	12,4%	-	12,9%
Father war	16,4%	-	17,5%
Catholic	51,8%	41,3%	52,3%
Protestant	46,1%	52,1%	45,8%
Other religion	1,7%	5,8%	1,5%
No religion	0,4%	0,8%	0,4%
Father education	2,0 (0,7)	2,0 (0,9)	2,0 (0,7)
Mother education	1,9 (0,6)	1,9 (0,7)	1,9 (0,6)
Number siblings	4,2 (2,1)	3,5 (1,4)	4,2 (2,1)
N Individual sibling = 6625			
Female	52,4%	54,5%	52,4%
Divorced	6,3%	11,2%	6,1%
Educational level	2,3 (0,8)	2,0 (0,9)	2,3 (0,8)
Age at marriage	24,3 (4,3)	23,3 (3,8)	24,4 (4,3)
Married < 1962	33,6%	21,5%	34,1%
Married 1962-1974	36,5%	36,8%	36,4%
Married after 1972	30,0%	41,7%	29,5%
Duration marriage	16,3 (9,1)	13,8 (8,4)	16,4 (9,1)
Number of children	2,9 (1,1)	2,8 (1,1)	2,9 (1,1)

Table 2: Combinations of number of divorced siblings and number of siblings in families with non-divorced parents and divorced parents

Non-divorced parents				
	2 siblings	3 siblings	4 or more siblings	Total
No divorced siblings	893 (84,9%)	463 (83,6%)	428 (81,7%)	1784 (83,8%)
1 divorced sibling	152 (14,4%)	81 (14,6%)	74 (14,1)	307 (14,4%)
2 or more divorced siblings	7 (0,7%)	10 (1,8%)	22 (4,2%)	39 (1,8%)
Total	1052 (100%)	554 (100%)	524 (100%)	2130 (100%)
Divorced parents				
No divorced siblings	42 (76,4%)	18 (72,0%)	10 (76,9%)	70 (75,3%)
1 divorced sibling	10 (18,2%)	7 (28,0%)	2 (15,4%)	19 (20,4%)
2 or more divorced siblings	3 (5,5%)	-	1 (7,7%)	4 (4,3%)
	55 (100%)	25 (100%)	13 (100%)	93 (100%)

Table 3: Individual and family level determinants of divorce risks of siblings with length of marriage as control variable: unstandardised multilevel estimates with their standard errors in parentheses.

	Model 0	Model 1	Model 2	Model 3	Model 4
Constant	-2.72 (.05)	-2.75 (.06)	-2.66 (.27)	6.01 (.77)	6.55 (.81)
Individual level					
Length marriage			.63 (.10)	.46 (.12)	.47 (.12)
Length marriage ²			-.07 (.01)	-.07 (.01)	-.07 (.01)
Length marriage ² t>8			.09 (.01)	.10 (.01)	.10 (.01)
Length marriage ² t>16			-.05 (.01)	-.06 (.01)	-.06 (.01)
Educational level sibling					
No secondary education				.00 (ref.)	.00 (ref.)
Lower secondary education				-.36 (.22) ns	-.30 (.24) ns
Middle secondary education				-.65 (.25)	-.73 (.28)
Higher secondary education				-.54 (.27)	-.80 (.31)
Number children sibling					
No children				.00 (ref.)	.00 (ref.)
1 child				-.46 (.17)	-.50(.18)
2 children				-.64 (.18)	-.72 (.18)
3 children				-.25 (.22) ns	-.38 (.23) ns

4 or more children				.19 (.30) ns	.08 (.31) ns
Age first marriage sibling				-.29 (.02)	-.34 (.02)
Female				.16 (.13) ns	.15 (.13) ns
Family level					
Non-disrupted marriage		.00 (ref.)	.00 (ref.)	.00 (ref.)	.00 (ref.)
Parental divorce		.66 (.23)	.41 (.24)ns	.09 (.26) ns	.30 (.29) ns
Father in war					1.74 (.22)
Mother widow					1.16 (.20)
Number of siblings					.08 (.04)
Parents Catholic					.00 (ref.)
Parents Protestant					.22 (.13) ns
Parents other religion					.46 (.42) ns
Parents no religion					.65 (.70) ns
Father's education					
No secondary education					.00 (ref.)
Lower secondary education					.17 (.20) ns
Middle secondary education					.23 (.31) ns

Higher secondary education					1.37 (.30)
Mother's education					
No secondary education					.00 (ref.)
Lower secondary education					-.08 (.18) ns
Middle secondary education					.14 (.28) ns
Higher secondary education					.03 (.44) ns
Variance at family level	.61 (.18)	.60 (.18)	.51 (.17)	.35 (.17)	.51 (.19)
-2log(lh)	-2246	-2283	-8833	-8872	-9300

Note: The lowest individual level variance is automatically scaled to 1.00 in all models. Therefore, the family level variances are not strictly comparable across models. The lower the $-2\log(lh)$ the better the model fits, although the $-2\log(lh)$ in multilevel analyses with dichotomous dependent variable is an estimation. ns means p-value > .05.

Table 4: Individual and family level determinants of divorce risks of siblings with marriage cohort as control variable: unstandardised multilevel estimates with their standard errors in parentheses.

	Model 2a	Model 3a	Model 4a
Constant		1.26 (.58)	1.53 (.55)
Individual level			
Married < 1962	.00 (ref.)	.00 (ref)	.00 (ref)
Married 1962-1974	.64 (.14)	.58 (.14)	.55 (.15)
Married > 1974	.68 (.14)	.61 (.18)	.66 (.17)
Education sibling			
No secondary education		.00 (ref.)	.00 (ref.)
Lower secondary education		-.19 (.19) ns	-.12 (.20) ns
Middle secondary education		-.19 (.19) ns	-.14 (.24) ns
Higher secondary education		-.05 (.23) ns	-.13 (.27) ns
Number children sibling			
No children		.00 (ref)	.00 (ref.)
1 child		-.78 (.15)	-.78 (.15)
2 children		-1.28 (.16)	-1.30 (.16)
3 children		-1.32 (.20)	-1.32 (.20)
4 or more children		-1.46 (.26)	-1.46 (.26)
Age first marriage sibling		-.15 (.02)	-.16 (.02)
Female		.10 (.11) ns	.11 (.11) ns
Family level			
Non-disrupted marriage	.00 (ref.)	.00 (ref.)	.00 (ref.)
Parental divorce	.59 (.23)	.50 (.23)	.45 (.24) ns
Father in war			.04 (.19) ns
Mother widow			.38 (.17) ns
Number of siblings			-.06 (.03)

Parents Catholic			.00 (ref.)
Parents Protestant			.18 (.11) ns
Parents other religion			.60 (.34) ns
Parents no religion			.72 (.61) ns
Father's education			
No secondary education			.00 (ref.)
Lower secondary education			.06 (.17) ns
Middle secondary education			.28 (.26) ns
Higher secondary education			.96 (.26)
Mother's education			
No secondary education			.00 (ref.)
Lower secondary education			-.28 (.15) ns
Middle secondary education			-.15 (.24) ns
Higher secondary education			-.29 (.39) ns
Variance at family level	.51 (.18)	.43 (.17)	.40 (.17)
-2log(lh)	-2373	-3131	-3420

Note: The lowest individual level variance is automatically scaled to 1.00 in all models. Therefore, the family level variances are not strictly comparable across models. The lower the $-2\log(lh)$ the better the model fits, although the $-2\log(lh)$ in multilevel analyses with dichotomous dependent variable is an estimation. ns means p-value > .05.

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Notes

¹ The East German section lacks information about marriage and divorce of the siblings of the respondents.

² The data of the 1964-71 birth cohort were not yet available at the start of this analysis in 1999.

³ As a consequence we have to delete two variables, which Wagner (1997: 262) had included in his analysis of the GLHS respondents and which have a significant effect on children's divorce risks: living in a big city; pre-marriage birth of child.

⁴ This group of brothers and sisters who died before the age of 25 is not small because of the Second World War.

⁵ Respondents were also asked to give information about their dead brothers and sisters.

⁶ It is not clear which alternative respondents chose if one of their brothers or sisters was only separated and not formally divorced. We assume that in that case the majority chose divorced rather than married.

⁷ The adjusted R² of this estimation was .41. The parameters of this equation were 12.216 +.478*geschlec + .279*kindern - .0367*nsibling - .951*relprot - .942*relander - .546*relkein + .0832*krieg - 1.288*scheid - 1.57*witwe - 1.413*bildvat1 - .909*bildvat2 - 2.4*bildvat3 - .492*bildmut1 - .323*bildmut2 - 1.295*bildmut3 - .844*bildung1 - .0952*bildung2 - .266*bildung3 + 11.817*cohort2 + 7.121*cohort3 + 1.896*cohort4 + 2.223*cohort5 - .322*ageheir.

⁸ In some parts only of the GLHS, respondents were also asked the same question for mothers. Given the fact that children mostly lived with their mother after divorce, especially for the analysed GLHS birth cohorts, we do not believe that we have underestimated the percentage of parental divorce by imposing this restriction on the period of father's absence. However it may have caused an underestimation of the percentages of parental death.

⁹ We treated separation, and father's flight from the DDR without taking his children with him, also as divorce.

¹⁰ We do not distinguish between the causes of death (war, illness, etc.).

¹¹ We do not distinguish between the roles in the war (soldier, prisoner, refugee, etc.).

¹² If the reasons for absence were the work or education of the father or the respondent, we coded this family as never absent. The same holds if the father had been in prison.

¹³ 'Abitur' or 'Fachhochschulreife'.

¹⁴ However, the effect of parental divorce on the divorce risks of their offspring is still significant for these Australian siblings, contrary to the German siblings.