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- Parental separation and children's educational attainment in Spain: Heterogeneity and rare and common educational outcomes
- Having power, having babies? Fertility patterns among German elite politicians
- Does fixed-term employment delay important partnership events?
- Does sibling and twin similarities differ in cognitive ability by parents' education?
- Sex and housework: Does perceived fairness of the distribution of housework actually matter?
- Chinese parent-child relationships in later life in the context of social inequalities

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# Editorial

Dear Reader,

In acknowledging the overall trend in academic publishing towards the Europeanization and internationalization of research by means of the English language, the *Zeitschrift für Familienforschung* | *Journal of Family Research* discontinues publishing papers in German. Starting with this issue, all papers will be published solely in English. Only manuscripts submitted in English are considered for admission to the review process.

In this first English-only issue, you will find the following peer-reviewed papers:

*Fabrizio Bernardi* and *Chiara Ludovica Comolli* investigate parental separation and children's educational attainment in Spain by focusing on heterogeneity and rare and common educational outcomes.

By addressing the question "Having power, having babies?", *Ansgar Hudde* and *Carmen Friedrich* look into fertility patterns among German elite politicians.

*Daniel Baron* and *Ingmar Rapp* ask whether fixed-term employment delays important partnership events, such as transitions into cohabitation, marriage, parenthood, and home ownership, among young adults in Germany.

*Tina Baier* inquires whether sibling and twin similarities differ by parents' education.

*Kristin Hajek* examines the assumed relationship between couples' perceived fairness of the distribution of housework and sexual satisfaction.

And, last but not least, *Thomas Emery*, *Pearl Dykstra* and *Maja Djundeva* present their research on Chinese parent-child relationships in later life in the context of social inequalities.

Of course, we welcome new submissions of manuscripts dealing with family-related research in the social sciences and humanities. We hope that you enjoy reading this issue.

Henriette Engelhardt-Wölfler  
Editor-in-chief

Kurt P. Bierschock  
Managing editor

# Parental separation and children's educational attainment: Heterogeneity and rare and common educational outcomes

## **Abstract:**

While the association between parental separation and children's lower educational achievements is a robust finding, the evidence regarding its heterogeneity across social groups is mixed. Some studies show that socioeconomically advantaged families manage to shelter their pupils from the consequences of parental break-up, while others find the opposite. We contribute to this debate and sketch a structural theory of the heterogeneity of the consequences associated to parental separation on children's educational outcomes. We argue that the separation penalty and its heterogeneity across social backgrounds differ depending on the selectivity of a given educational outcome. In particular, the smallest penalty will be observed for very rare and very common outcomes. The rarity of an educational outcome depends on pupils' social background, which might produce the observed heterogeneity even if the separation penalty itself is equal across parental social background.

We investigate the heterogeneity of the consequences of separation by parents' education in Spain on two children's outcomes. One outcome (enrolment in tertiary education) is rare for children in low educated families, while the other (retaking in primary and secondary education) is rare for children in highly educated families. The results show that the penalty associated to parental separation for retaking a year in primary and secondary education is larger for children of low educated mothers. No heterogeneity is found for enrolment in tertiary education.

**Key words:** parental separation, diverging destinies, heterogeneity, rare and common educational outcomes

## **1. Introduction**

When compared to children raised in two-parent families, children from non-intact families tend to fare worse across a host of short- and long-term indicators of achievement and wellbeing (Amato 2000, 2001; Dronkers/Harkonen 2008; McLanahan et al. 2013). The negative consequences of parental separation on children include short-term increases in physical and psychological distress and decreases in interpersonal wellbeing and longer-term reductions in relationship stability, educational achievement and economic security

(Amato 1994). The associational evidence of the nexus between parental union dissolution and children's lower achievements is quite robust across countries and time. It was on the basis of this evidence that McLanahan's (2004) formulated her famous 'diverging destinies' thesis, suggesting that family instability that is more common among low educated mothers critically contributes to the disparities in children's access to resources and in their later socio-economic outcomes.

More recent studies have turned to the investigation of whether the consequences of family disruption for children differs across social groups, asking whether some groups are better equipped than others to deal with them. Some studies show that socio-economically advantaged families manage to buffer their offspring from the negative consequences of union dissolution (Albertini/Dronkers 2009; Bukodi/Dronkers 2003; Gratz 2015; Fischer 2007; Lampard 2012), while other studies find the opposite, namely that children from socio-economically advantaged families suffer a larger separation penalty (Kalmjin 2010). It has variously been suggested that the divide in the literature is due to the different contexts or cohorts studied, the choice of different child outcomes, the way some key variables such as parental social origins/union dissolution are operationalized and/or the measurement of the differentials in relative or absolute terms (Bernardi/Boertien 2017a; Härkönen et al. 2017).

This paper makes three main contributions to the literature on the consequences of parental union dissolution. First, it tests one of the core argument in McLanahan's (2004) 'diverging destinies' thesis. In her original formulation, for such a thesis to hold there should be a negative socio-economic gradient in family instability (i.e. lower socio-economic groups should be more likely to experience family disruption). Moreover, family instability has to entail a penalty in terms of children' educational and socioeconomic attainment. An additional factor generally overlooked by previous studies is that even if the two previous conditions hold, family structure might not contribute to inequality of opportunity if the separation penalty is larger for children of socio-economically advantaged families, when compared to children from the lower social strata (Bernardi/Boertien 2017b). This is because, if the family instability penalty is larger for the higher socio-economic groups, opposite processes can cancel each other out. The effect on socio-economic inequalities due to the larger prevalence of family disruption among the lower strata could be off-set by the larger penalty in terms of the educational and socioeconomic attainment that is experienced by children of higher social strata. Additionally, one might note that the diverging destinies thesis would also hold in a situation where there is no socio-economic gradient in family instability but the size of the separation penalty is larger for children of lower socio-economic strata<sup>1</sup>.

Investigating the heterogeneity of the family disruption penalty represents, then, a salient test of the diverging destinies thesis. In the present article, we analyze the existence of a separation penalty in Spain and its heterogeneity across socioeconomic groups. The second contribution is that we assess the existence of a penalty on two different educational outcomes in Spain: retaking one year in primary and secondary education and enrollment in tertiary education. What is relevant here is that one outcome represents an ed-

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1 Note that this specific situation was not discussed in McLanahan's (2004) original formulation of the 'diverging destinies' thesis.

educational success (enrollment in tertiary education) and one represents an educational failure (retaking). Previous work on the heterogeneity of the consequences of parental separation for children outcomes by parental socio-economic status have indeed shown that the results change depending on the outcome considered. We will argue that the distinction between outcomes in terms of success and failure might be crucial to understanding the inconsistency of findings in the literature on the heterogeneity of the penalty of parental separation.

Finally, this study focuses on a largely under-investigated context in this literature: Spain. Research on the consequences of parental separation is mostly concentrated on the US (Biblarz/Raferty 1999; McLanahan/Sandefur 1994; Augustine 2014) and on Northern or Continental Europe (Sigle-Rushton et al. 2005; Mandemakers/Kalmijn 2014; Bernardi/Boertien 2016; Engelhardt, Trappe/Dronkers 2002; Gratz 2015; Gahler/Palmtag 2014; Gahler/Harkonen 2014). In contrast, while empirical research on Southern European countries is still rare (for an exception see Albertini/Dronkers 2009). The Divorce Law in Spain was enacted only in 1981, relatively late compared to other western countries, and still two decades after the law was passed, the divorce rate was, as in other Southern European countries, well below that of other western countries. Divorces remained rare until the early 2000s when the Express Divorce Bill was passed, making legal separation easier and faster. After 2005, the rate of separation increased so rapidly that today, only a decade later, Spain resembles a Nordic European country more than a Southern one in terms of the divorce rate. Moreover, other institutional factors, such as the lower cost of higher education in Spain compared to other countries might reduce the differentials across family background of the family instability effect on pupils' transition to tertiary education<sup>2</sup>. Our study therefore also contributes to answering the question of how institutional features might buffer the consequences of family instability.

## 2. Background

### 2.1 *The union dissolution penalty in children education and its heterogeneity across socio-economic groups*

Research interest in how family structures are related to children's life chances has been extensive. In particular, literature addressing the consequences of parental separation on children outcomes has flourished in the last decades (Amato 2000, 2001; Blossfeld et al. 1995; De Graaf/Kalmijn 2006; Härkönen/Dronkers 2006; Härkönen et al. 2017; Hoem 1997; Jalovaara 2003; Kalmijn 2010; Lyngstad 2004; Matysiak et al. 2014). The experience of parental union dissolution has been shown to be associated with short-term increases in physical and psychological distress and decreases in cognitive development and interpersonal wellbeing, and longer-term reductions in relationship stability, educational achievement and economic security (Amato 1994). The reduction in time and resources

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2 In this article when we use the term "effect" without a strict causal interpretation. We discuss below issues related to the endogeneity of parental separation.

from the non-resident parent is considered one explanation for the lower achievements of children after parental separation (Albertini/Dronkers 2009). Other mechanisms include the distress and conflict leading to and produced by the separation; the change in parenting style following separation (Amato 1994, 2000) and the decline in economic resources following a divorce or separation (Albertini/Dronkers 2009; Astone/McLanahan 1991, McLanahan 1999).

Recent studies have also focused on the heterogeneity of the separation penalty among children from different socioeconomic background (Albertini/Dronkers 2009; Bukodi/Dronkers 2003; Fischer 2007; Lampard 2012; Bernardi/Boertien 2016; Härkönen et al. 2017; Kalmijn 2010). The hypothesis is that some groups might be better equipped to deal with the consequences of family disruption. However, empirical evidence in this respect is mixed. Some studies show that the largest negative effects of separation are found among disadvantaged families (Albertini/Dronkers 2009; Bukodi/Dronkers 2003; Fischer 2007; Gratz 2015; Lampard 2012; Mandemakers/Kalmijn 2014). For example, Lampard (2012) shows that in non-intact British families, the occupational position of their offspring is negatively affected by parental separation when parental education is low. Albertini and Dronkers (2009) find that in Italy children of low educated divorced parents fare significantly worse compared to children of low educated intact couples, while children of highly educated parents (whether separated or married) do not differ in a significant way. Similar results in terms of mothers' education moderating the negative effects of divorce for children's educational attainment are found in a study on Hungary by Bukodi/Dronkers (2003). Gratz (2015) finds that parental break-up negatively affects school grades and the probability of attending upper secondary education in Germany only for the children of low educated parents.

Low socioeconomic status parents supposedly lack the necessary social and cultural resources to manage the negative consequences of separation such as parental conflict, the loss of support from the wider family, the partial loss of authority and the lower quality of socialization (Albertini/Dronkers 2009). Furthermore, the financial burden of a divorce weighs more on the limited budget of low socioeconomic status families, which translates into fewer economic resources being devoted to children's education, compared to the high socioeconomic status families. The argument echoes that by other studies in social stratification research focusing on how families with different socioeconomic background deal with adverse events affecting children's lives. These studies find a compensatory effect that allows socio-economically advantaged families buffering the consequences of these negative events on their children's future achievements (Bernardi 2014). Highly educated parents, for instance, more frequently help children with their homework or can afford to pay private lessons to compensate for children's low performance at school (Bernardi/Gratz 2015). Similar compensatory mechanisms might be at play when the problematic event is parental separation.

On the other hand, some studies find that the separation penalty is smaller among children from lower socioeconomic origins (Beller 2009; Bernardi/Boertien 2016). Early studies conducted on the US show that parental separation fosters intergenerational mobility by reducing the transmission of resources from parents to children (Biblarz/Raferty 1999). Since the transmission is normally larger for children of high socioeconomic status parents, the latter are hypothesized to suffer more from parental separation compared to

children of low socioeconomic status origin. With slight variants, then, the smaller penalty that some studies find for children of low SES families in case of separation is interpreted as a floor effect. For children from low social origins, the difficulties of reaching higher level of educations are already very large and the added negative effect of separation is smaller (Bernardi/Radl 2014; Klamjin 2010).

## 2.2 *The heterogeneity of the union dissolution penalty: why the type of outcome matters*

The inconsistent results that point in some cases to a compensatory effect and in other to a floor effect of parental separation might be reconciled if one distinguishes among different child outcomes. In particular, in the case of dichotomous outcomes, the notion of threshold is relevant<sup>3</sup>. One can assume that children are distributed along an unobserved continuous distribution that reflect the propensity of a given outcome, such as enrolling at university. If their propensity is above a given threshold, they make the transition (i.e. they enroll at the university) otherwise they do not. One can further assume that a parental union separation entails some negative consequences for children (stress, losses of economic resources, losses of parental time etc.) that push the unobserved propensity of a given outcome down. What then becomes crucial is where children are located in the propensity distribution and whether the parental separation pushes them below the critical threshold. If the children are predominantly already located much below the critical threshold, the consequences of a separation will be minimal. Similarly, if they are located far above it, the consequences will also be minimal. Conversely, the consequences of separation will become most visible when children are located in the proximity of the threshold. In those cases, a parental separation might more consequential because it might push the children below the threshold.

In this respect it is relevant to consider how extreme the threshold is, i.e. the level of selectivity of a given outcome, and consequently how “rare” an educational outcome is. If one further assumes that the propensity of a given outcome is normally distributed, when the threshold is extreme and thus outcome is “rare”, only few individuals are located in the proximity of the threshold. In this case the negative consequences of parental separation will be smaller. On the contrary, the largest parental separation penalty should be observed when the probability of the outcome is 0.5 and the threshold divides the population in two equal groups, 50% who attain the outcome and 50% who do not. Critically, the rarity of an outcome depends on the socio-economic conditions of the family of origin. In general, an educational failure (such as failing to complete high schools) is rare outcome for students from high SES families, while an educational success (such as achieving a university degree) is a rarer outcome for students from low SES families.

The prediction then that one can formulate based on the notions of threshold and selectivity associated with a given outcome is that the negative consequences of a parental separation are weaker for students from high SES families compared to those from low SES families, when the outcome of interest is an educational failure. This is because edu-

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3 We thank one of the anonymous reviewers for pointing us the usefulness of this distinction out and encouraging us to elaborate on it.

cational failure is a rare outcome for high SES student and the largest majority of them are far above the underlying threshold to experience any consequence in case of parental separation. A larger penalty is, however, more likely to manifest for students from high SES families in case of an educational success because some of those who were close to the threshold might fall below it. The opposite pattern can be expected for students of socioeconomically disadvantaged families. They are more frequently just above the threshold of an educational failure outcome and more frequently much below the threshold of an educational success outcome. In their case, a stronger penalty associated with parental separation should be observed for educational failure and weaker one for educational success. The important implication of this line of argument is that although the penalty might be the same, its consequences might still vary depending on the unobserved distribution with respect to the threshold for a given educational outcome.

This argument in terms of threshold has already been outlined in Bernardi and Boertien (2016), who show that in the UK the separation penalty in tertiary education attainment is twice as large for the children of highly educated parents compared to the children of low educated parents. Moreover, the authors find that this heterogeneity is due to the larger decline in family income after separation in families with highly educated parents. Most importantly, they also show that the same decline in income is more detrimental for the educational attainment of children in highly educated families because they lie on a part of the income distribution where a change in family income is more strongly associated with tertiary education attainment.

Finally, although for the sake of brevity we cannot provide a systematic review of all the previous findings, the theory sketched in this section, based on the idea of threshold (i.e. different level of selectivity of different educational outcomes), seems to be consistent with the opposite patterns of heterogeneity in the family instability penalty found, for instance, in Bernardi and Radl (2014) and Grätz (2015). Bernardi and Radl (2014) study the probability of tertiary education attainment, and thus an educational outcome with a relatively high critical threshold and relatively rare occurrence for children of low SES families. In line with the argument proposed above when the educational outcome is a success, they find that the average family instability penalty is lower for children of low educated parents. Grätz (2015) analyses the probability of attending the upper track in secondary school (Gymnasium) in Germany. Failing to enroll in the academic track is relatively rare outcome for children of highly educated parents<sup>4</sup> and Grätz (2015) finds no negative consequences of parental separation for them.

### 2.3 *Spanish context*

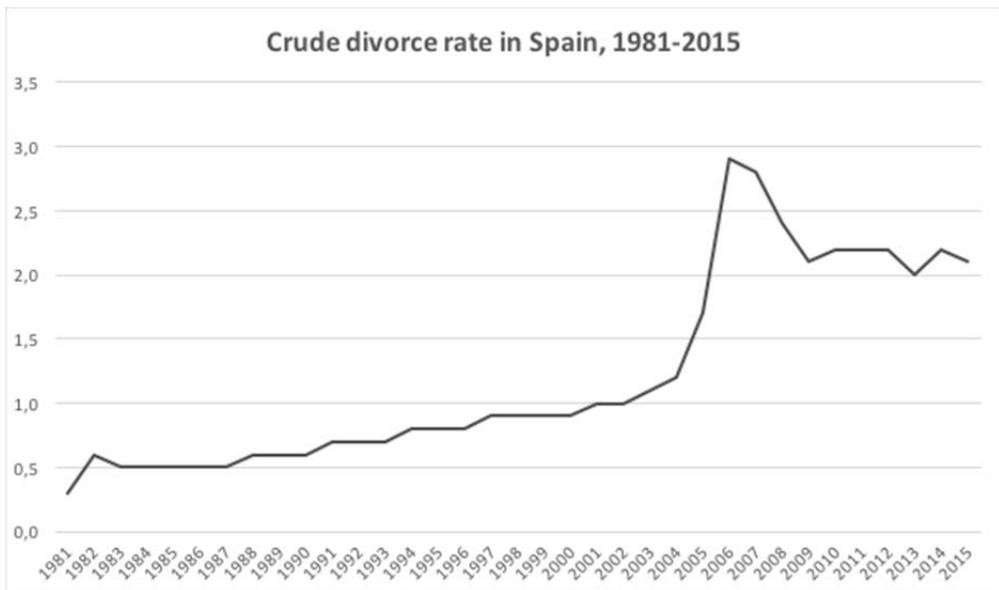
Most of the existing studies on the intergenerational effects of union dissolution on children are conducted in the USA or in Northern and Continental European countries. Very few papers investigate the issue in Southern European countries (Albertini/Dronkers 2009). The differences between these contexts are numerous in terms of welfare, educa-

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4 The proportion of children born between 1983 and 1993 (roughly the same years considered in Grätz 2015) whose parents have an Abitur (the certificate to access higher education) and achieve themselves an Abitur is between 70 and 75% (Klein 2018) for children of highly educated parents.

tional systems, family and social norms, and the diffusion of divorce and separations (Härkönen/Dronkers 2006; Coppola/Di Cesare 2008). It is difficult to generalize the results obtained in other contexts to a country like Spain, which passed the Divorce Law only in 1981 but subsequently saw a very steep increase in divorce rates since then, especially after 2005 when the Express Divorce Bill making separations easier was passed (see Figure 1). Unfortunately, more general statistics including union dissolutions after cohabitation, the focus of this paper, are not yet available for Spain. However, Figure 1 suggests that, during the period under analysis in this paper (children born between 1965 and 1994, see more details below), Spain was still in the early stages of the diffusion of divorce. This coupled with an educational gradient that was still positive (Härkönen/Dronkers 2006) suggest that in Spain the largest separation penalty would be borne by children of low educated parents. Compared to countries like Finland and the UK, parental separation is still rare and financially expensive. The cost of union dissolution weighs more on the budget of lower socioeconomic strata of the population. Moreover, being union break-ups more common among highly educated couples in the period under analysis, the selection mechanism still work in favor of them. The few lower educated partners who break-up might be those with very troubled relationships, with the highest conflict and the lower inter-relational skills to deal with problems within the couple.

Figure 1: Crude divorce rate in Spain, 1981-2015



Source: Elaboration of the authors based on Eurostat data.

The educational system in Spain is fundamentally comprehensive and cost-free (Calero 2005). Primary education (Colegios de Educación Primaria) comprises 6 years (6-12 years old) and lower secondary education comprises an additional 4 years (Educación Secundaria Obligatoria, age 13-16) after which compulsory education ends. Upper sec-

ondary education is either academic or vocational (Bachillerato or Formación Profesional de Grado Medio) and lasts two years. Tertiary education also comprises both academic and vocational tracks (Formación Profesional de Grado Superior, Diplomatura, Licenciatura, Grado, Máster or Doctorado). The separation between academic and vocational tracks in Spain thus takes place relatively late, at 16-year-old (OECD 2012). Nevertheless, Spain is characterized by low levels of post-compulsory education participation and especially low rates for children from low socioeconomic or immigrant origins (OECD 2012; Azzolini et al. 2012; Fernández-Mellizo/Saturnino 2017). The rate of retaking, particularly during compulsory education, is large and higher than the EU average. Retaking happens when a student fails to achieve a minimum level of proficiency in a given number of key subjects. Only half of students manage to finish compulsory lower secondary education without repeating at least one year and the majority of the retaking takes place in the first and third year of ESO (Educación Secundaria Obligatoria) when the pupils are 12-16 years old (Carabaña 2017). Retaking has long-term consequences for students: the risk of dropping out with only secondary education or even before is much higher among those who have repeated one year (Calero 2005). Among those who enter upper secondary education the largest majority also enter university. In other words, the transition from compulsory to non-compulsory education is the critical hurdle within the Spanish educational system. Those who manage to overcome it are also likely to access tertiary education. University fees are comparatively low and publicly subsidized. The drop-out rates among those who enroll at university is also relatively low, when compared to other OECD countries (OECD 2013: 8). As a result, the educational distribution is polarized (Gradin 2000; Ballarino et al. 2008): Spain has very high rate of lower secondary educated or less, but also comparably high level of university degree holders, when compared to other OECD countries (OECD 2014a, 2014b).

The implication for our study is that the negative association between union dissolution and retaking, on the one hand, and entering to university, on the other hand, are likely to be different. The smoother transition from upper secondary to tertiary education, and the very low cost of university would suggest that, contrary to other context where university fees are very high such as the UK, the heterogeneity in the separation penalty across socioeconomic groups on the “good” outcome (university attendance) would be lower in Spain. The penalty is expected, instead, to be larger and more heterogeneous across parental resources on the “bad” outcome, namely on years’ repetition during compulsory education. According to the official statistics presented above, retaking is disproportionately more common among pupils coming from disadvantaged families. Since parental separation is a form of disadvantage that accumulates with other economic or social disadvantage, we expect the association between union dissolution and children’s probability of retaking to be larger among families with low educated parents.

### 3. Data, variables and method

The dataset we use is the 2013 Encuesta Social General Española (ESGE) conducted by the Centro de Investigaciones Sociológicas (CIS). A representative sample of Spanish 18+ residents was interviewed during 2013, reaching a total sample size of more than 5,000

individual respondents<sup>5</sup>. This survey collected detailed information on respondents' educational outcomes (years' repetition and educational attainment) on parents' characteristics (e.g. education, marital history).

We restrict the analysis to the respondents born after 1965, namely those respondents who were 16 or younger in 1981, to limit as much as possible the selected group of parents who divorced before the Divorce Law of 1981. We also restrict the sample of respondents to children born to Spanish mothers. Our final ESGE sample is composed of 2,240 respondents born between 1965 and 1994 (aged 19-48 at the time of interview), among whom 114 experienced parental separation (around 5% of the sample) including both legal divorces after marriage and separations after cohabitation. We acknowledge that the sample size is small and that the number of parental separations is critically low. For this reason, we cannot distinguish between legal divorce after marriage and other separations and, besides parental separation and the educational level of the parents, it would not be possible to divide further the sample to investigate the impact of other characteristics of parents and children (e.g. respondents' age at parental marital disruption, respondents' sex, parental occupation). These data limitations are typical of studies of marital disruption in countries where divorce is a rare event as Spain (Albertini/Dronkers 2009).

Table 1 reports the distribution of the independent and dependent variables. The main explanatory variable, parental separation is operationalized with a dummy variable that takes value 1 if parents separated or divorced before age 16. For descriptive purposes we report the distribution of the age of the respondents at parental separation. Among the 114 cases of parental separation<sup>6</sup>, 75% (86 cases) happened when children were younger than 12. We focus on two child educational outcomes: the repetition of at least one year during primary or secondary school and whether the respondent ever enrolled in tertiary education. The former (repetition) can be considered a "bad" educational outcome, while the latter (university attendance) a "good" one. About one third of the respondents in the sample repeated at least one year in primary or secondary school and about one third have ever enrolled at the university. Since we do not know in which educational cycle the repetition took place, in principle, it could happen before parental separation. However, as described in section 2.3 most of the retaking takes place in ESO, when pupils are 12-16 and there is very low repetition before and especially after that age. In contrast, we showed in Table 1 that the majority of the parental union dissolutions take place when the children were below 12. The likelihood that repetition happens before parental separation is thus of low concern. We do not limit the sample to union dissolutions that happened before the age of 12, so as not further reduce the number of parental breakups that is already extremely low. We are sufficiently confident that we measure parental separation before retaking eventually takes place.

Parental education – our proxy for the socioeconomic background of the family – is either the father's or the mother's educational attainment and it is operationalized as a categorical variable of low (primary or lower secondary), middle (upper secondary) and high (at least some tertiary). Table 1 shows that Spanish mothers are, on average, slightly less edu-

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5 For more information on sampling procedures, response rate and characteristics of the survey please visit [http://www.cis.es/cis/export/sites/default/Archivos/Marginales/2960\\_2979/2975/IM2975\\_ESGE.pdf](http://www.cis.es/cis/export/sites/default/Archivos/Marginales/2960_2979/2975/IM2975_ESGE.pdf).

6 We still have 18 separations happening before 1981. We did not exclude them to not reduce further the number of events of interest. We believe results are not driven by these very few cases.

cated than fathers, with three quarters of mothers having only lower secondary education at maximum and less than 10% having tertiary education (*versus* 14% of fathers).

The additional control variables included in the models are typical of analyses of educational outcomes. The respondent's year of birth (linear, centered around the mean, 1978) as educational attainment varies over cohorts; the sex and number of siblings (only child, one sibling or two or more) since school performance is usually higher for girls than boys and parental resources are diluted among siblings (Downey 2001). Furthermore, we control for the size of the city where the respondent lives and we add a dummy for the Autonomous Community where s/he resides since the risk of repetition varies remarkably across communities in Spain (Bernardi 2012). Finally, we control for whether parents were working when s/he was 16 years old. The distribution of these variables is also reported in Table 1. Interestingly, almost half of mothers were working when the respondents were growing up. Among the working mothers, 8% separated in contrast to the 2.3% separating among non-working mothers (not shown). To put in another way, among the mothers who separated, three quarters were in the labor market. Looking at their educational levels, we see that separated women tend to work more often if low educated. We cannot identify whether these women were working before the union dissolution or started working after separating. To the extent, however, that labor market participation can be an antecedent of parental separation and it might also affect children's educational outcomes, we include it as a control variable in the analyses.

*Table 1:* Descriptives. Respondents born after 1965 to Spanish mothers

Independent variables	#	%	Total
<b>Parental separation</b>	<b>114</b>	<b>5.1</b>	<b>2240</b>
Mother education:			
Primary or lower secondary	1359	74.3	
Upper secondary	293	16.0	
Tertiary	177	9.7	1829
Father education:			
Primary or lower secondary	1246	68.3	
Upper secondary	324	17.7	
Tertiary	255	14.0	1825
Female Respondents	1153	50.4	2286
Number of siblings			
R is the only child	292	12.8	
One siblings	1323	57.8	
Two siblings or more	672	29.4	2287
Working mothers when R was 16	1076	48.0	2240
Working mothers and separated	86	8.0	
Working and separated, Primary or lower secondary	50	4.6	
Working and separated, Upper secondary	19	1.8	
Working and separated, Tertiary	7	0.7	
Working and separated, missing education	10	0.9	
Working fathers when R was 16	2027	93.3	2173
R lives in a city with more than 400000 inhabitants	317	16.2	2287
<b>Dependent variables</b>	<b>#</b>	<b>%</b>	<b>Total</b>
R repeated one year in primary or secondary school	860	38.2	2250
R enrolled or attended university	779	34.4	2263

*Source:* Elaboration of the authors based on ESGE 2013.

Table 2 shows the distribution of parental separation by mother and father's education. The highest proportion of separating parents in our sample is present among mid-educated mothers and fathers. In line with previous findings (Coppola/Di Cesare 2008, Harkonen/Dronkers 2006) the educational gradient of union dissolution in Spain for parents of children born between 1965 and 1994 is still slightly positive and has not yet reversed. More than 9% of upper secondary educated mothers separate against less than 5% in both lower and higher educational groups. The distribution is more even across fathers' educational groups, where upper secondary and tertiary educated are more likely to experience union dissolution compared to low educated fathers.

*Table 2: Parental separation by parents' education*

	Parental separation		R repeated one year		R enrolled in university	
	#	%	#	%	#	%
Mother's education:						
Primary or lower secondary	62	4.6	514	38.4	413	30.7
Upper secondary	27	9.3	84	29.0	164	56.2
Tertiary	8	4.6	28	15.9	136	77.3
Tot.	97		626		713	
Father's education:						
Primary or lower secondary	50	4.1	484	39.3	355	28.6
Upper secondary	19	5.9	107	33.3	162	50.5
Tertiary	13	5.2	50	19.9	190	75.1
Tot.	82		641		707	

*Source:* Elaboration of the authors based on ESGE 2013.

Table 2 further reports the distribution of the educational achievements of children by parental education. The distribution is similar whether we look at mother's or father's education: educational outcomes are far better among children with highly educated parents compared to low educated. Around 16-20% of respondents with tertiary educated parents repeat one year during primary or secondary school, while this proportion reaches 40% among the respondents with low education<sup>7</sup>. By contrast, only one third of respondents coming from families with low educated parents ever enroll in university compared to three quarters of respondents with tertiary educated parents.

Following this descriptive illustration of the sample and variables in the ESGE dataset, we report the results from the multivariate regressions in the next section. We estimate both Linear Probability Model (LPM)'s coefficients with robust standard errors and logit models with odds ratios. The two provide substantially equivalent results in terms of marginal effects so, due to the easier interpretation, the LPM is reported in the main text while the Logit models are reported in Appendix Tables A.1-A.2.

<sup>7</sup> Very similar differences in the risk of repetition by parental education have been previously documented using PISA data (Enguita et al. 2010).

## 4. Results

Table 3 reports the LPM coefficients for repetition and enrollment in university depending on parental separation and mother's or father's education. Net of family structure, the probability that respondents born to tertiary educated mothers experience the repetition of one year at school is 23 percentage points lower, compared to children of low educated mothers. Conversely, the probability of attending university is 46 percentage points higher for children with mothers with tertiary education than children with mothers with lower education. The advantage of having a father who is tertiary educated are similar but slightly smaller compared the advantage of a highly educated mother. Net of parental resources, experiencing parental union dissolution is negative for child educational attainment: when parents are separated instead of together, the probability of retaking one year increases about 15%. Similarly, having separated parents reduces the likelihood of attending university by about 10%. The penalty is, for both outcomes, substantially meaningful: it is twice the size of female advantage in the case of school performance and two-thirds of that for the transition to university. Similar results from other studies confirm the robustness of the association: using Generation and Gender Survey for data for 14 countries, Bernardi and Radl (2014) estimate an average divorce penalty of around 7 percentage points for achieving a university degree. Results from the logistic regression are very similar (Table A.1), with the odds ratio of repeating one year being twice as large if the respondent has separated parents rather than living in intact families and the odds ratio of attending university being around 40% smaller for children of separated parents.

If one broadens the perspective to the larger issue of intergenerational inequality, our study also indicates that social background inequalities dominate over the disadvantage associated with family structure, particularly in the case of enrollment at university. For instance, the probability of university enrollment for children of highly educated parents is about 50 percentage points higher than that of the children of low educated parents (and about 6 times higher in relative terms). The penalty associated with parental separation amounts to a reduction in the probability of enrollment of about 10 percentage points on average. Any discussion on the role of family structure on the reproduction of inequality should not lose sight of the fact that the size of association between children's outcome and family structure is tiny when compared to that between children's outcome and parental education or social class.

In line with existing evidence, control variables show that female respondents have lower risk of repetition and a higher probability of university attendance while the number of siblings is negatively associated with both outcomes. Having a mother and father working is positively correlated with higher educational outcomes although the effects are not precisely estimated in the models. The same applies to living in a large city: it fosters better educational outcomes but the coefficients are often not statistically significant. Unexpectedly, younger respondents perform worse in terms of grade repetition and they are less likely to enter tertiary education<sup>8</sup>. These coefficients are small but precisely estimated.

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8 The increase over time in the risk of repetition is in line with the administrative data presented in Carabaña (2017) that show that the rate of repetition increased between mid-1990s and the 2014. In

*Table 3:* Linear Probability Models of repeating one year at school and attending university after parental separation by mother and father education

	(1) Model	(2) Model	(3) Model	(4) Model
	Repetition of one year		Attending university	
<b>Mother upper secondary</b>	-0.104*** (-0.166- -0.041)		0.258*** (0.192-0.323)	
<b>Mother tertiary</b>	-0.234*** (-0.302- -0.167)		0.462*** (0.390-0.534)	
<b>Father upper secondary</b>		-0.061** (-0.120- -0.002)		0.210*** (0.149-0.271)
<b>Father tertiary</b>		-0.194*** (-0.253- -0.135)		0.459*** (0.399-0.519)
<b>Parental separation</b>	0.154*** (0.045-0.262)	0.152*** (0.043-0.261)	-0.094* (-0.196-0.008)	-0.104** (-0.205- -0.004)
<b>Female</b>	-0.086*** (-0.131- -0.042)	-0.086*** (-0.130- -0.042)	0.139*** (0.095-0.182)	0.151*** (0.108-0.193)
<b>Year of birth (Cent.)</b>	0.005*** (0.002-0.008)	0.003** (0.001-0.006)	-0.006*** (-0.009- -0.003)	-0.004*** (-0.007- -0.002)
<b>R's siblings</b>	0.063*** (0.026-0.100)	0.065*** (0.028-0.103)	-0.072*** (-0.108- -0.036)	-0.076*** (-0.112- -0.041)
<b>Mother working (R 16)</b>	-0.009 (-0.058-0.039)	-0.051** (-0.098- -0.004)	0.003 (-0.044-0.050)	0.069*** (0.025-0.114)
<b>Father working (R 16)</b>	-0.005 (-0.098-0.089)	-0.006 (-0.095-0.083)	0.083* (-0.001-0.168)	0.060 (-0.021-0.141)
<b>City &gt; 400000</b>	-0.023 (-0.089-0.044)	-0.054 (-0.119-0.010)	0.050 (-0.016-0.115)	0.054* (-0.009-0.118)
<b>CA</b>	Yes	Yes	Yes	Yes
<b>Constant</b>	0.432*** (0.300-0.563)	0.472*** (0.345-0.599)	0.108* (-0.017-0.233)	0.057 (-0.062-0.175)
<b>Observations</b>	1,698	1,750	1,707	1,760
<b>R-squared</b>	0.063	0.063	0.150	0.170

*Note:* CA stands for *Comunidad Autónoma*. 95% Heteroskedasticity robust confidence intervals in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

*Source:* Elaboration of the authors based on ESGE 2013.

In Table 4 we introduce the interaction between parental separation and parental education. The separation penalty in the risk of retaking for respondents with low educated mother or father (main effect) is larger compared to the average penalty measured in Table 3, while it is not for university enrollment (with the exception of children with low educated fathers, Model 4). Upper secondary and especially tertiary educated parents seem to compensate for the separation penalty (negative interaction terms for retaking and positive for enrollment at university). Contrasting the separation effect for the tertiary educated (changing the reference category in the parental education variable, not shown) also suggest that there is no difference in the risk of repetition and the probability of attend-

the case of university attendance one has to consider that the youngest respondents might still have a chance to enroll in the coming years (after completing secondary education in case they are late due to repetition or after a spell of inactivity or employment).

ing university among children of tertiary educated parents whether separated or not . However, coefficients are very imprecisely estimated – probably due to the very few cases of separation, especially among the tertiary educated – and the F-test for joint significance of the interactions does not rule out the possibility of a zero-interaction effect, so we cannot give a definite judgment based on these results. All interactions in the logistic model (Table A.2) are also not statistically different from zero and odds ratios in non-linear model are harder to interpret especially with regard to interactions.

*Table 4:* Linear Probability Models of repeating one year at school and attending university after parental separation by mother and father education. Interaction models

	Model (1)	Model (2)	Model (3)	Model (4)
	Repetition of one year		Attending University	
<b>Mother upper secondary</b>	-0.095*** (-0.159- -0.030)		0.261*** (0.193-0.328)	
<b>Mother tertiary</b>	-0.227*** (-0.296- -0.158)		0.458*** (0.384-0.532)	
<b>Father upper secondary</b>		-0.057* (-0.118-0.004)		0.208*** (0.145-0.271)
<b>Father tertiary</b>		-0.182*** (-0.243- -0.122)		0.454*** (0.393-0.516)
<b>Parental separation</b>	0.203*** (0.066-0.340)	0.209*** (0.057-0.360)	-0.094 (-0.216-0.027)	-0.130** (-0.251- -0.009)
<b>Par. Separation*Mother upper secondary</b>	-0.128 (-0.374-0.118)		-0.033 (-0.278-0.211)	
<b>Par. Separation*Mother tertiary</b>	-0.172 (-0.459-0.116)		0.124 (-0.203-0.450)	
<b>Par. Separation*Father upper secondary</b>		-0.077 (-0.334-0.180)		0.039 (-0.236-0.314)
<b>Par. Separation*Father tertiary</b>		-0.227* (-0.470-0.016)		0.092 (-0.149-0.333)
<b>Female</b>	-0.086*** (-0.130- -0.041)	-0.086*** (-0.130- -0.042)	0.138*** (0.094-0.182)	0.150*** (0.108-0.193)
<b>Year of birth (Cent.)</b>	0.005*** (0.002-0.008)	0.003** (0.001-0.006)	-0.006*** (-0.009- -0.003)	-0.004*** (-0.007- -0.002)
<b>R's siblings</b>	0.063*** (0.026-0.100)	0.066*** (0.028-0.103)	-0.072*** (-0.108- -0.036)	-0.077*** (-0.112- -0.041)
<b>Mother working (R 16)</b>	-0.011 (-0.060-0.038)	-0.050** (-0.097- -0.004)	0.003 (-0.044-0.050)	0.069*** (0.024-0.114)
<b>Father working (R 16)</b>	-0.003 (-0.097-0.090)	-0.006 (-0.094-0.083)	0.083* (-0.001-0.168)	0.060 (-0.021-0.140)
<b>City &gt; 400000</b>	-0.023 (-0.089-0.044)	-0.057* (-0.122-0.009)	0.049 (-0.017-0.115)	0.055* (-0.008-0.119)
<b>CA</b>	Yes	Yes	Yes	Yes
<b>Constant</b>	0.428*** (0.296-0.560)	0.467*** (0.339-0.594)	0.108* (-0.018-0.233)	0.059 (-0.060-0.178)
<b>Observations</b>	1,698	1,750	1,707	1,760
<b>R-squared</b>	0.064	0.064	0.150	0.170

*Note:* CA stands for *Comunidad Autónoma*. 95% Robust Confidence Intervals in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

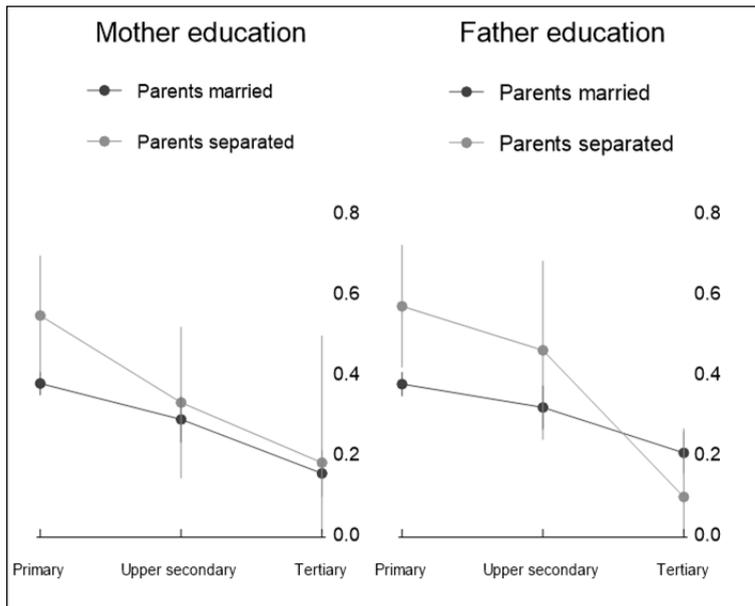
*Source:* Elaboration of the authors based on ESGE 2013.

Figures 2-3 present results from the predicted probabilities of children educational outcomes from the logistic model (also from Table A.2). Figure 2 shows the predicted probabilities of children repeating one year at school across mothers' and fathers' educational levels, comparing those who have separated (grey) or married (black) parents. We see that the penalty associated with parental separation is concentrated mainly among children with low educated parents. The gap is substantial both in absolute and in relative terms: the probability of retaking one year is about 20 percentage points higher among children of low educated parents that have separated, compared to children of low educated parents in intact families. No differences in the probability of retaking are observed among children of highly educated parents depending on whether the parents separated or not.

In terms of transition to university, the heterogeneity in the parental separation penalty by parental education is less pronounced. Moreover, the confidence intervals for the estimates for children from intact and non-intact families overlap (Figure 3) and therefore we cannot draw definite conclusions regarding the heterogeneity of the penalty across socioeconomic groups. Still, no support is found for the argument discussed in the section 2.2 that a larger penalty should be observed among children of highly educated parents in case of a "good" outcome, such is enrollment at the university.

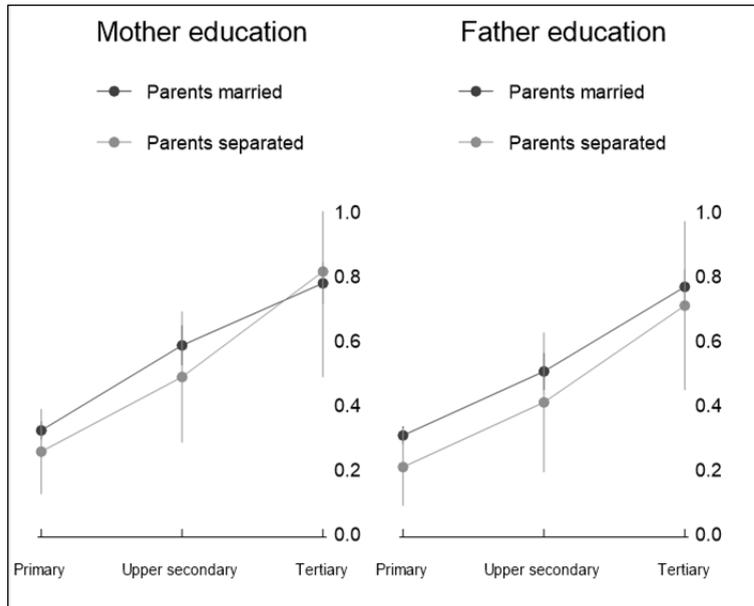
Overall, both the logistic and the linear probability models indicate that, if there is any heterogeneity across socioeconomic group in Spain, the largest negative consequences of union dissolution are to be found for the risk of repeating one year at school and among children of low educated parents. This holds irrespective of which parent we choose to measure family background and both considering absolute and relative differences.

Figure 2: Predicted probabilities of repeating one year at school



Source: Elaboration of the authors based on ESGE 2013.

Figure 3: Predicted probabilities of attending university



*Note:* Margins computes CI with a normal approximation of the standard errors computed from nonlinear predictions using the delta-method. Confidence intervals that include impossible values of the parameter, outside the range 0-1 in case of predicted probabilities, can nevertheless be “correct.” The estimation of confidence intervals only approximate (asymptotically) the coverage probability.

*Source:* Elaboration of the authors based on ESGE 2013.

#### 4. Robustness checks

We performed a series of additional analyses as robustness checks (results for the additional models can be obtained from the corresponding author upon request). First, when we use the dominance model – the highest education of the two parents – we obtain almost identical results to using father's education. Second, net of combined mother and father resources,<sup>9</sup> the penalty is only slightly smaller for both outcomes, but imprecisely estimated in the model of the probability of entering university. Third, we replicate analyses dropping missing observations in any of the explanatory and dependent variables to perform the same analyses on identical samples. The sample size becomes even smaller ( $N=1,608$ ) and the number of separations is reduced to 71. Results do not differ substantially from those presented here but the confidence intervals predictably become much larger. Fourth, we distinguish between primary and lower secondary education for mothers and fathers to check

9 We do not find strong evidence of multicollinearity (the highest Variable Inflation Factor is 1.70 for parental separation).

whether the union dissolution penalty was concentrated among very low (primary) educated parents. This seems to be the case for fathers' education on both performance and transition. The penalty is larger for primary educated mothers for transition to university but it is larger for lower secondary educated for school performance. Finally, we analyze the association between parental separation and transition to tertiary education, conditional on having attained at least upper secondary education (Formación Profesional de Grado Medio or Bachillerato, or higher). The penalty on attending tertiary education conditional on secondary education is lower and never statistically different from zero, across all levels of maternal or paternal education. This might be related to the reduced sample size or, more substantively, to the fact that once upper secondary education is attained, a large majority of students make the transition to the university.

To summarize, the robustness checks confirm the solidity of our main findings but also highlight new within-group heterogeneities. In all models, we find that the parental separation penalty on children educational outcomes is more pronounced for the risk of repeating one year than for transition to tertiary education, and the penalty on repetition is stronger among children with low educated mothers and fathers. However, the check on a more refined measure of parental education reveals differences within the low educated group. For the transition to university we find a significant penalty in non-intact families for the children of primary educated mothers and fathers, meaning that our findings in the main analysis average out the heterogeneity of the primary and lower secondary educated parents on university enrollment. Only the very low tail of children with primary educated parents suffer a penalty after parental separation on transition to university.

## 5. Conclusions

Focusing on the case of Spain, a relatively under-researched context in this literature, this paper investigates the existence of a union dissolution penalty on children's educational performance and school transitions, measured through years' repetition during primary or secondary school and enrollment in tertiary education. Before drawing our main conclusions, we must highlight a few limitations of our study. First, our findings cannot be interpreted as causal. Part of the observed negative association between parental separation and children's educational outcomes is likely to be driven by parental conflict or other unobserved traits (i.e. personality, interpersonal or conflict resolution skills) that lead to separation and also negatively influences children's educational outcomes. A correct interpretation of our findings should thus refer to some type of union malfunctioning that manifests itself in the observed break-up. In this respect there is also evidence that in some cases of harsh parental conflict, children actually benefit if parents separate (Jekielek 1998). In addition, our results represent a gross estimate that does not take into account post-separation arrangements that previous studies have indicated to be crucial for child wellbeing and possibly for educational attainment (Turunen 2017; Vanassche et al. 2013). The second relevant limitation of the study is the small sample size from which we cannot draw very conclusive statements, particularly when we investigate interactions. Union dissolution has increased significantly in Spain only during the last decade and studying its long-term consequences for the children is to a certain extent premature. Nonetheless,

our results can provide some hints for the coming years, when more and more children with separated parents will attend schools. An additional caveat is that in the cohorts considered in our analysis the educational gradient of union dissolution was still partly positive. This means that union dissolution was less prevalent among low educated parents. Low educated parents who did separate were, therefore, possibly more negatively selected on factors such as parental conflict, which also hinder children's educational performance and attainment. Since the educational gradient has changed in more recent years (Garriga/Cortina 2017), it will be interesting to replicate our analysis in the future to check whether the observed larger penalty for children of low educated parents also decreases.

With these caveats in mind, the main results are the following. First, we confirm existing evidence for other contexts and show that there is a negative association between parental break-up and Spanish children's educational outcomes. The negative impact of separation is more pronounced for the risk of repetition than for enrollment at university. Retaking school years is a typical feature of the Spanish educational system. In Spain, as outlined above, the main divide in educational outcomes is the transition from compulsory to non-compulsory education and grade repetition increases the risk of not making this transition. Second, we find that the heterogeneity in the parental separation penalty depends on the type of educational outcome considered (Bernardi/Boertien 2016; 2017b). For the analysis of the risk of repetition, that following our previous discussion can be considered an educational failure and a relatively rare event for students with highly educated parents, our results are in line with those previous studies that have hinted at compensatory effects in the case school performance. Our findings show that among the children of highly educated parents, the risk of repetition does not increase much if the parents separate, while it does among the children of low educated parents. The theory that we have sketched in section 2.2 provide a structural explanation of this findings. While the notion of compensatory advantage implies some active actions of parents to buffer their children from the negative consequences of an adverse event (Bernardi 2014), the theory outlined in this article suggests that the consequences of parental separation will differ depending on the selectivity of a given outcome. The penalty will be smaller for very rare (or very common) outcomes, as it is the case of repetition for students from highly educated parents. Regarding enrolment in tertiary education, while previous studies tend to document a larger separation penalty among children of highly educated parents (Bernardi/Radl 2014), we find no clear heterogeneity in the separation penalty. How can we explain this divergent finding? Bernardi/Boertien (2017b) show for the UK that the loss in economic resources after a union breakup is more consequential for university attainment among students with highly educated parents. What seems crucial in the case of UK is that the costs for enrollment at the university are relatively high and thus the household income decline associated with parental separation hampers children's chances of continuing on to tertiary education. In the case of Spain, university fees are comparatively low and thus the household's financial resources play a smaller role in the decision to enroll in university, compared to other contexts. In terms of the discussion on the level of selectivity of a given outcome, it is relevant that in the Spanish case enrolling at the university is common among students with highly educated parents (about 75% enroll at university) but not extremely rare among students from low educated parents (about 30% enroll at university, see Table 2). Both groups might then be located in area of the distri-

bution where the negative consequences of a parental separation bring about similar negative consequences. No clear pattern of heterogeneity would then emerge.

Finally, what are the main implications for McLanahan's "diverging destinies" thesis? Our results suggest that family instability does reinforce social inequality in terms of negative outcomes (school repetition), but it does not with respect to positive outcomes such as tertiary education enrollment. In the latter case, previous studies suggest that it might even reduce inequality in many contexts (Bernardi/Radl 2014). Our paper highlights that the choice regarding the type of children's educational outcome used to test the 'diverging destinies' thesis might explain part of the heterogeneity of previous findings, as found elsewhere (Gratz 2015; Bernardi/Boertien 2016). In section 2.2 we have argued that even if the separation penalty is equal across parental educational background, its consequences might still vary depending on threshold and level of selectivity of a given educational outcome. The theory in section 2.2 has only been sketched and further work might profitably expand and formalize the basic insights that we have outlined in this article.

Finally, despite the limits of testing the diverging destinies thesis in the Spanish context, where the diffusion of parental separation among low educated women is still low, this paper shows that the accumulation of disadvantage in terms of the risk of repetition (that can then lead to a permanent drop-out) among those with low educated and separated parents might require some specific attention by school and educational policy makers.

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## Appendix

### Logit models

Table A.1: Logit models of repeating one year at school and attending university after parental separation by mother and father education

	Model (1)	Model (2)	Model (3)	Model (4)
	Repetition of one year		Attending University	
<b>Mother upper secondary</b>	0.620*** (0.458-0.839)		3.191*** (2.376-4.285)	
<b>Mother tertiary</b>	0.278*** (0.176-0.441)		8.752*** (5.786-13.238)	
<b>Father upper secondary</b>		0.758** (0.577-0.995)		2.594*** (1.982-3.396)
<b>Father tertiary</b>		0.372*** (0.262-0.526)		8.442*** (6.037-11.804)
<b>Parental separation</b>	1.957*** (1.231-3.111)	1.966*** (1.229-3.144)	0.631* (0.371-1.075)	0.596* (0.347-1.023)
<b>Female</b>	0.669*** (0.542-0.825)	0.671*** (0.547-0.824)	1.979*** (1.597-2.452)	2.135*** (1.720-2.650)
<b>Year of birth (Cent.)</b>	1.024*** (1.010-1.038)	1.016** (1.003-1.029)	0.970*** (0.956-0.983)	0.979*** (0.966-0.992)
<b>R's siblings</b>	1.337*** (1.123-1.592)	1.351*** (1.135-1.609)	0.699*** (0.584-0.838)	0.681*** (0.568-0.817)
<b>Mother working (R 16)</b>	0.964 (0.770-1.206)	0.792** (0.638-0.984)	1.015 (0.807-1.277)	1.413*** (1.129-1.767)
<b>Father working (R 16)</b>	0.976 (0.638-1.495)	0.969 (0.656-1.431)	1.570* (0.979-2.518)	1.369 (0.873-2.148)
<b>City &gt; 400000</b>	0.878 (0.635-1.215)	0.754* (0.547-1.038)	1.277 (0.934-1.747)	1.303* (0.953-1.781)
<b>CA</b>	Yes	Yes	Yes	Yes
<b>Constant</b>	0.775 (0.422-1.423)	0.933 (0.528-1.650)	0.152*** (0.079-0.291)	0.117*** (0.062-0.221)
<b>Observations</b>	1,698	1,743	1,707	1,760

Note: CA stands for *Comunidad Autónoma*. 95% Robust Confidence Intervals in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Elaboration of the authors based on ESGE 2013.

*Table A.2:* Logit models of repeating one year at school and attending university after parental separation by mother and father education. Interaction models

	Model (1)	Model (2)	Model (3)	Model (4)
	Repetition of one year		Attending University	
<b>Mother upper secondary</b>	0.646*** (0.472-0.884)		3.205*** (2.363-4.347)	
<b>Mother tertiary</b>	0.289*** (0.180-0.462)		8.520*** (5.598-12.967)	
<b>Father upper secondary</b>		0.771* (0.581-1.022)		2.560*** (1.942-3.374)
<b>Father tertiary</b>		0.395*** (0.277-0.562)		8.239*** (5.846-11.611)
<b>Parental separation</b>	2.355*** (1.315-4.218)	2.441*** (1.289-4.623)	0.605 (0.298-1.229)	0.500* (0.232-1.076)
<b>Par. Separation*Mother upper secondary</b>	0.600 (0.208-1.734)		0.974 (0.314-3.027)	
<b>Par. Separation*Mother tertiary</b>	0.473 (0.062-3.630)		2.135 (0.206-22.164)	
<b>Par. Separation*Father upper secondary</b>		0.724 (0.245-2.135)		1.346 (0.387-4.686)
<b>Par. Separation*Father tertiary</b>		0.328 (0.065-1.640)		1.661 (0.351-7.871)
<b>Female</b>	0.670*** (0.543-0.827)	0.672*** (0.547-0.825)	1.976*** (1.595-2.449)	2.133*** (1.719-2.647)
<b>Year of birth (Cent.)</b>	1.024*** (1.011-1.038)	1.016** (1.003-1.029)	0.969*** (0.956-0.983)	0.979*** (0.966-0.992)
<b>R's siblings</b>	1.340*** (1.124-1.596)	1.354*** (1.137-1.614)	0.701*** (0.585-0.840)	0.680*** (0.567-0.816)
<b>Mother working (R 16)</b>	0.956 (0.763-1.198)	0.794** (0.640-0.986)	1.017 (0.808-1.279)	1.410*** (1.127-1.764)
<b>Father working (R 16)</b>	0.982 (0.641-1.506)	0.972 (0.658-1.436)	1.567* (0.977-2.512)	1.365 (0.870-2.142)
<b>City &gt; 400000</b>	0.876 (0.633-1.212)	0.747* (0.542-1.030)	1.276 (0.933-1.744)	1.308* (0.956-1.789)
<b>CA</b>	Yes	Yes	Yes	Yes
<b>Constant</b>	0.763 (0.415-1.402)	0.914 (0.516-1.619)	0.152*** (0.079-0.292)	0.119*** (0.063-0.225)
<b>Observations</b>	1,698	1,743	1,707	1,760

Note: CA stands for *Comunidad Autónoma*. 95% Robust Confidence Intervals in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Elaboration of the authors based on ESGE 2013.

# Having power, having babies? Fertility patterns among German elite politicians

## **Abstract:**

Members of the political elite have far-reaching influence on the overall society. In this paper, we analyse fertility patterns among the German political elite for two reasons: First, we learn more about the living circumstances of a subgroup that makes crucial decisions and could serve as a role model for the general population. Second, we gain insight into the association between social status and fertility patterns at the top tier of the status distribution. We collect biographical data from all high-rank politicians in Germany in 2006 and/or 2017, comprising 184 women and 353 men. We compare fertility patterns in this subgroup to the general population, as well as we differentiate the number of children by politicians' gender, region (eastern/western Germany), party affiliation, and other variables. Results show that, on average, male politicians have relatively many children: 2.0 in western Germany, and 2.2 in eastern Germany. Female politicians have very few children in western Germany (1.3) and relatively many in eastern Germany (1.9). The east-west gap between men and women is entirely driven by differences in childlessness. For men, the observation of high fertility in this high-status group could hint towards a positive association between social status and fertility at the top of the status distribution. For women, large east-west differences in this subgroup could mean that the association between social status and fertility at the top of the status distribution might be negative or positive, depending on macro-level characteristics such as gender norms and work-family reconciliation policies.

**Key words:** fertility, elite, politicians, number of children, family, biographical data

## **1. Introduction and background**

This paper aims to provide first novel insights into the demographic behaviour of a subgroup of the population relevant for its far-reaching influence on society. Our three main motivations for this descriptive analysis of fertility patterns of elite politicians are as follows: First, we can observe the lives of people who make influential decisions that influence society. Political decisions and efforts may be influenced by politicians' individual backgrounds, including the number of children they have (Baumann et al. 2013). Parenthood might also have an influence on political success (Smith 2017).

Second, because of their prestige, elites could serve as role models for the general population, and thus influence their behaviour (Bohlken 2011: 70; Skirbekk 2008). Therefore, it is interesting to investigate characteristics such as parenthood – especially in Germany, a country known for low fertility rates.

Third, we can learn more about the link between social status and fertility by looking at a subgroup at the top of the societal status distribution. Fully understanding an association means understanding it in all parts of the distribution. As many associations are not linear, it is dangerous to extrapolate associations from the middle of the distribution to the upper or lower end. Regular representative surveys do not capture elite groups – the upper end of the social status distribution – in adequate numbers. High education levels among women, high income, and a heavy workload are often associated with childlessness or low number of children. Exploring the number of children born to elite politicians will enlighten whether this association is also prevalent when high status characteristics are pronounced: Elite politicians are characterized by high education, far-above average incomes, very heavy workloads, societal power, and prestige. So, how many children do they have?

*Elite studies in Germany.* Although elites are a popular research topic in the German social sciences (cf. Hoffmann-Lange 2001), none of the previous studies have investigated fertility patterns. The main target groups in elite studies have been comprised of individuals from different elite sectors including politics, business, public administration, the judiciary branch, associations, science, culture, and media (compare term “elite pluralism” by Hoffmann-Lange, 2003: 114). Previous elite studies have focused on social background, career paths, connections between the elite sectors and attitudes towards social inequality (Bürklin/Rebenstorf 1997; Gruber 2009; Hartmann 2013; Kaltefleiter/Wildenmann 1972; Wildenmann et al. 1982; Wildenmann 1968). Our goal is to fill the research gap regarding fertility patterns by studying one specific elite group, which Hoffmann-Lange (1992: 403f) describes as one of the most influential and powerful – and therefore most important – elite groups: politicians.

*Fertility in eastern and western Germany.* Germany has one of the lowest fertility rates in the world (Buhr/Huinink 2015). In the general population, women born in the 1950s in eastern Germany have on average 1.8 children, while their counterparts from the west have around 1.6 children. In the subsequent cohorts, fertility patterns converged as the number of births declined sharply in eastern Germany and only moderately in western Germany. For women born between the mid-1960s and mid-1970s, the average number of children is between 1.5 and 1.6 in both regions. Although the average number of children is similar for this cohort, parity structures differ by region: In the west, women are more likely to remain childless than in the east, but those that have a first child are more likely to also have a second, third, or fourth (childless: 21% vs. 14%, share with 3+ children: 18% vs. 13% for women born in the 1960s, Bujard/Lück 2015; Goldstein/Kreyenfeld 2011). We are not aware of any comprehensive data on cohort fertility patterns of men in Germany.

*Findings on social status and fertility: Men.* The reported studies use education and/or income as proxy measures for social status. Very few deal with the association between social status and the number of children born to men in Germany (these are: Miettinen et al. 2015; Ruckdeschel/Naderi 2009; Schmitt 2005). Available evidence from Germany and other western societies suggests that men with high social status are less likely to remain childless

in most countries, mainly because they are less likely to remain single (Barthold et al. 2012; Hopcroft 2015; Miettinen et al. 2015; Trimarchi/Van Bavel 2017). In the Nordic countries – where data quality on this subject is best – men with high social status have a higher average number of children (Jalovaara et al. 2017; Kravdal/Rindfuss 2008; Nisén et al. 2018).

*Findings on social status and fertility: Women.* In Germany, women with higher levels of education and longer working hours tend to postpone motherhood, are more likely to remain childless, and have fewer children on average. These associations are stronger in western Germany than in eastern Germany (Blossfeld/Huinink 1991; Bujard 2015; Dorbritz 2015; Kreyenfeld/Konietzka 2017). Typical explanations for these east-west differences include differences in gender norms and in work-family reconciliation policies between these regions (e.g. Hudde/Engelhardt 2017). In eastern Germany work-family reconciliation is more favourable because the offer of public childcare is higher and the attitudes towards working mothers are more supportive (e.g. Zoch/Hondralis 2017). In international and comparative research, a number of authors argue that the association of social status and fertility is becoming less negative or even vanishing over time, especially in the Nordic countries (Jalovaara et al. 2017; Kravdal/Rindfuss 2008; Skirbekk 2008). Recent changes in German family policy indicate a development towards the Nordic model (Fleckenstein 2011). However, there is no empirical evidence that shows the association between fertility and social status to have vanished. Based on these findings, we expect to observe low fertility rates among female elite politicians in Germany, especially in western Germany.

*This study.* In this study, we analyse fertility patterns of 537 high-ranking German politicians and compare their number of children to those of the general population.

## 2. Data

*The data set.* We adopt Gruber's (2009) definition of the German political elite, understood in a positional sense (*Positionselite*): Someone belongs to the elite if she or he is in a position with access to influence and power (Gruber 2009: 41; Hoffmann-Lange 1992: 20). Gruber (2009) defines 369 positions of the German executive and legislative branches as the political elite at both the regional and federal level, including positions such as party leaders, ministers, heads of government, parliamentary party group leaders, committee chairs, and secretaries of state (for the list of all positions, see Gruber 2009: 275ff). As for this study, we analyse politicians that are in the Gruber's list (cut-off date: March 1<sup>st</sup>, 2006) and add all politicians that held the same positions on July 1<sup>st</sup>, 2017 (some politicians hold an elite position in both years). The overall data set includes 670 politicians.

*Data collection.* We collected data from all 670 top politicians in July and August 2017. All data (except for position and party) are respective to the year 2017. Our data stem from three sources, listed here in order of priority: (1) the Munzinger biographical online database ([www.munzinger.de](http://www.munzinger.de)), (2) numerous volumes of *Kürschner's* collection of self-written short biographies of members of federal and state parliaments (e.g. Holzapfel 2016; see dataset for full list), and (3) Wikipedia. If none of the above sources reported information about children, we assumed that the politician is childless. To challenge this assumption, we

explored various other sources (e.g. media reports; web-pages of the politician, parties or parliaments), which in several cases directly confirmed our assumption with explicit statements of the politician being childless. For the remainder, additional sources did not mention whether the politician did or did not have children. Most importantly, there was not a single case for which the additional sources contradicted our assumption that the politician was childless. We are therefore confident that our information on the number of children is reliable; however, we might still slightly *underestimate* the actual number of children by using this approach. The data set available online at Datorium shows all politicians and the sources used to gather their information (Friedrich/ Hudde 2018).

*Sample selection.* As we are interested in the final number of children, we study women aged 45+ and men aged 50+ in 2017 (82%, n=549). As we are also interested in differences by party affiliation, we further exclude politicians from very small parties (n=4) or without party affiliations (n=8). We also calculated mean values including these politicians, and our results were robust. The final sample size for our analysis is 537 German elite politicians.

*Reference data: Number of children in the general population.* To compare the average number of children born to top politicians with the overall population, we used data from the 2012 Microcensus (RDC of the Federal Statistical Office and Statistical Offices of the Länder 2012). Our reference data refer to the politicians' own birth cohorts, resulting in cohort-weighted averages. We compare our sample of elite politicians to two groups: the general female population and the general female population with a university degree (84% of elite politicians have a university degree). Unfortunately, we have neither reference data for male fertility in the general population nor the general male population with a university degree.

### 3. Results

Table 1 lists background variables of the sample. Roughly a third of the elite politicians are women, and slightly more than a fifth are from eastern Germany. The vast majority of politicians is married. Singlehood is very low in all groups except for women in the west. Unmarried cohabitation is rare in all groups. Elite politicians have high levels of education: only one in seven does *not* have a university degree. One in five female and one in three male politicians hold a PhD title.

*Table 1:* Overview variables for female and male politicians (N=537)  
Column fractions displayed

	Females			Males		
	West	East	Total	West	East	Total
Birth year, average	1958	1959	1958	1954	1953	1953
Relationship status						
Single	.14	.02	.11	.05	.03	.05
Unmarried, cohabiting	.04	.05	.04	.03	.04	.03
Married, cohabiting	.63	.62	.63	.86	.87	.86
Divorced/(legally) separated, not cohabiting	.11	.21	.14	.03	.05	.03
Widowed, not cohabiting	.03	.00	.02	.01	.00	.01
No information	.05	.10	.06	.02	.01	.02
Education						
PhD	.20	.19	.20	.31	.31	.31
University degree (without PhD)	.65	.67	.65	.55	.59	.56
No university degree	.15	.14	.15	.14	.10	.13
Religion						
Catholic	.26	.05	.21	.36	.17	.32
Protestant	.18	.12	.17	.29	.30	.29
Muslim	.02	.00	.01	.00	.00	.00
No denomination/no information	.54	.83	.61	.35	.53	.39
Party (sorted by left-right scale according to Polk et al. (2017), left on top)						
The Left (Far-left)	.08	.43	.16	.03	.14	.05
Greens (Ecological)	.21	.17	.19	.07	.01	.06
SPD (Social democrat)	.38	.19	.34	.24	.34	.26
CDU (Christian conservative)	.25	.21	.24	.42	.47	.43
FDP (Liberal)	.02	.00	.02	.12	.03	.10
CSU (Christian conservative)	.06	.00	.05	.10	.00	.08
AfD (Far-right')	.00	.00	.00	.02	.01	.02
Political level						
State	.50	.38	.47	.39	.21	.35
Federal	.50	.62	.53	.61	.79	.65
Member of the <i>core elite</i> , according to Hartmann (2013, p. 30f)	.44	.36	.42	.45	.30	.41
Year of position						
2006	.35	.50	.38	.57	.69	.60
2017	.50	.40	.48	.31	.25	.30
2006 and 2017	.15	.10	.14	.12	.06	.10
N	142	42	184	276	77	353

\* The AfD is often described as right-wing populist. This categorization is controversially debated (e.g. Arzheimer, 2015; Decker/Lewandowsky, 2017).

### *Comparison to the general population*

#### *Average number of children: Female vs. male politicians from the east vs. west*

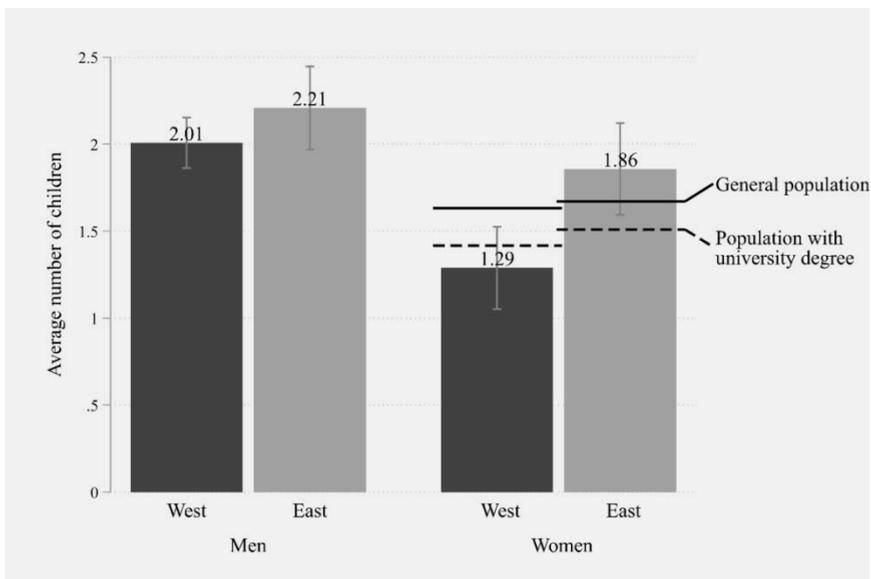
Figure 1 presents the average number of children for both elite politicians and the general population by gender and region. Among female politicians, the average number of children

is 1.3 in the west and 1.9 in the east.<sup>1</sup> For men, the average number of children is 2.0 and 2.2, respectively. We compare these numbers to two age-standardised reference groups of the general population: all women (by region), and all women that have a university degree (by region).

To compare number of children, one-sample t-tests are used (for the sake of simplicity, we treat the reference values from the Microcensus as fixed values, as standard errors are negligible). Female politicians in western Germany have significantly less children than the general population and insignificantly less than the general population with a university degree (1.29 vs. 1.63,  $p < .01$ ; and 1.29 vs. 1.39,  $p > .1$ ). Their counterparts in the east have insignificantly more children than the general population and significantly more children than the general population with a university degree (1.86 vs. 1.67,  $p > .1$ ; and 1.86 vs. 1.49,  $p < .01$ ).

Unfortunately, no reference fertility data is available for the general German male population.<sup>2</sup> Male politicians appear to have relatively many children: 2.01 in western and 2.21 in eastern Germany.

*Figure 1: Average number of politicians' children by gender and region, and compared to the general population. 95%-confidence intervals displayed.*



- 1 There is one relevant statistical outlier in western Germany: Ursula von der Leyen, Federal Minister of Defense, has seven children. Excluding her from the analysis would reduce the average value from 1.29 to 1.25.
- 2 The Microcensus does not contain a variable on number of children for men. Readily available surveys, such as SOEP, NEPS, or ALLBUS, seem to overestimate the number of children. For a discussion see e.g., Kreyenfeld et al. (2012).

*Parity distribution: Female vs. male politicians from eastern vs. western Germany*

Tables 2 and 3 show the parity distribution among politicians and the general population. 40% of female politicians from western Germany are childless, compared to “only” 20% in the general population and 29% in the general population with a university degree. Among female politicians in eastern Germany, childlessness is below 10% (note the low number of cases). Among male politicians, childlessness is generally much lower, at 17% in the west and 5% in the east. While for the general population, having 3+ children is more common for women in the west than it is in the east, this association seems to be reversed or absent among elite politicians (difference not significant). No substantial regional differences in progression rates to the second or third child are apparent for male politicians.

*Table 2:* Distribution of politicians by number of children, gender, and region. Column fractions displayed, standard errors in parentheses.

	Male politicians			Female politicians		
	West	East	Total	West	East	Total
0	.17 (.02)	.05 (.03)	.14 (.02)	.40 (.04)	.07 (.04)	.33 (.03)
1	.11 (.02)	.16 (.04)	.12 (.02)	.18 (.03)	.21 (.06)	.19 (.03)
2	.39 (.03)	.48 (.06)	.41 (.03)	.27 (.04)	.53 (.08)	.33 (.03)
3+	.34 (.03)	.31 (.05)	.33 (.03)	.15 (.03)	.19 (.06)	.16 (.03)
Total						
(absolute numbers in brackets)	1.00 [276]	1.00 [77]	1.00 [353]	1.00 [142]	1.00 [42]	1.00 [184]

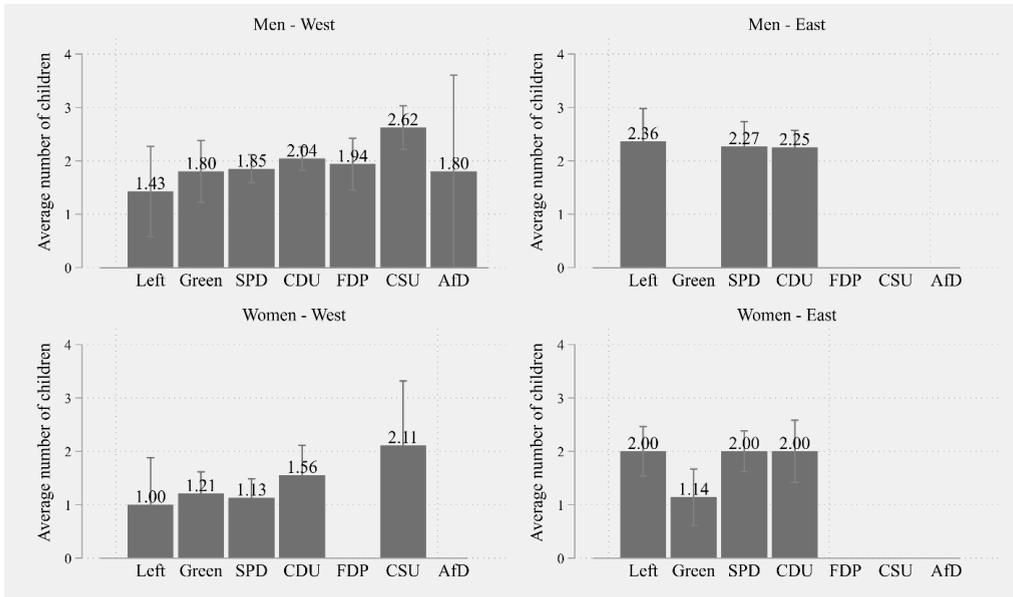
*Table 3:* Distribution of the female reference population by number of children, education level, and region. Column fractions displayed. Data source: Own calculation based on the 2012 Microcensus.

	General population			Population with university degree		
	West	East	Total	West	East	Total
0	.20	.12	.18	.29	.17	.26
1	.24	.30	.25	.22	.30	.24
2	.38	.44	.39	.35	.43	.37
3+	.18	.13	.18	.14	.10	.13
Total	1.00	1.00	1.00	1.00	1.00	1.00

*Differences by party*

Looking at both regions together, differences in the number of children between parties are minor and do not seem to follow any clear pattern. However, this changes as soon as we separate by region, as displayed in Figure 2. Both male and female politicians from more conservative parties in the west tend to have more children (note the low case number of observations and large confidence intervals in some of the groups displayed). The association seems to be stronger in 2017 than in 2006 group (not shown here). Members of the CSU, the Bavarian regional branch of the Christian Democratic parliamentary group, which is associated with the most conservative family values and policies (Fleckenstein 2011), have the most children. We find no clear party-based patterns in eastern Germany.

*Figure 2: Average number of politicians' children by gender, region, and party affiliation. Groups with less than five observations left blank. 95%-confidence intervals displayed. Parties sorted by left-right scale, based on the widely-used Chapel Hill expert survey (Polk et al. 2017).*



### *Multivariate regression analysis*

We run multivariate negative binomial regression analyses, by gender, to explore whether substantial, significant associations between the number of children and other variables (including interactions with region) are present (Cameron/Trivedi 2013). Table 4 lists the estimated results. Here are some selected observations. Fertility is substantially and significantly higher in eastern than in western Germany for men and woman across all models. Men from different birth cohorts do not seem to differ in their number of children, whereas younger women (from later cohorts) appear to have slightly fewer children than their older counterparts. Political conservatism is significantly associated with higher fertility among women and men in western, but not in eastern Germany. For men, we find opposite educational differentials in east and west: in the west, holding a PhD title is significantly associated with higher fertility, while in the east the association seems to be the opposite. Are members of the core elite – those who hold the most powerful societal positions within the sample – any different from the “regular elite”? Hartmann (2013: 30f) presents a list of political positions that have the greatest access to power (around 40% of all elite positions in the sample) and terms politicians in such positions the *political core elite*. We find no statistically significant differences between this core elite and the remainder of the political elite. There are also no evident significant associations between religious denomination and the number of children (note that existing literature suggests that religiosity, rather than religious denomination, is important here; see Zhang 2008). Of

course, the absence of significant results might partly be a consequence of the low numbers of observations in some of the groups observed.

Table 4: Multivariate negative binomial regression models.

	Men				Women			
	(M1) base	(M2) + education	(M3) + core elite	(M4) + religion	(F1) base	(F2) + education	(F3) + core elite	(F4) + religion
Born in eastern Germany (ref.=western Germany)	0.51 <sup>+</sup> (0.06)	0.65 <sup>+</sup> (0.02)	0.68 <sup>+</sup> (0.02)	0.66 <sup>+</sup> (0.03)	0.90 <sup>+</sup> (0.02)	1.03 <sup>+</sup> (0.01)	0.97 <sup>+</sup> (0.02)	1.16 <sup>**</sup> (0.01)
Birth year (centered)								
× West	-0.00 (0.40)	-0.00 (0.43)	-0.00 (0.43)	-0.00 (0.46)	-0.02 <sup>+</sup> (0.08)	-0.02 (0.14)	-0.02 (0.13)	-0.01 (0.19)
× East	0.00 (0.71)	-0.00 (0.79)	-0.00 (0.78)	-0.00 (0.74)	-0.01 (0.47)	-0.01 (0.48)	-0.01 (0.47)	-0.01 (0.51)
Left-right scale								
× West	0.06 <sup>+</sup> (0.05)	0.05 <sup>+</sup> (0.08)	0.06 <sup>+</sup> (0.07)	0.05 (0.13)	0.11 <sup>+</sup> (0.05)	0.10 <sup>+</sup> (0.07)	0.10 <sup>+</sup> (0.06)	0.10 (0.11)
× East	-0.02 (0.69)	-0.02 (0.59)	-0.02 (0.59)	-0.02 (0.77)	-0.02 (0.76)	-0.02 (0.76)	-0.02 (0.76)	-0.11 (0.23)
Education (ref.= university degree)								
PhD × West		0.19 <sup>+</sup> (0.04)	0.19 <sup>+</sup> (0.04)	0.20 <sup>+</sup> (0.04)		0.21 (0.28)	0.20 (0.31)	0.21 (0.28)
PhD × East		-0.27 (0.16)	-0.26 (0.18)	-0.22 (0.26)		-0.13 (0.71)	-0.12 (0.73)	-0.20 (0.57)
Below university × West		0.11 (0.39)	0.11 (0.39)	0.12 (0.37)		0.27 (0.21)	0.24 (0.25)	0.24 (0.25)
Below university × East		0.07 (0.77)	0.07 (0.77)	0.13 (0.61)		-0.37 (0.37)	-0.37 (0.36)	-0.48 (0.25)
Core elite (ref.=no)								
× West			0.04 (0.62)	0.03 (0.77)			-0.20 (0.21)	-0.21 (0.19)
× East			-0.01 (0.94)	-0.07 (0.69)			-0.06 (0.83)	-0.01 (0.98)
Religion (ref.=no denomination/no information/other)								
Protestant × West				0.07 (0.52)				0.30 (0.16)
Protestant × East				-0.14 (0.55)				0.65 (0.15)
Catholic × West				0.08 (0.44)				-0.11 (0.63)
Catholic × East				0.16 (0.54)				0.70 (0.22)
Constant	0.37 <sup>+</sup> (0.03)	0.31 <sup>+</sup> (0.08)	0.29 (0.11)	0.28 (0.13)	-0.17 (0.51)	-0.22 (0.39)	-0.15 (0.56)	-0.19 (0.48)
Observations (N)	353	353	353	353	184	184	184	184

Note: p-values in parentheses.

<sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ .

### 3. Discussion and conclusion

To our knowledge, this is the first study exploring fertility among contemporary societal elites. We are able to show that fertility patterns among German elite politicians differ substantially by gender and region.

The low fertility rate for female elite politicians in western Germany is in line with previous findings. The negative association between social status and fertility might be driven by deficient work-family reconciliation. In eastern Germany, elite politicians have on average more children than the general population as well as the sub-population with a university degree. Results for men in both regions and women in eastern Germany might be a sign of a positive association between social status and fertility at the top of the distribution.

Our study has limitations. First, despite full data coverage of the German political elite, the number of cases is rather low, especially for female politicians in eastern Germany. Second, we do not have information on most politicians' partners, which would allow us to more accurately explore fertility patterns from a couple perspective. In addition, no information on the age of their children is available for most politicians, rendering this analysis unable to examine in which career or life course stage elite politicians had their children. Third, we are not able to uncover causal mechanisms with the analysis of these data.

Future research could study the causal mechanisms behind the observed descriptive associations: Does being part of the elite influence fertility behaviour, for example indirectly through attractiveness on the partner market? Or do certain fertility behaviours increase political career opportunities, such as people being more likely to vote for family-oriented politicians? How do career and fertility interact over the (gendered) life course? Further, future research could study fertility patterns among other elite groups such as top-tier business, culture, and scientific subgroups, as well as in other societal contexts.

All in all, this paper is innovative as it presents first insights into the fertility behaviour of a highly relevant subgroup: those that have great power and societal influence. Further, this investigation serves as a starting point for a more detailed analysis of elite demographic behaviour and the association between fertility and social status at the highest tier of the distribution.

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*Daniel Baron & Ingmar Rapp*

# Does fixed-term employment delay important partnership events?

## Comparing transitions into cohabitation, marriage, parenthood and home ownership among young adults in Germany

### **Abstract:**

This article investigates whether fixed-term employment affects the realization of important partnership events. We are looking at four transitions: entering cohabitation, marriage, parenthood and home ownership. Data were obtained from a random sample of 1,083 young German adults aged 20 to 35 years based on the AGIPEB Survey. We use the Kaplan-Meier method and piecewise-constant exponential models to estimate survival curves and transition rates. Women and men who work under a fixed-term contract are similarly likely to enter cohabitation, marriage and parenthood as persons who work under a permanent contract. In contrast, fixed-term employment compared to working under a permanent contract prolongs the transition into home ownership.

**Key words:** atypical employment, cohabitation, family economics, fertility, fixed-term employment, marriage, real estate purchase, partnership stabilization

## **1. Introduction**

Due to rising global competition during the last three decades, many European economies faced severe difficulties maintaining their standards of employment protection (Heyes/Lewis 2014). In particular, labor relations and employment standards in welfare state regimes, such as Germany, which according to Esping-Andersen (1990) can be labeled *conservative*, underwent profound changes. Culminating in a variety of deregulation policies, a reduction of employment protection led to an increase in non-standard employment, such as part-time contracts, fixed-term employment or temporary agency work (Jiménez-Rodríguez/Russo 2012; Kalleberg 2000; Keller 2013).

This article studies the influence of fixed-term employment on young adults' partnerships. Although negative effects of fixed-term employment on private life might not be as severe in general as had been expected in former times (Mayer et al. 2010), they might pose serious restrictions to planning private life especially among young adults. In Germany, young adults are the most affected by fixed-term contracts, with more than 40% of

all first-time employees entering the labor market based on a fixed-term contract (Jiménez-Rodríguez/Russo 2012; Kalleberg 2000; Keller 2013). Although the chances to transition into a permanent contract later in their careers are high (Böhnke et al. 2015; Eichhorst/Tobsch 2013), it is reasonable to assume that working under a fixed-term contract may delay important decisions which stabilize intimate relationships (i.e., moving together, marriage, entering parenthood and purchasing real estate), because this type of work can complicate the planning of a young adult's future (Blossfeld/Drobnic 2001; Kurz et al. 2005).

Indeed, earlier studies observed a high degree of reported planning insecurities among young adults regarding their private and family-life when being confronted with atypical employment (Brinkmann et al. 2006; Kurz et al. 2005; Sander 2012). But it is still an open question to what extent fixed-term employment affects the realization of important partnership events. While some studies found evidence for a significant delay of important partnership events, such as entering parenthood (Auer/Danzer 2016; Düntgen/Diewald 2008; Kind/Kleibrink 2013; Kreyenfeld 2008), other research did not find significant associations between fixed-term employment and the transition to parenthood (Brose 2008; Gebel/Giesecke 2009; Kreyenfeld 2010; Kurz et al. 2005; Schmitt 2012b; Tölke/Diewald 2003). However, previous research on the impact of fixed-term employment on important partnership events is mostly limited to family formation. Most strikingly, there is relatively little evidence on how fixed-term employment affects other important events among young adults' life-courses in Germany such as cohabitation, marriage and home-ownership (King/Christensen 1983). To our knowledge, there exist only very few studies so far that tests for effects of fixed-term employment on more than one important partnership event among young adults in a comparative setting. An exception for Germany is the study by Kurz et al. (2005) which examined the effects of fixed-term employment on both on the transition to first marriage and the transition to first birth.<sup>1</sup>

The current study examines to what extent working under a fixed-term contract – in comparison to working under a permanent contract affects the institutionalization of partnerships among young German Adults. Adding to previous research, we not only consider the transition into marriage and parenthood, but also focus on entering cohabitation and entering home ownership. The question of how these partnership events are affected by fixed-term employment is of high relevance because a considerable part of young adults is working under fixed-term contracts (see the following section for references).

Unlike previous research which most often rely on data from the German Socio-Economic Panel Study (Göbel et al. 2018), we use an alternate sample consisting of approximately 1,100 young German adults that allows for measuring effects on a monthly basis.<sup>2</sup> Therefore, our study gives new empirical evidence regarding the much-debated

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- 1 For an overview over current research on effects of atypical employment on private and family life in Germany see Baron and Hill (2017).
  - 2 The data is taken from the research project AGIPEB – “Decisions made under uncertainties. How precarious work influences the institutionalization process in intimate relationships”. The project was funded by the German Research Foundation (DFG) and was carried out from 2012 to 2017. Other panel datasets in Germany, such as the Pairfam Study or the Panel Study Labour Market and Social Security (PASS), turned out to be not suitable for our study because they do not contain

question to what extent fixed-term employment affects private life in general (Dörre 2012; Standing 2013) and important partnership events among young adults in particular.

The following section gives an overview of the development of non-standard employment in the last decades in Germany. In section 3, we outline our theoretical model, and in section 4 we describe our data and our analysis methods. To test our hypotheses, we use an event history analysis approach (Blossfeld et al. 2007; Cleves et al. 2010).<sup>3</sup> After presenting our results (Section 5), we conclude with a discussion of our findings and an outlook on future research issues (Section 6).

## 2. Empirical background

Although non-standard employment has significantly increased in the last decades (Jiménez-Rodríguez/Russo 2012; Kalleberg 2000; Keller 2013), it scarcely applied to fixed-term employment. In 2014, the share of fixed-term contracts among all employment contracts in Germany amounted to 8%, with figures being relatively stable since 1991, when it was 7.5% (Statistisches Bundesamt 2015; Keller/Seifert 2013: 26f.). The question of whether and how fixed-term employment influences young adults' partnerships is nonetheless relevant. This is highlighted by the fact that about 40% of all fixed-term employees are working involuntarily under a fixed-term contract, as they had originally searched for a job with a permanent contract (Statistisches Bundesamt 2015). Moreover, these figures probably underestimate the frequency of fixed-term employment because individuals younger than 25 years, many who are first-time employees, are statistically excluded from the official calculations of the German Federal Bureau of Statistics. After including this group, except for those still in vocational training, Keller and Seifert (2013) concluded that 44% of all job starters in Germany worked under a fixed-term contract in 2012 compared to 32% in 2001.

All in all, there are only slight gender differences, with about 9% female and about 8% male fixed-term laborers (Statistisches Bundesamt 2015). Furthermore, there is some empirical evidence that the prevalence of working under fixed-term contracts in Germany is contingent on belonging to certain occupational groups. Routine operatives (e.g., assemblers and laborers), routine office workers (e.g., telephone operators) and routine service workers (e.g., cleaners and salespeople) are most affected by non-standard employment (comprising both fixed-term contracts and agency work). In contrast, technical experts, managers or skilled service workers are less affected (Marx 2011). Employees with academic degrees and unskilled laborers show the highest amounts of fixed-term contracts (each with 12%), followed by employees in service occupations (11%) (Statistisches Bundesamt 2015).

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enough data on participants' occupational biographies in the first case, and on partnership biographies in the second.

3 For further discussions of advantages as well as limitations of our dataset, see the methods section and the concluding discussion in the remainder of this paper.

### 3. Previous research

Several studies examined the consequences of fixed-term employment on entering parenthood. Some studies for Germany showed that the transition to parenthood was significantly delayed in those partnerships where at least one of the two partners worked under a fixed-term contract (Auer/Danzer 2016; Düntgen/Diewald 2008; Kind/Kleibrink 2013; Kreyenfeld 2008). Additionally, Laß (2017: 182) found a prolonging effect for women who worked under a fixed-term part time contract. However, several other German studies found no significant effects of working under a fixed-term contract on the transition rate into parenthood (Brose 2008; Gebel/Giesecke 2009; Kreyenfeld 2005; Kurz et al. 2005; Schmitt 2012b; Tölke/Diewald 2003).

Most of the aforementioned studies used data from the German Socio-Economic Panel. The only exception is the study by Tölke and Diewald relying on data from the German Family Survey (Tölke/Diewald 2003). Furthermore, Kurz et al. (2005) studied effects on transitions to marriage among young German adults. Here, fixed-term employment did not exert any significant effect.

There is some evidence for delaying effects of fixed-term employment on important partnership events in other European countries. In Spain, for example, fixed-term employment has been found to delay parenthood for women and marriage for men when using data from the European Household Panel (De La Rica/Iza 2005). Furthermore, Lersch and Dewilde (2015) studied effects of fixed-term employment on home-ownership in twenty-two countries based on data from EU-SILC. They found a significant prolonging effect of non-permanent employment on the time until purchasing real estate that is significantly stronger in Northern European countries than in South European countries. Germany was not included in this study.

Concerning other dimensions of employment status, Kreyenfeld found an accelerating effect of being unemployed on the time until birth of the first child on German females with low levels of education (Kreyenfeld 2008). Schmitt (2012a) reported similar results for France, Germany and the United Kingdom. Friedman et al. (1994) reported the same for the United States and argued that realizing life plans by giving birth to a child may compensate for uncertainty in other spheres of life (i.e., occupational careers). Additionally, several studies showed that being in the educational system has a prolonging effect on the time until marriage and entering parenthood among young German couples (Blossfeld/Jaenichen 1992; Mulder/Wagner 2001; Schneider 2016).

In summary, most of the previous studies dealing with the effects of fixed-term employment on important partnership events concentrate on the transitions to parenthood, thereby neglecting other events that are also important for the institutionalization of a partnership, such as the transitions to cohabitation, marriage and home ownership (King/Christensen 1983; Kopp et al. 2010).

## 4. Theoretical model and research hypotheses

In this section, we will outline our theoretical model to explain the effects of working under fixed-term contracts on important partnership events. Our model is based on life course approaches and economic approaches to family formation.

A key assumption of life course approaches is that different life domains are highly interrelated (Huinink/Kohli 2014). Therefore, transitions during family life cannot be understood and explained without considering other important spheres of life, such as the area of work, especially atypical employment. Another assumption of life course approaches is that each transition may have multiple time dependencies (Blossfeld/Huinink 2001). For example, the transition to cohabitation may depend on both a relationship's duration and the chronological age of the actors involved.

Life-course approaches have proven to be very useful when it comes to conceptualizing empirical studies on important partnership events among young adults (Settersten Jr. 2004). In addition, they are of great relevance when it comes to describing the biographical aspects of family life. However, life course approaches do not represent a cohesive theory (Hill/Kopp 2013; Mayer 1990; Settersten Jr. 2004). Therefore, additional theoretical approaches are needed to explain the effects of fixed-term employment on important partnership events; such as entering cohabitation; marriage; parenthood and home ownership.<sup>4</sup>

Based on the theory of the value of children, it has been assumed that young adults and particularly women may try to compensate perceived socioeconomic uncertainty (i.e., a lack of knowledge regarding the odds of future events) by entering parenthood (Friedman et al. 1994). Thus, actors who work under a fixed-term contract might enter parenthood earlier than those who work under a permanent contract. However, recent research has not found any results supporting this assumption (Brose 2008; Kreyenfeld 2010, 2015; Kurz et al. 2005, Schmitt 2012b, Tölke/Diewald 2003).

Following economic approaches to family formation (Becker 1973, 1981), the decision to invest in an intimate relationship is contingent on the material resources provided to young couples. When comparing income from permanent employment with income from fixed-term contracts, it becomes clear that guaranteed financial resources are far more insecure when working under a fixed-term contract. Based on economic approaches, significant delays in the institutionalization of intimate relationships can be expected because young adults refrain from investing in their partnerships when expecting unsecure payoffs due to short contract durations. In addition, income disadvantages of fixed-term workers may also hamper investments into the partnership. Furthermore, it is reasonable to assume that people who are fixed-term employed may reduce investments into their relationships as they refrain from making decisions that would rule out alternate, future life course options (Elster 1979). Thus, our *first hypothesis* is as follows: Contrary to working under a permanent contract, being in a fixed-term contract delays important partnership events.

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4 There are several other approaches such as the spillover-hypothesis (Grzywacz et al. 2002) or the theory of *capitalist landgrab* (Dörre 2012) that discuss the negative consequences of atypical employment for planning of private lives. For analytical reasons, we stick to the relatively strict assumptions of the investment model as it allows for deducing research hypotheses based on action theoretic considerations in a far more sophisticated way than the aforementioned concepts (Coleman 1990).

Confirming Rusbult's family economic investment model (Rusbult 1980; Rusbult et al. 1998), recent studies found that partnership events often occur in the following chronological order: (1.) cohabitation, (2.) marriage, (3.) parenthood and (4.) home ownership (King/Christensen 1983; Kopp et al. 2010). The action theoretical rationale behind this chronological order is that realizing the aforementioned events increases both the anticipated rewards in the form of increased perceived quality of the relationship and the anticipated losses if the partnership dissolves to a different degree.

When comparing the aforementioned events, there are few doubts that cancelling cohabitation is relatively inexpensive, as cohabitation is associated with relatively few monetary and non-monetary investments. Marriage is associated with greater monetary and non-monetary (i.e., social-emotional and juridical) long-term consequences, and giving birth to a child is more expensive than marrying, because the decision to give birth to a child increases the density and necessity of interaction between both partners and cannot be legally or legitimately reversed in the future (Rusbult 1980).

It is less clear whether entering parenthood should be assumed to be more or less expensive than purchasing real estate. Buying a house is, on the one hand, less consequential than giving birth to a child, because it can be reversed. On the other hand, the decision to purchase a house implies opting for a shared place of residence. In this regard, buying a house is more consequential than entering parenthood. Furthermore, the decision to buy a house may tie both partners closer together on a monetary basis than giving birth to a child because home ownership implies carrying large economic burdens for both partners (i.e., paying off a mortgage). Additionally, the decision of young adults to own a real estate might be restricted by having little equity capital. Furthermore, credit institutions in Germany very often refrain from offering real-estate loans to clients who work in insecure employment arrangements such as fixed-term employment. Thus, many fixed-term employees in Germany who wish to buy a home are prevented from doing so due to institutional restrictions.<sup>5</sup>

Our *second hypothesis* is as follows: The more expensive the decision, the greater is the delay of important partnership events in the case of fixed-term employment contrary to working under a permanent contract. Based on the assumption that buying a house and entering parenthood are the most expensive decisions, this hypothesis implies that buying real estate and entering parenthood should be delayed the most in the case of fixed-term employment, followed by marriage. In contrast, the decision to cohabit should stay rather unaffected.

We expect that both women and men may hesitate from investing in their partnerships when being confronted with insecurity, although perhaps to different degrees. For example, fixed-term employment of women may have stronger effects on the transition to parenthood than fixed-term employment of men, because usually women instead of men interrupt their career when they have children. Therefore, we will also present separate analyses for women and men.

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5 It is reasonable to assume that some potential home-owners who work under a fixed-term contract refrain from asking for a real-estate loan because they anticipate declining reactions. Due to restrictions of our data we were not able to test for this assumption. For further discussion regarding these arguments see the concluding section of this paper.

## 5. Data and method

Our data were drawn from the AGIPEP Survey,<sup>6</sup> which is a stratified random sample consisting of 1,083 German adults aged from 20 to 35 years, who were in a permanent relationship and dependently employed, i.e. working for public or private employers, at the time of the interview (self-reference). The sample covered both East and West Germany. The overall response rate amounted to 39%.<sup>7</sup>

The survey was collected using computer assisted telephone interviews. To ensure a sufficient number of cases of people working under fixed-term contracts, the sample is equally distributed between people who were working under a fixed-term contract at least once during their relationship or in the year prior to the start of their relationship and people who were not.<sup>8</sup> It is important to note that individuals who were not living in a partnership at the time of the interviews are not included in the sample. This might lead to an underestimation of the effects of fixed-term employment on partnership events.<sup>9</sup>

Data collection took place between August 2012 and March 2013. After excluding cases with missing values for the dependent variable or at least one of the explanatory variables, the remaining samples contain 1,073 cases (829 events) for moving together, 1,035 cases (541 events) for marriage, 1,076 cases (454 events) for entering parenthood and 1,077 cases (274 events) for purchasing real estate. Dependent variables are the transition rates to cohabitation, marriage, parenthood and home ownership.

Our main explanatory variable is employment status. We distinguished between working under a fixed term-contract, working under a permanent contract, being in education, being unemployed or otherwise not employed. All these variables were measured retrospectively on a monthly basis. Although retrospective data gathering techniques are prone to serious amounts of reporting errors (Schnell 2012) this might be of minor relevance for this study because occupational biographies are easier to recall than attitudes or emotions (Brückner 1990).<sup>10</sup> Moreover, measuring fixed-term employment retrospectively on a monthly basis seems more accurate than measuring fixed-term employment on a

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6 The full title of the study is “AGIPEB-Decisions made under uncertainties. How precarious work influences the institutionalization process in intimate relationships” (Gesis Study ZA5356).

7 For further methodical details see (Baron/Krüger 2017; Eickemeier et al. 2016).

8 Participants were screened based on a nation-wide representative sample consisting of 6,219 adults in Germany aged between 20 and 35 years who were dependently employed and living in a partnership (lasting at least six months) at the time of the interviews. Of these 6,219 persons, 3,738 agreed to participate in the main study. From this population, participants of this study were randomly drawn using a stratified sampling approach. One half of the sample was randomly drawn from those persons among these 3,738 persons who had at least one fixed-term contract during their occupational careers. The other half was randomly drawn from those actors who had never worked under a fixed-term contract.

9 Furthermore, only one of both partners was interviewed. Implications of this restriction will be discussed in the concluding section of this article. Additionally, it should be noted that actors with non-German citizenship are underrepresented in our sample with a share of 4.8%, compared to 8.2% for Germany in 2013 when the interviews had been conducted (Federal Statistical Office 2014: 26)

10 If interviewees were not able to remember the exact dates of an occupational spell they were asked to report the season when the spell started or ended. The number of interviewees who had to rely on this option was only of very minor importance (self-reference).

yearly basis, which is the case in other existing data for Germany such as the German Socio-Economic Panel or Pairfam.

As mentioned before, individuals had to be dependently employed at the time of the interview in order to participate in the study, but a substantial part of the sample has been in education at earlier stages of their partnership.

The date of the start of the relationship, the date of cohabitation, the date of marriage and the date of buying real estate were also measured on a monthly basis. In contrast, the date of entering parenthood was measured on a yearly basis. Data were modified to use the middle of each year when an event occurred as a proxy for the exact date of birth of the first child. After that, the date of entering parenthood was reduced by 9 months because most pregnancies last approximately 9 months.

As some couples were still not cohabiting, married, parents or homeowners at the time of the interview, this study used event history analysis to estimate transition rates. We used the Kaplan-Meier method (Blossfeld et al. 2007) to estimate survival curves for all four transitions. For each transition, the time clock begins at the time of the start of the relationship. Additionally, we conducted piecewise constant exponential models (Blossfeld et al. 2007) for testing our hypotheses about the effects of fixed-term employment on the aforementioned transitions. Therefore, we split the time axis (i.e., the duration of the relationship) into six time periods: 0 to less than 2 years, 2 to less than 4 years, 4 to less than 6 years, 6 to less than 8 years, 8 to less than 10 years and 10 years or more. This allows for modeling flexible transition rates.

In our multivariate analyses, we control for age (both linear and squared), gender, living in East or West Germany, nationality and educational attainment (having attained at least a college entrance level or an equivalent level of education in contrast to lower education) because these variables can be expected to be associated with both important partnership events and fixed-term employment (Kreyenfeld 2010, 2015). Age was included as a time-dependent variable, whereas living in East or West Germany, nationality and education were only measured at the time of the interview. Furthermore, we tested for interaction effects between fixed-term employment and gender (results not shown in tables).

## 6. Results

Looking at the distribution of the sample (table 1), 829 persons (77%) had moved in together with their partner at the time when the interviews took place. In addition, 541 persons (52%) had already married, and 454 persons (42%) had transitioned to parenthood. Only 274 persons (25%) had purchased real estate together with their partner. Regarding the measures for employment status, shares of the time spent working under fixed-term contracts varied from 17% (cohabitation) to 23% (home ownership) of the relevant time at risk. Shares of the time spent working under permanent contracts varied between 36% (cohabitation) and 43% (parenthood). For the time spent in the educational system, shares varied from 27% (home ownership) to 40% (cohabitation). The incidences of being unemployed and being otherwise not employed are comparatively low with shares ranging from 3 to 6%.

Table 1: Distribution of the samples

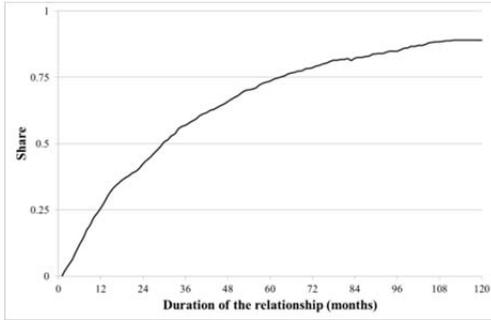
	Cohabitation		Marriage		Parenthood		Real Estate	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Employment status								
Fixed-term contract	.17	–	.22	–	.22	–	.23	–
Permanent contract	.36	–	.40	–	.43	–	.42	–
In education	.40	–	.33	–	.30	–	.27	–
In unemployment	.02	–	.02	–	.02	–	.02	–
Otherwise not employed	.05	–	.04	–	.03	–	.06	–
Duration of relationship								
Less than 2 years	.48	–	.34	–	.31	–	.27	–
2 to 4 years	.25	–	.26	–	.25	–	.23	–
4 to 6 years	.13	–	.17	–	.18	–	.18	–
6 to 8 years	.07	–	.11	–	.12	–	.14	–
8 to 10 years	.04	–	.07	–	.07	–	.09	–
More than 10 years	.04	–	.05	–	.06	–	.10	–
Age (years)	24.03	4.48	24.73	4.14	25.06	4.17	25.61	4.25
Female	.60	–	.62	–	.61	–	.62	–
A-level	.64	–	.66	–	.67	–	.63	–
East Germany (0)	.17	–	.20	–	.17	–	.19	–
Non-German	.06	–	.03	–	.03	–	.04	–
No. of persons	1073		1035		1076		1077	
No. of person months	38923		67152		75548		89918	
No. of events	829		541		454		274	
Percentage of events	77		52		42		25	

Note: Source: AGIPEB-Survey 2013. Calculations of the means are based on the number of person months.

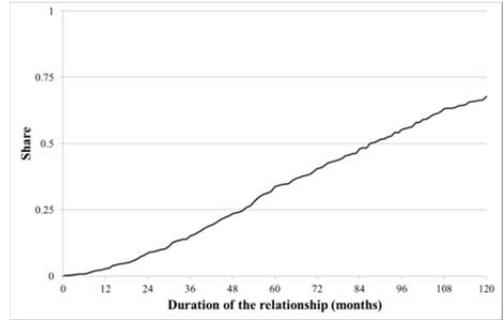
In our sample, nearly two thirds of persons had passed A-levels (German ‘Abitur’) which means that persons on lower educational levels were underrepresented. When looking at official statistics based on the German micro-census for 2013, about 46% of adults in the age between 25 and 35 years – persons with migration background not included – had passed A-levels (Statistisches Bundesamt 2014: 78). The underrepresentation of actors on lower educational can be, at least partly, explained by the fact that persons with non-German citizenship were underrepresented in our study. This empirical background should be taken into consideration when interpreting the following results.

Figures 1-4 show the proportion of couples, who had moved in together (Figure 1), married (Figure 2), entered parenthood (Figure 3) or bought home ownership (Figure 4) after a certain period of time since the beginning of their relationship. It took 11 months until one quarter of all couples had moved together (Figure 1). After 28 months, one half of the couples had moved together. Becoming married (Figure 2) and entering parenthood (Figure 3) occurred considerably later, followed by purchasing real estate (Figure 4). This gradation of the survival curves is in line with our theoretical expectation: The more expensive the transition, the later the transition takes place.

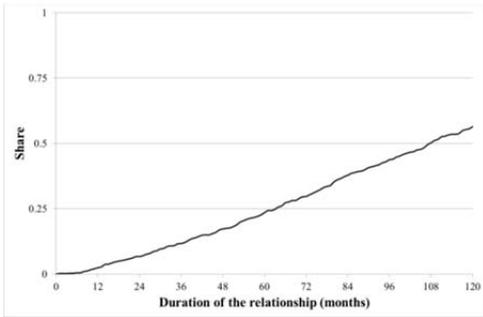
*Figure 1:* Proportion of couples who have moved in together by relationship duration



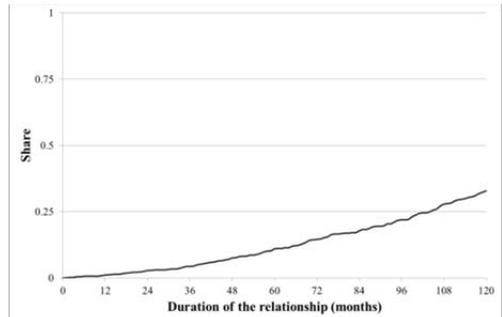
*Figure 2:* Proportion of couples who have married by relationship duration



*Figure 3:* Proportion of couples who have entered parenthood by relationship duration



*Figure 4:* Proportion of couples who have purchased real estate by relationship duration



*Note:* Source: AGIPEB-Survey 2013. All estimates are Kaplan-Meier Estimates.

Table 2 presents the results of the piecewise exponential models for the transitions into cohabitation (column 1), marriage (column 2), parenthood (column 3) and home ownership (column 4). The presented values are hazard ratios. Values greater than 1 represent an increased transition rate, and values less than 1 represent a reduced transition rate to cohabitation, marriage, parenthood and home ownership.

Controlling for the duration of the relationship, age, gender, education, living in East or West Germany and nationality, working under a fixed-term contract did not affect the transition into cohabitation compared to working under a permanent contract (column 1 of table 2). The same applied for the transition into marriage (column 2 of Table 2) and for the transition into parenthood (column 3 of Table 2). In contrast, working under a fixed-term contract significantly delayed the purchase of real estate by  $((1-0.71)*100=)$  29% when compared to working under a permanent contract (column 4 of Table 2).

*Table 2:* Effects of fixed-term employment on partnership events  
(piecewise-constant exponential models, hazard ratios and standard errors)

	Cohabitation		Marriage		Parenthood		Real Estate	
	HR	SE	HR	SE	HR	SE	HR	SE
<b>Employment status</b>								
Fixed-term contract (Ref.: permanent contract)	.97	.09	.92	.09	1.06	.12	.71 *	.10
In education (Ref.: permanent contract)	.66 **	.07	.51 **	.08	.59 **	.10	.25 **	.07
In unemployment (Ref.: permanent contract)	.81	.20	.83	.08	1.16	.38	.27	.20
Otherwise not employed (Ref.: permanent contract)	.74	.14	1.68 *	.08	4.12 **	.73	.60	.16
<b>Duration of relationship</b>								
2 to 4 years (Ref.: < 2 years)	.86	.08	1.75 **	.24	1.53 **	.24	1.45	.35
4 to 6 years (Ref.: < 2 years)	.68 **	.08	2.10 **	.30	1.79 **	.29	2.05 **	.48
6 to 8 years (Ref.: < 2 years)	.48 **	.08	2.10 **	.32	2.20 **	.37	2.03 **	.50
8 to 10 years (Ref.: < 2 years)	.46 **	.12	2.21 **	.39	2.38 **	.44	2.97 **	.73
More than 10 years (Ref.: < 2 years)	.26 **	.10	2.44 **	.45	2.78 **	.54	2.82 **	.71
<b>Age</b>								
Years	2.00 **	.20	2.08 **	.32	2.15 **	.25	1.40	.30
Years (squared)	.99 **	.00	.99 **	.00	.99 **	.00	.99	.00
Female (Ref.: Male)	1.16 *	.09	1.03	.09	1.21	.12	1.14	.14
A-level (Ref.: No a-level)	1.12	.10	.90	.09	.64 **	.06	1.12	.15
East Germany (Ref.: West Germany)	1.14	.10	.69 **	.08	1.43 **	.17	.79	.13
Non-German (Ref.: German)	.50 **	.10	1.04	.27	1.05	.24	.89	.30
Intercept	.00 **	.00	.00 **	.00	.00 **	.00	.00 **	.00
No. of persons	1073		1035		1076		1077	
No. of person months	38923		67152		75548		89918	
Events	829		541		454		274	
Log Likelihood	-1554.33		-896.05		-835.52		-633.12	

*Note:* Source: AGIPEB-Survey 2013. \* $p < .05$ ; \*\* $p < .01$  (two-tailed tests).

Further results from Table 2 show that being in education compared to working under a permanent contract reduced the likelihood of moving in together with a partner (hazard ratio, 0.66;  $P < 0.01$ ). Furthermore, being in education made it less likely to marry (hazard ratio, 0.51;  $P < 0.01$ ), to start a family (hazard ratio, 0.59;  $P < 0.01$ ) and to purchase real estate (hazard ratio, 0.25;  $P < 0.01$ ).

Results remained similar when calculating separate models for women and men (see Table 3 and 4 in appendix). The only exception was that the effect of fixed-term employment on entering home ownership now was significant only for men. However, the difference between women and men is not statistically significant.

Additionally, we tested for interaction effects between educational attainment and employment status for each women and men, but did not find significant interactions between education and fixed-term employment (results not shown in tables).

## 7. Discussion

The aim of this study was to analyze the effects of fixed-term employment on the institutionalization of relationships among young adults in Germany. Adding to previous research, we did not only focus on the transition into marriage and parenthood, but were

looking at two additional important partnership events: entering cohabitation and home ownership. Furthermore, we used a new sample consisting of young German adults that has not been studied in previous research to test our hypotheses, the AGIPEB Survey.

Based on Rusbult's investment model and family economics, we expected that fixed-term employment delays the realization of important partnership events, because individuals refrain from investing in their partnerships when being confronted with insecurity. Our main hypothesis was that fixed-term employment compared to working under a permanent contract delays the transitions into cohabitation, marriage, parenthood and home ownership. This hypothesis was confirmed for purchasing real estate. In contrast, results showed no effects of fixed-term employment compared to permanent employment on the transition rate into cohabitation, marriage and parenthood.

One possible reason why fixed-term employment delays the transition into home ownership, but not the transition into cohabitation and parenthood, may be that buying a house not only ties the partners closer together but also ties them to a particular place of residence. Another reason might be that the couples' decision to buy a house is overturned by third parties. In particular, creditor institutes may refuse to offer a mortgage to persons working under a fixed-term contract, because they want to minimize the risk of mortgage default. In contrast, cohabitation is associated with relatively few monetary and non-monetary investments, and this could be the reason why we did not find an effect of fixed-term employment on the transition rate into cohabitation.

There may be several reasons why we did not find effects of fixed-term employment on the transition into marriage and parenthood. First, there are theoretical arguments why fixed-term employment does not necessarily delay marriage and parenthood. Based on the theory of the value of children, it has been argued that (some) young adults may try to compensate perceived socioeconomic insecurity by entering parenthood (Friedman et al. 1994). This could contribute to the fact that there are, on average, only marginal differences between transition rates into marriage and parenthood of persons who work under a fixed-term contract compared to those who work under a permanent contract. Second, we were not able to differentiate between wanted and unwanted pregnancies when measuring the transition to parenthood. Also for this reason, the effects of fixed-term employment on fertility decision making might be underestimated in our study. Third, our sample is restricted to persons who were in a permanent relationship and who were dependently employed at the time of the interview. Couples who have separated, possibly because of fixed-term employment, are not included in the sample, and the same applies to persons whose careers as temporary workers ended up in unemployment or inactivity. This might lead to a downward bias of the effects of fixed-term employment on marriage and entering parenthood. However, previous studies for Germany which were based on other samples and which focused on the transition into marriage and parenthood also found no significant effect of fixed-term employment on entering parenthood based on the Family Survey of the German Youth Institute (Tölke/Diewald 2003), or mostly found no significant effects based on the GSOEP (Brose 2008; Gebel/Giesecke 2009; Kreyenfeld 2005; Kurz et al. 2005; Schmitt 2012b), and also found no effect of fixed-term employment on marriage (Kurz et al. 2005).

The present study has several limitations. As already mentioned, our sample is restricted to persons who were in a relationship and who were dependently employed at the

time of the interview, and this might be one reason why we did not find any effects of fixed-term employment on entering cohabitation and parenthood. Another restriction of our data is that we could not consider data on both partners' occupational life courses. Therefore, we were not able to study possible compensation or cumulation effects which might occur when only one partner or when both partners are working under a fixed-term contract. Finally, there are good reasons to expect that the effects of fixed-term employment may differ between subgroups, for example by occupation, employment status, or duration of working under a fixed-term contract. However, due to small case numbers, we could not examine such differences.

Other existing data sets such as German Socio-Economic Panel (GSOEP), the German Family Panel (Pairfam) or the panel study "Labour Market and Social Security" (PASS) do allow for empirical studies that focus on effects of work life on family life – or vice versa – only to a narrow extent. Future research would, thus, profit from a better data basis to analyze the effects of atypical employment on partnership stabilization processes. In this context, a panel study approach using monthly data on young adults' occupational and partnership biographies that also allows for sophisticatedly measuring effects of different types of atypical employment as well as of subjective attitudes towards work on partnership processes would be necessary.

Taken together, previous research based on other data sources and our results indicate that fixed-term employment does, on average, not yield strong postponing effects on important partnership events in Germany. Nonetheless, our study supplements previous research showing that fixed-term employment affects young adults' partnerships at the minimum with regard to one event: the purchase of home ownership will be postponed.

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## Appendix

Table 3: Effects of fixed-term employment on partnership events for women  
(piecewise-constant exponential models, hazard ratios and standard errors)

	Cohabitation		Marriage		Parenthood		Real Estate	
	HR	SE	HR	SE	HR	SE	HR	SE
Employment status								
Fixed-term contract (Ref.: permanent contract)	.86	.11	.79	.10	1.08	.15	.76	.14
In education (Ref.: permanent contract)	.60 **	.08	.43 **	.09	.66	.14	.25 **	.08
In unemployment (Ref.: permanent contract)	.55	.20	.91	.35	1.24	.48	.44	.31
Otherwise not employed (Ref.: permanent contract)	.65	.16	1.76 **	.36	6.40 **	1.26	.69	.19
Duration of relationship								
2 to 4 years (Ref.: < 2 years)	.78 *	.09	1.96 **	.36	1.75 **	.37	1.12	.36
4 to 6 years (Ref.: < 2 years)	.65 **	.09	1.99 **	.38	2.13 **	.45	1.88 *	.56
6 to 8 years (Ref.: < 2 years)	.47 **	.10	2.18 **	.43	2.68 **	.59	1.97 *	.60
8 to 10 years (Ref.: < 2 years)	.57 *	.15	2.15 **	.48	2.74 **	.66	2.47 **	.77
More than 10 years (Ref.: < 2 years)	.25 **	.11	2.41 **	.55	3.48 **	.84	3.04 **	.94
Age								
Years	2.07 **	.26	1.72 **	.31	1.77 **	.34	1.77 *	.48
Years (squared)	.99 **	.00	.99 **	.00	.99 **	.00	.99 *	.00
A-level (Ref.: No a-level)	1.02	.11	.91	.11	.60 **	.07	1.24	.20
East Germany (Ref.: West Germany)	1.04	.13	.63 **	.10	1.37 *	.20	.79	.17
Non-German (Ref.: German)	.56 *	.14	1.20	.33	.70	.20	1.00	.39
Intercept	.00 **	.00	.00 **	.00	.00 **	.00	.00 **	.00
No. of persons	613		593		615		615	
No. of person months	23201		41748		45798		55372	
Events	493		336		292		174	
Log Likelihood	-916.20		-528.48		-481.22		-384.32	

Note: Source: AGIPEB-Survey 2013. \* $p < .05$ ; \*\* $p < .01$  (two-tailed tests).

**Table 4:** Effects of fixed-term employment on partnership events for men  
(piecewise-constant exponential models, hazard ratios and standard errors)

	Cohabitation		Marriage		Parenthood		Real Estate	
	HR	SE	HR	SE	HR	SE	HR	SE
<b>Employment status</b>								
Fixed-term contract (Ref.: permanent contract)	1.16	.17	1.21	.21	1.11	.20	.61 *	.15
In education (Ref.: permanent contract)	.74	.11	.62 *	.14	.48 *	.14	.25 **	.12
In unemployment (Ref.: permanent contract)	1.26	.41	.69	.41	1.06	.62	.00	.00
Otherwise not employed (Ref.: permanent contract)	.96	.28	1.19	.55	.89	.53	.00	.00
<b>Duration of relationship</b>								
2 to 4 years (Ref.: < 2 years)	.96	.12	1.46	.32	1.29	.32	1.99	.75
4 to 6 years (Ref.: < 2 years)	.69 *	.13	2.22 **	.48	1.41	.36	2.30 *	.88
6 to 8 years (Ref.: < 2 years)	.50 *	.14	1.97 **	.49	1.69	.45	2.01	.83
8 to 10 years (Ref.: < 2 years)	.26 **	.14	2.46 **	.71	2.18 **	.65	3.70 **	1.49
More than 10 years (Ref.: < 2 years)	.33 *	.17	2.69 **	.90	2.07 *	.71	1.95	.86
<b>Age</b>								
Years	2.28 **	.44	3.07 **	.94	3.43 **	1.23	.87	.33
Years (squared)	.98 **	.00	.98 **	.01	.98 **	.01	1.00	.01
A-level (Ref.: No a-level)	1.24	.16	.92	.14	.73	.12	.94	.20
East Germany (Ref.: West Germany)	1.26	.18	.80	.15	1.53 *	.29	.80	.22
Non-German (Ref.: German)	.38 *	.16	.60	.43	2.45 *	.96	.55	.40
Intercept	.00 **	.00	.00 **	.00	.00 **	.00	.00	.02
No. of persons	460		442		461		462	
No. of person months	15722		25404		29750		34546	
Events	336		205		162		100	
Log Likelihood	-626.78		-359.64		-339.96		-239.90	

Note: Source: AGIPEB-Survey 2013. \* $p < .05$ ; \*\* $p < .01$  (two-tailed tests).

*Tina Baier*

# Does sibling and twin similarity in cognitive ability differ by parents' education?

## **Abstract:**

Stratification scholars predominantly investigate how differences among children from different families emerge and tend to neglect differences among children from the same family. I study sibling similarity in cognitive ability and examine whether their similarity varies by parents' education. Although economic approaches and their extensions argue that disadvantaged parents reinforce differences while advantaged parents compensate for differences, I argue that parents may also make equal investments and thus accept differences among their children. I refer to the literature on stratified parenting that demonstrates that parents are engaged differently in child-rearing and their children's skill formation processes. Because advantaged parents foster children's talents more individually compared with disadvantaged parents, I propose that sibling similarity is lower in advantaged than in disadvantaged families. Previous studies based on sibling correlations provide conflicting evidence. To account for observable and unobservable differences among siblings, I extend the established sibling correlation approach and study dizygotic and monozygotic twins in addition to siblings. The analyses draw on novel data from a population register-based study of twin families. I find that young adult siblings and twins are less alike in cognitive ability in highly educated families than in less educated families. Hence, my results support the hypothesis concerning equal investments and indicate that stratified parenting has a long-lasting influence on children's cognitive ability.

**Key words:** intergenerational transmission; educational inequality; cognitive ability; sibling correlations; twins; Germany

## **1. Introduction**

The link between family background and children's education is well established in the literature (e.g., Breen 2010; Breen/Jonsson 2005; Torche 2015). Most of what we know about the impact of family background influences derives from studies that examine children from different families. Yet, a smaller body of literature studies differences that emerge among children from the same family. These studies highlight that shared family background influences, such as parents' education, occupation or income, do not affect siblings equally. Indeed, for most stratification outcomes, including education, siblings

correlate at about 0.5 (e.g., Downey 1995; Hauser/Wong 1989; Sieben/Huinink/De Graaf 2001). Thus, stratification mechanisms run not only between families but also within the family itself: despite being exposed to fairly similar family conditions, siblings end up with different levels of education. This challenges the common – though mostly not explicitly stated – assumption that shared family influences affect children in similar fashion (e.g., Conley 2008; Diewald et al. 2015).

An emerging scholarship investigates whether the similarity of siblings varies depending on parents' social background (e.g., Conley 2008; Conley/Glauber 2008; Conley/Pfeiffer/Velez 2007; Grätz 2018). Despite excellent research in this field, studies do not explicitly take into account the fact that differences among siblings are not only the result of parents' social background and associated resources but are also driven by differences in genetic make-up. Behavioral genetics provides consistent evidence that genes are an important source of individual differences and that they can shape reactions to and from the social environment (e.g., Freese 2008; Polderman et al. 2015). To understand why differences among siblings emerge, it is therefore important to consider genetic heterogeneity as well. I build on previous studies on a possible stratification of sibling similarity and study sibling and twin similarity in cognitive ability, which is highly predictive of educational success and is strongly influenced by genes (e.g., Polderman et al. 2015).

Current explanations for within-family differences are mainly rooted in economic perspectives that model parents' investment decisions within the household (Becker/Tomes 1976; Behrman/Pollak/Taubman 1982). Adding a stratification aspect, Conley (2004, 2008) proposes that advantaged parents are more likely to invest in a way that compensates for differences among their children, whereas disadvantaged parents reinforce differences due to efficiency considerations. I argue, however, that parents might also invest equally in their children and thus accept differences among them. I draw on the literature on stratified parenting, which originally emphasized the role of parenting in the emergence of differences between families and propose that differences in parenting also influence the extent to which siblings resemble one another (e.g., Cheadle/Amato 2011; Kalil/Ryan/Corey 2012; Lareau 2011; Lareau/Weininger 2003). Lareau differentiates between two logics of parenting (2011). Disadvantaged parents are engaged in a parenting concept referred to as "natural growth" and intervene little in their children's skill formation processes. Because resources are limited, parents more often invest primarily to meet the basic needs of their children. Advantaged parents, by contrast, have more resources and can afford investments in addition to those needed fundamentally. They engage in a parenting concept referred to as "concerted cultivation" and intend to further skills and behaviors typically found in higher class families. Importantly, parents embrace an active parenting strategy that shapes developmental processes of their children. Over and above "concerted cultivation" in accordance with higher class habits such active investments can also address children's individual potentials and needs. Such investments are more child-specific. Because children develop depending on their unique interests, talents, and related specific inputs, I expect them to end up being less alike in their cognitive ability than siblings from disadvantaged backgrounds. Hence, I propose a competing hypothesis – namely, that siblings are less similar in terms of cognitive ability in advantaged families than in disadvantaged families.

Previous research on sibling similarity (i.e., sibling correlations) in cognitive skills is limited and provides conflicting evidence (Anger/Schnitzlein 2017; Conley/Pfeiffer/Velez

2007; Grätz 2018). Yet, findings on sibling correlations have recently been criticized (e.g., Björklund/Jäntti 2012): First, (full) siblings differ in age and, because family contexts are not necessarily stable over time, might grow up in different family environments. Second, (full) siblings differ in their genetic make-up. Consequently, findings concerning the link between parents' social background and the similarity of siblings might be influenced by developmental differences, genetic differences, and/or a combination of the two – and are not necessarily the direct consequence of varying parental resources.

To address this shortcoming, I study the similarity of (full) siblings, dizygotic (DZ), and monozygotic (MZ) twins. DZ twins are born at the same time and thus share much more of the family influences than (full) siblings do. However, DZ twins differ in their genetic make-up, which also affects the degree of similarity. MZ twins, by contrast, are genetically alike. The similarity between MZ twins therefore captures family influences most comprehensively. MZ twins allow one a) to accurately differentiate between shared family and child-specific influences and b) to rigorously test whether the similarity changes if parents' education increases.

Sibling and twin similarity is estimated with multilevel models. I draw on the newly collected dataset from the TwinLife study. TwinLife is a population register-based sample of more than 4,000 twins and their families residing in Germany (Diewald et al. 2017). Unlike many observational twin studies, TwinLife has applied a probability-based sampling strategy. These data make it possible to investigate, for the first time for Germany, sibling and twin similarity in cognitive ability and a possible stratification covering a broad range of the social spectrum (Lang/Kottwitz 2017).

I contribute to the literature by acknowledging that family influences comprise both social resources and genetic transmission. In addition, I control for the relationship of siblings and twins, which addresses a major limitation of studies analyzing within-family stratification. This enables me to model family influences more comprehensively and to analyze systematic differences in the similarity of siblings that are not influenced by differences in the rearing environment, genetic influences or even the sibling relationship. Finally, I extend current theoretical explanations based on economic investment and emphasize the role of stratified parenting instead.

## 2. Theoretical background

How can we explain differences in cognitive ability among children from the same family? And do differences vary according to parents' social background? To address these questions, I apply a within-family perspective and link parents' investments and parenting to sibling similarity. I then refer to the sibling correlation framework, which is widely applied to test the proposed mechanisms indirectly. Incorporating findings from behavioral genetics, I argue that twins as opposed to siblings provide a more suitable unit of analysis to test whether a change in similarity is associated with parents' social background.

## 2.1 *Sibling similarity and parents' investments*

To explain how differences among children from the same family emerge, scholars predominantly refer to economic perspectives that model parents' resource allocation decisions within the household. Becker and Tomes (1976) propose a general model according to which parents rationally invest various types of resources in children's human capital formation and, thus, in later-life outcomes. Following the investment paradigm, parents aim to maximize the total returns of the household. Accordingly, their investment decisions are driven by efficiency considerations, and resources are directed to the child from whom they anticipate the highest returns. Later in the life course, parents seek to create equality among children by monetary transfers. According to the "efficiency paradigm", parents purposely reinforce differences in human capital, which increases differences among their children.

Behrman and colleagues (1982) counter this perspective and add a different motivational aspect of parents' investments decisions. Because future returns on investment are uncertain, parents seek to compensate differences among children and tend to create equal outcomes in children's human capital. Thus, parental investments actively reduce differences among siblings, leading to higher sibling similarity with respect to education and, presumably, later income. This ultimately reduces the need to make monetary transfers in order to create equal living standards for their children. In this sense, parents invest in exactly the opposite way from that predicted by Becker and Tomes (see also Conley 2008).

Thus, in both perspectives, parents allocate their resources unequally among their children: If their decision is guided by efficiency considerations, parents increase differences among their children by favoring the most promising child (lower similarity). If, on the other hand, parents intend to create equal outcomes, they compensate for differences and favor the less talented child (higher similarity).

### Parents' investments and social background

It is also important to take into account the fact that the quality and quantity of parents' investments might differ depending on their social background. According to the family investment model (FIM), which extends the investment paradigm, advantaged parents have more resources that are conducive to cognitive and noncognitive skill development than do disadvantaged parents (e.g., Conger/Conger/Martin 2010). Resources include not only various goods and services, such as better housing and healthy food, but also skill-enhancing activities and a stimulating home environment (e.g., Cunha/Heckman 2007; Cunha et al. 2006). The family stress model (FSM) focuses on the influence of intra-family dynamics and marital conflicts triggered by economic hardship; due to increased levels of psychological stress, disadvantaged parents become less involved in their children's affairs, are less capable of meeting their children's emotional needs, and often respond with harsh parenting (e.g., Conger/Elder 1994; Conger/Conger/Martin 2010). The related nonmaterial consequences of financial strain are the relevant pathways through which parents' social position influence children's skills and well-being. Both the family investment model and the family stress model have made major contributions to our understanding of how parents' social background leads to systematic differences between

children from advantaged and disadvantaged families. Nonetheless, whether and how parents' social background leads to differences or similarity among children from the same family remains unclear.

Conley (2004, 2008) adopts a within-family perspective and links parents' social background to their resource allocation decisions. He argues that parents' investment rationale is contingent on their social position: Depending on the resources available, parents invest either in a compensatory fashion or in line with the efficiency paradigm. Accordingly, parents with fewer resources minimize the risk of failure by directing resources to the most promising children, whereas advantaged parents can afford both – investments in the most promising child and compensatory investments in the less gifted one. In this perspective, equality among siblings is a goal that can be attained once enough resources are available (higher sibling similarity); otherwise, parents will have to pick one of their children and direct their resources selectively (lower sibling similarity) (Conley 2004).

However, parents might also make equal investments and accept that their children develop differently. To elaborate how equal investments might accentuate differences between children from the same family, I draw on the literature on stratified parenting. Broadly speaking, parenting refers to parent-child interactions that affect children's development. Hereby, we can distinguish between parenting goals, parenting styles, and parenting practices (Darling/Steinberg 1993). Parenting goals, or socialization goals, refer to the outcomes that parents seek for their children. Parenting styles denote the emotional climate in which parent-child interactions are embedded, and parenting practices refer to parental actions and activities that parents provide for their children in order to achieve their goals. The study of parenting styles has a long research tradition among developmental psychologists pioneered by Baumrind (1971), whilst recent sociological studies focus on parents' activities, i.e. parenting practices, as expression of distinct cultural taste (e.g., Cheadle/Amato 2011; Kalil/Ryan/Corey 2012; Lareau 2011; Lareau/Weininger 2003).

In her qualitative study, Lareau (2011) identifies two different logics of parenting that describe systematic differences in child-rearing and involvement in children's skill formation processes. These logics are rooted in the parents' distinct cultural practices and habits and influence children's skills, educational attainment, and hence their subsequent life chances.

Advantaged parents adopt a parenting concept referred to as "concerted cultivation." Parents seek to promote – that is, cultivate – their children's unique talents and to give them the ability to speak up for themselves in order to increase their chances of later-life success. To achieve this, parents invest various types of resources that support the skill development of their children. Importantly, parents actively shape the development of their children and plan interactions and activities with their children. Parents are very controlling paired with responsiveness. Parents provide clear guidance and are strongly involved in structuring their children's daily lives. Consequently, children grow up in a home environment in which the parents structure their leisure time and actively further their children's interests. To be effective (i.e., to foster the children's talents), such parents provide child-specific inputs: they customize their children's daily activities in line with the children's interests; they monitor the children's educational processes individually; and they provide support if needed. Hence, stimulating activities and resources are

provided for every child, but what kind of investment each child receives will depend on their specific needs.

Disadvantaged parents adopt a parenting concept referred to as “natural growth”. Here, the children’s development is perceived more as something that naturally evolves over time. Parents intervene less in the developmental processes of their children and provide those inputs that are fundamentally needed for development. Parents are less involved and more authoritarian, set strict rules which are not questioned. Due to limitations of time and money, parents often lack the capacity to discover their children’s individual talents and/or to provide stimulating activities or resources to further those interests. Consequently, such parents adopt a less active role in their children’s development and skill formation. Disadvantaged parents also provide their resources for all of their children; investments are, however, rather uniform and thus less child-centered.

Quantitative studies provide support for different parenting concepts in line with Lareau’s notion on different logics of parenting (e.g., Cheadle 2008; Cheadle/Amato 2011) and their association with children’s academic performance (Bodovski/Farkas 2008; Roksa/Potter 2011) and facets of personality (Kaiser/Diewald 2014; Kaiser 2017). It is important to note that Lareau does not adopt a within-family perspective; rather, she shows how culturalized habits lead to systematic differences between advantaged and disadvantaged children. Furthermore, the notion of stratified logics of parenting is not mutually exclusive from either the family investment perspective or the family stress perspective. In fact, Lareau’s notion of different logics of parenting is supported by the finding that more advantaged parents provide more skill-enhancing inputs compared with disadvantaged parents (e.g., Conger/Conger/Martin 2010). Related to that, psychological stress as proposed by the family stress model (e.g., Conger/Elder 1994; Conger/Conger/Martin 2010) might provide a mechanism that explains why disadvantaged children receive less attention from their parents. Nonetheless, I argue that an important mechanism behind the emergence of within-family differences is rooted in active and strategic parenting behaviors found in advantaged families: Parents that seek to cultivate distinct skills and behaviors are also more actively involved in shaping the development of their children. Such investments can address children’s potentials and needs more individually which promote differences in cognitive ability among siblings to a greater extent (lower sibling similarity) than investments from disadvantaged parents. Disadvantaged parents often lack the capacity and/or resources to make those skill-enhancing investments and provide fairly uniform inputs, which leads to higher similarity. That siblings in advantaged families end up being more different than siblings in disadvantaged families is not intentional – it is a side effect of parents’ distinct parenting behavior.

Taken together, the literature provides competing hypotheses for a stratification of sibling similarity. Conley (2004, 2008) argues that parents allocate their resources selectively: If resources are limited, parents will allocate their resources efficiently; if resources are not restricted, parents tend to compensate. If Conley’s argument holds, I expect *siblings to be less similar in disadvantaged families compared with siblings from advantaged families (H1)*. If, however, parents make equal investments and adopt different parenting concepts, I expect the opposite pattern – that is, I expect *siblings to be more similar in disadvantaged families compared with siblings from advantaged families (H2)*.

## 2.2 *Previous findings*

The link between social background and sibling similarity has been studied for socioeconomic outcomes such as education, income, and earnings (Conley/Glauber 2008; Conley 2008), as well as for cognitive and noncognitive skills (Anger/Schnitzlein 2017; Conley/Pfeiffer/Velez 2007; Grätz 2018). Most studies refer to the US, although more recent studies have been conducted for Germany. Given that educational decisions are different from investments that further the development of cognitive ability (Boudon 1974; Breen/Goldthorpe 1997; Erikson/Jonsson 1996), in the following I focus on studies that analyze sibling similarity in cognitive and noncognitive skills. Conley, Pfeiffer and Velez (2007) analyzed sibling similarity in cognitive skills and behavioral outcomes during early childhood (between ages 6 and 12) based on the Panel Study of Income Dynamics (PSID) for the US. These authors used literacy, numeracy, reading comprehension, and problem-solving skills as indicators of cognitive skills, and the Behavior Problem Index (BPI) for behavioral outcomes; social background was approximated using mothers' education. The results offer some support for a systematic variation according to social background: Sibling similarity in literacy and the BPI was significantly higher for siblings whose mothers were less educated. Anger and Schnitzlein (2017) examined sibling similarity in cognitive ability, noncognitive skills (i.e., the Big Five), and locus of control for adult siblings (aged between 20 and 54) in Germany using the Socio-Economic Panel study (SOEP). Because they had only small sample sizes, they examined the link with social background only for noncognitive skills. The results show that sibling similarity for most indicators of noncognitive skills was higher for siblings whose mothers are more educated. Grätz (2018) examined sibling similarity in cognitive ability for young adult siblings (aged between 17 and 28) based on the SOEP as well. He used more recent waves and examined systematic differences in the similarity of cognitive skills according to social background, as indicated by parents' education, occupation, and social class (based on the Erikson-Goldthorpe-Portocarero social class scheme, EGP). Regardless of the indicator of social background, sibling similarity did not change systematically according to social background.

In sum, the empirical literature provides conflicting evidence for the country and the outcome under study. In the US, sibling similarity in the BPI and in literacy skills tend to be higher in disadvantaged families. For Germany, however, sibling similarity in noncognitive skills tend to be higher in advantaged families. Sibling similarity in cognitive skills, by contrast, did not systematically differ.

There are two factors that might explain why these findings diverge between the US and Germany. First, institutional differences might play a role. Germany and the US vary greatly in the institutional set-up of the welfare state. Social inequality is much more polarized in the US context, and the welfare state there is less invasive and provides only a weak insurance structure. The German welfare state, by contrast, provides more generous social benefits and a safety net. At least regarding cognitive skills, evidence for the US shows that poverty is strongly linked to children's cognitive outcomes, which is less so in Germany (Biedinger 2011). Thus, the fact that sibling similarity in literacy skills in the US is associated with social background might be explained by differences in marginalization that are experienced in these two countries (see also Schulz et al. 2017). Yet, evi-

dence for a systematic variation in cognitive outcomes is weak, because it was found for only one indicator of cognitive skills during early childhood. In addition, it is striking that the pattern identified for noncognitive skills tends in the opposite direction.

The second important factor that might explain the divergent findings is the age range of the siblings, which is closely linked to the development of cognitive and noncognitive skills (e.g., Cunha/Heckman 2007; Haworth et al. 2010). The two studies for Germany analyzed young adult siblings, whereas the study for the US analyzed siblings during childhood. Given that children are more sensitive to environmental influences (i.e., family inputs) during childhood (e.g., Cunha/Heckman 2007), divergent findings might indicate that the influence of parents' social background varies over the children's life courses. However, this remains an empirical question and will require more research that also takes children's developmental stage into consideration.

A major limitation of previous studies, besides possible life course variation, is that they have not sufficiently accounted for genetic influences. Genetically sensitive studies provide consistent evidence that cognitive and noncognitive skills, as well as more distal outcomes such as achievement scores, grades, and educational attainment, are significantly influenced by genetics (e.g., Ayorech et al. 2017; Branigan/McCallum/Freese 2013; Johnson/McGue/Iacono 2005; de Zeeuw/de Geus/Boomsma 2015). IQ research in particular has a long tradition in behavioral genetics, and previous studies show that heritability of adults' cognitive skills (i.e., IQ) is between 0.6 and 0.8 (Tucker-Drob/Briley/Harden 2013). Thus, genetic influences account for about 60 percent to 80 percent of total variation in IQ. This does not mean that environmental (i.e., social) influences are unimportant, because genetic tendencies are realized under social conditions (i.e., the proximate family environment) (e.g., Bronfenbrenner/Ceci 1994).

Moreover, environments that humans encounter are not random but are a function of an individual's genotype, referred to as "gene-environment correlations" (Plomin/DeFries/Loehlin 1977; Rutter 2007). Passive gene-environment correlations describe situations in which individuals are selected into environments that match their talents. For example, parents who favor classical music not only transmit such preferences, they also expose their children more often to this type of music. Thus, children inherit genetic dispositions but are also exposed to environmental influences in line with these dispositions. Evocative gene-environment correlations describe individuals' reactions to the genetic endowments of others; for example, gifted children might receive special treatment from teachers. Recent evidence shows that children's genetic make-up also influences how parents treat their children; for example, extrovert children might be treated differently from introvert children. Children's genetic make-up can therefore influence how parents react to them (Avinun/Knafo 2014; Klahr/Burt 2014). Finally, individuals actively search for environments that match their innate talent (niche picking), which is referred to as active gene-environment correlation.

If we do not take genetic heterogeneity into account, findings concerning the link between similarity and parents' social background (i.e., social transmission mechanisms) remain misleading. Genes affect cognitive ability directly, but they also operate indirectly in that genes influence how parents react to their children and/or how children react to their parents' investments. Thus, any similarity or dissimilarity of siblings might be driven by differences in genetic make-up.

### 2.3 Sibling, DZ twin, and MZ twin similarity

As noted, sibling similarity (i.e., sibling correlation) serves as an indirect test for parents' investment strategies. Sibling similarity can be understood as a summative measure for all measured and unmeasured influences of family background ("total family effect") (e.g., Sieben/Huinink/De Graaf 2001). The idea is straightforward: Because siblings are born and raised in the same family, everything that makes them alike can be attributed to shared family influences. The more alike siblings are, the stronger the influence of shared family influences. Conversely, differences among siblings emerge as a result of influences that are not shared by siblings and thus are specific to the child.

On an interpretive level, it is important to note that a low sibling correlation does not necessarily imply that family background is not important, because differences among siblings may be rooted in parents' actions (e.g., Björklund/Jäntti 2012; Conley 2008). In line with the theoretical assumptions outlined above, parents' efforts may lead to either sibling similarity or sibling dissimilarity. If parents compensate for differences, sibling similarity increases and shared family influences increase (H1). For efficiency reasons, there is still only one child who benefits from the parents' resources, but, as differences increase, shared family influences decrease. And even if parents allocate their resources equally (H2), shared family influences decrease to the extent that initial differences are reinforced. Thus, differences among siblings – lower sibling correlations – may be triggered by parents efforts. Given that non-shared or child-specific influences may be the result of parents' selective resource allocation, the interpretation of the similarity of siblings as the "total family impact" can be misleading (Conley 2008). Nevertheless, sibling correlations, as a descriptive measure, provide an understanding of whether stratification mechanisms on the societal level influence intra-family dynamics that lead to differences among siblings (ibid.).

On a conceptual level, it is important to note that sibling similarity summarizes not only the influence of parents' characteristics and associated resources, but also the impact of influences associated with the broader family context (i.e., neighborhood influences), genetic endowments, and effects that siblings have on one another (e.g., Conley/Glauber 2008). In the following, I explain why twins provide a better unit of analysis to capture shared family influences and how twins enable us to test whether a change in the similarity is associated with varying resources of the parents.

(Full) siblings are born and raised at different points in time and share about half of their DNA. Twins, by contrast, are born and raised at the same time, while MZ twins are, at conception, genetically alike (see Table 1).

*Table 1:* Similarity and dissimilarity of siblings and twins

	(Full) siblings	DZ	MZ
Exposure to <i>same</i> family conditions	No	Yes	Yes
Genetic overlap	~ 50 %	~ 50 %	~ 100 %
Sources of dissimilarity	Non-shared influences and genes	Non-shared influences and genes	Non-shared influences

It is common in stratification research to study the similarity of (full) siblings. Siblings may grow up under different family conditions (i.e., families might relocate, parents might switch jobs and/or re-partner) and differ in their genes. Thus, their similarity might result from either of these influences or from a combination of the two. Consequently, a change in the similarity might not be a direct consequence of varying parental resources and the associated investments. DZ twins are raised simultaneously, and hence they grow up under almost the same family conditions. For example, when twins grow up, their parents have the same occupational and educational status, and the twins live in the same neighborhood and probably attend the same school (or at least a school that is nearby). It is less likely that differences in the strength of the similarity between DZ twins can be attributed to the broader family context (because most of the contextual influences are shared). DZ twins are raised under most similar family conditions, while the rearing environment of (full) siblings can be very different. Thus, a change in the strength of similarity of DZ twins is more likely to be associated with systematic differences in parents' resources. Nonetheless, differences between DZ twins might still be due to their genetic differences. MZ twins are genetically identical and thus provide the most comprehensive measure for shared family influences because of their common upbringing and shared genes. Any difference among MZ twins must be the result of unshared influences – net of genetic factors. Studying MZ twins, therefore, makes it possible to rigorously test whether the similarity is associated with parents' social position and related investments.

Given the above, I argue that studying MZ twins provides the most rigorous test for the two hypotheses proposed earlier. The findings concerning the link between sibling similarity and parents' social background based on (full) siblings serve as baseline findings, because this is the general approach in stratification research. Results for DZ and MZ twins show to what extent the similarity changes when children are raised under the most similar family conditions (DZ twins) and if genetic heterogeneity is also controlled for (MZ twins).

Nonetheless, similarity between twins may also be the result of sibling effects – that is, of the influence siblings have on one another. This is a general concern when studying siblings and possibly even more so when studying twins. Previous studies have found that siblings have an effect on cognitive development (Azmitia/Hesser 1993; Brody 2004; Dunn 1983). Siblings may serve as teachers, which is beneficial to both the one being taught and the one teaching, because the teaching sibling has to reconsider a given subject, reduce the level of complexity, and find appropriate and/or easier explanations. Siblings are even more effective teachers than are peers, which may possibly be explained by their greater familiarity with and knowledge of their siblings' unique talents and weaknesses (Azmitia/Hesser 1993). Studies in this field analyze siblings. And it might be argued that interactions are not directly transferable to twins, who might have more similar knowledge than siblings who differ in age. However, as Dunn (1983) noted, sibling relationships are characterized by both “reciprocity” and “complementarity,” with the latter being positively associated with sociocognitive development. Reciprocal interactions, however, are very likely among twins, who share even more time with each other and know each other probably even better than (full) siblings know one another. I therefore argue that such learning processes are also prevalent in twin dyads.

Importantly, mutual influences among siblings might differ in how parents allocate their resources. When resources are scarce, sibling rivalry might be increased, which in

turn lowers mutual influences among siblings as they struggle for scarce resources. As competitors, it is unlikely that they will teach each other. However, siblings might also interact less with each other if there are plenty of resources, because they seek to set themselves apart to maintain their niche in the family system. Given that there is no empirical research on a possible stratification on siblings' relationships and their influence on cognitive outcomes, both scenarios are equally plausible. To rule out the possibility that sibling effects are not the main driver of sibling and twin similarity, I provide a sensitivity analysis that controls for the closeness of the twin and sibling relationships.

### 3. Data and methods

The analyses draw on newly collected data from the TwinLife panel study, a population register-based study of twins and their families residing in Germany (Diewald et al. 2017). These data make it possible – for the first time for Germany – to examine sibling and twin similarity in cognitive ability. Data collection started in 2014. TwinLife applies an extended twin family design in which the twins, their biological and social parents, and one sibling (if available) are surveyed. The information on zygosity (i.e., whether a twin is mono- or dizygotic) was obtained by means of physical similarity reports (self-reports or parents' reports) (see Lenau/Hahn 2017).<sup>1</sup> Due to the probability-based sampling strategy, TwinLife provides a unique opportunity to examine correlations in cognitive ability on a broad range of the social spectrum (Lang/Kottwitz 2017).

The analyses are based on young adult siblings and twins from the two oldest birth cohorts, aged between 17 and 25 years (birth cohorts 1997/98 and 1990-93, respectively). I excluded younger birth cohorts from the analysis (twins aged between 5 and 12), because age is a strong moderator of cognitive development (e.g., Cunha/Heckman 2007; Haworth et al. 2010), and the question how parents' social background affects cognitive ability at different stages of children's life course represents a study in its own right. Studying young adults is particularly interesting, because I can examine whether social background and associated allocation decisions have a lasting influence on cognitive ability.

To investigate sibling and twin similarity, I generated three samples: a sibling sample, a DZ twin sample, and an MZ twin sample. TwinLife samples twin families only (with or without additional non-twin siblings). Thus, siblings in the sibling sample are (full) siblings of twins who are randomly paired with one twin from the monozygotic or dizygotic twin pair (i.e., non-twin sibling-twin dyads). I restrict the minimum age of the siblings to the minimum age of twins (17 years) and the age difference to up to 8 years (i.e., two standard deviations from the age difference) in order to avoid the level of cognitive ability being affected by developmental differences within the sibling-twin dyad. Given the design of the TwinLife study, the sibling sample includes families with at least three children (i.e., the twin pair and one non-twin sibling), which is not necessarily the case for the twin samples considering that twins do not necessarily have a non-twin sibling. To ensure

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1 The algorithm to determine the zygosity of twins was additionally cross-validated through genotyping procedures with a subsample of about 300 twin pairs (Lenau/Hahn 2017).

the results will not be influenced by fewer resources among families who have more than two children, I restrict the analyses to families with at least 3 and no more than 8 children (the maximum number of children in all three samples). The sibling sample comprises 726 siblings, the DZ sample 1,148 twins, and the MZ sample 1,232 twins.

### 3.1 Variables

The outcome of interest is that for cognitive ability. Cognitive ability is measured using the Culture Fair Intelligence Test (CFT 20-R), which is a standard psychometric test to measure nonverbal (fluid) intelligence (Weiß 2006). Individuals' cognitive ability scores are estimated using structural equation modeling. As recommend by the TwinLife group, I used age-corrected CFT scores (Gottschling 2017). I deleted observations with missing values for the cognitive testing (14% of the sample). Information on cognitive ability was missing more often among low-educated families ( $p < 0.05$ ). Because lower-educated families are to some extent underrepresented, the findings concerning sibling and twin similarity tend to represent lower-bound estimates.

I use parents' education as an indicator of social background – that is, the highest level of education achieved by the parents (dominance principle).<sup>2</sup> I chose parents' education because it covers not only transmission mechanisms that run through economic resources but also resources that can be summarized as “cultural capital” that fosters children's cognitive ability. For example, more educated parents provide a stimulating home environment and activities, and they transmit distinct preferences and practices, all of which are linked to children's educational achievements (e.g., Cunha/Heckman 2007; Duncan et al. 1998; Lareau/Weininger 2003). Based on the CASMIN classification scheme (see Appendix 1), I distinguish low-educated (CASMIN 1a-c, 2b), medium-educated (CASMIN 2a, c), and highly educated parents (CASMIN 3a, b). CASMIN 2b refers to individuals with intermediate levels of general education but without vocational training. They are included in the lowest educational category for two reasons. First, the German labor market is highly credentialized and it is very uncommon to enter the labor market without any vocational training (e.g., Allmendinger 1989; Solga 2005). Second, due to educational expansion, the proportion of individuals with low levels of secondary education is decreasing, while the proportion of individuals with intermediate levels of secondary education is increasing (Solga 2005).<sup>3</sup>

CASMIN information was missing for 7.8% of the mothers and 32% of the fathers. I used multiple imputation with chained equations with 20 data sets for each observation to impute the missing information on education (van Buuren et al. 2006). The main variables for the imputation model are at the family level (i.e., they come from the twins' parents).

In sensitivity analyses, I investigate the role of mutual influences among siblings and twins. To indicate the closeness of a relationship, three questions were asked: *How often do you talk about important things with [name of the other sibling]?* *How often do you attempt to cheer up [name of the other sibling]?*, and *How close do you feel to [name of the*

2 The results do not change substantially if mother's education is used to indicate educational background instead (see Appendix A3).

3 The results remain stable if individuals with CASMIN 2b are in the group with medium education.

*other sibling*]?<sup>4</sup> The response categories were never, rarely, occasionally, often, and very often. I used confirmatory factor analysis based on structural equation modeling to create an index of closeness (the coefficient of determination is 0.8). Table 2 shows the descriptive statistics for the sibling, DZ, and MZ samples.

Table 2: Descriptive statistics

	Siblings				DZ				MZ			
	Mean/ SD	Min.	Max.	N	Mean/ SD	Min.	Max.	N	Mean/ SD	Min.	Max.	N
<i>Individual (twin) level variables:</i>												
Cognitive ability	98.96 (16.49)	56	143	726	98.21 (16.49)	55	143	1148	99.30 (15.83)	55	146	1232
Age	20.73 (3.20)	17	31	726	19.82 (3.00)	17	25	1148	20.13 (3.02)	17	25	1232
Male	0.45 (0.50)	0	1	726	0.41 (0.49)	0	1	1148	0.42 (0.49)	0	1	1232
Closeness <sup>a)</sup>	0 (1.00)	-2.70	1.69	726	-0.23 (1.02)	-3.71	1.03	1148	0.22 (0.93)	-3.71	1.03	1232
Family size	3.56 (0.90)	3	8	726	3.54 (0.91)	3	8	1148	3.59 (0.90)	3	8	1232
<i>Family-level variables:</i>												
Parents' CASMIN (imputed)												
Low	0.18 (0.39)	0	1	726	0.18 (0.38)	0	1	1148	0.19 (0.39)	0	1	1232
Medium	0.47 (0.50)	0	1	726	0.47 (0.50)	0	1	1148	0.46 (0.50)	0	1	1232
High	0.35 (0.48)	0	1	726	0.35 (0.48)	0	1	1148	0.35 (0.48)	0	1	1232
Parents' CASMIN (unimputed)												
Low	0.20 (0.40)	0	1	712	0.18 (0.39)	0	1	1120	0.22 (0.41)	0	1	1198
Medium	0.46 (0.50)	0	1	712	0.47 (0.50)	0	1	1120	0.44 (0.50)	0	1	1198
High	0.34 (0.47)	0	1	712	0.35 (0.48)	0	1	1120	0.34 (0.47)	0	1	1198

Source: TwinLife Wave 1; own calculations. Standard errors in parentheses. <sup>a)</sup> Closeness is mean-centered.

The distribution of the main variable is fairly similar across all three samples. However, with regard to the closeness of the sibling and twin relationship, there are substantial differences: MZ twins are closest, followed by siblings and then by DZ twins. Differences between DZ and MZ twins have previously been found in the literature and might be explained by their closer resemblance in terms of both the rearing environment and their genetic make-up (Fortuna/Goldner/Knafo 2010). The fact that siblings are closer to one another than DZ twins are to each other is contrary to previous findings (which, however, were reported in studies based on small samples) and therefore requires more empirical investigation (*ibid.*).

4 Twins were asked the same questions.

### 3.2 Analytical strategy

To examine the similarity among siblings and twins, I use multilevel modeling in which siblings (level 1) are nested in families (level 2) (e.g., Raudenbush/Bryk 2002). Multilevel models (also known as variance decomposition models) are well suited for the question under study because they make it possible to separate out the different sources of variation in children's cognitive ability that is, shared family and non-shared child-specific influences. Given that the variance components are of particular interest, I separately specify empty models for each sibling sample. Based on this regression set-up, the intra-class correlation coefficient ICC can be calculated.

$$ICC = \frac{\sigma_b^2}{\sigma_w^2 + \sigma_b^2}$$

The ICC is defined as the ratio of the variance due to between-family differences (shared family influences) ( $\sigma_b^2$ ) relative to the total variance (i.e., variation that can be attributed to the family ( $\sigma_b^2$ ) plus variation that can be attributed to the child ( $\sigma_w^2$ )). A low ICC indicates high within-family stratification: despite shared family influences, siblings' outcomes differ from each other. Vice versa, a high ICC indicates a greater importance of shared family influences.

I first estimate variance decompositions for each sample (siblings, DZ twins, MZ twins) separately. I then estimate these models for each sample, differentiated by parents' education. The test for a systematic variation according to parents' education is based on the z-value of the differences in the ICCs (Conley/Glauber 2008; Conley/Pfeiffer/Velez 2007; Kenny/Kashy/Cook 2006). It is common in the sibling correlation literature to consider only the ICC, which is a standardized measure of the importance of the between-family (random effect) variance, at the expense of the variance components in absolute terms. However, the ratio stays the same if both variance components change simultaneously. Thus, the relative importance of shared family influences may change even if the ICC does not. To better understand the ongoing processes, I also provide information about the variance components in absolute terms (Erola 2012).

I estimate two-level random intercepts models with the mixed command in Stata 14.2 using the restricted maximum-likelihood option.

## 4. Results

Table 3 shows the results for sibling and twin similarity in the unrestricted sample (column 1) and their variation according to parents' education (columns 2 to 4). Figure 1 visualizes the findings. Table 3 reports three estimates of empty multilevel models: 1) the variance components in absolute terms as an indication of the underlying structure of the variation (Variance [family] and Variance [child]); 2) the intra-class correlation (ICC), which specifies the relative importance of shared family influences; and 3) the mean level of cognitive ability (constant), which provides information about the direction of shared family influences.

Table 3: Sibling and twin similarity in cognitive ability according to parents' education

	Overall		Low		Parents' education Medium		High	
	$\beta$ /var	z-value	$\beta$ /var	z-value	$\beta$ /var	z-value	$\beta$ /var	z-value
<b>Siblings</b>								
Constant	98.95 (0.71)	139.09	90.77 (1.96)	46.36	98.63 (1.09)	90.22	102.91 (1.07)	95.88
Variance (family)	96.47		147.38		73.09		58.62	
Variance (child)	174.55		125.03		186.97		181.65	
ICC	0.36 (0.05)	7.76	0.54 (0.10)	5.6	0.28 (0.08)	3.72	0.24 (0.08)	2.87
N		726		122		324		280
<i>Differences in ICC</i>	<i>z-value</i>							
Medium vs. high	2.03							
High vs. low	0.35							
Low vs. medium	2.34							
<b>DZ twins</b>								
Constant	98.21 (0.58)	170.7	90.39 (1.63)	55.37	96.22 (0.90)	106.96	103.36 (0.90)	115.06
Variance (family)	108.13		112.15		91.54		71.79	
Variance (child)	163.72		181.09		159.57		161.73	
ICC	0.40 (0.04)	11.32	0.38 (0.09)	4.02	0.36 (0.06)	6.11	0.31 (0.07)	4.69
N		1148		176		510		462
<i>Differences in ICC</i>	<i>z-value</i>							
Medium vs. high	0.19							
High vs. low	0.54							
Low vs. medium	0.61							
<b>MZ twins</b>								
Constant	99.3 (0.58)	169.81	92.77 (1.51)	61.5	99.63 (0.94)	106.11	101.83 (0.92)	110.42
Variance (family)	170.72		175.53		169.17		146.35	
Variance (child)	79.87		66.67		80.83		84.65	
ICC	0.68 (0.02)	31.54	0.72 (0.05)	14.44	0.68 (0.04)	19.23	0.63 (0.04)	15.41
N		1232		212		536		484
<i>Differences in ICC</i>	<i>z-value</i>							
Medium vs. high	0.63							
High vs. low	0.88							
Low vs. medium	1.41							

Source: TwinLife Wave 1; own calculations. Standard errors in parentheses.

I start with the results for the unrestricted sample (Table 3, column 1). These are baseline results for the degree of within-family stratification by sibling type. The similarity of (full) siblings is 0.36 (see ICC). Thus, more than a third of the total variation in cognitive ability can be attributed to shared family influences; child-specific influences account for about two thirds of the total variation. On average, siblings share about 50 percent of their DNA. Thus, genetic influences are included in the shared family component (if they lead to sibling similarity) and also in child-specific influences (if they lead to differences) (see Table 1). Since (full) siblings differ in age and genetic make-up, their similarity is comparatively low. However, the similarity of DZ twins is only slightly higher (40%). As noted earlier, DZ twins are born and raised at the same time. The rearing environment for DZ

twins is therefore much more similar compared with the rearing environment for siblings. Nonetheless, the correlation – and hence the degree of within-family stratification – in cognitive ability for siblings and DZ twins is about the same (0.40 for DZ and 0.36 for siblings). Thus, even under the most similar family conditions DZ are differently affected by them. The similarity of MZ twins is considerably higher (0.68), which can be explained by shared rearing and shared genes. The fact that the similarity is considerably higher for MZ twins reflects the importance of genetic influences for cognitive ability (e.g., Ayorech et al. 2017). Any difference between MZ twins results from non-genetic non-shared influences (see Table 1). About 30 percent of the total variation in cognitive ability is associated with child-specific influences – net of children's genes.

Next, I evaluate how the overall similarity changes according to parents' education (Table 3, columns 2-4). The results show that the degree of similarity decreases in all three samples from less to highly educated parents. The decrease in the similarity is most pronounced in the sibling sample. In less educated families, sibling similarity is about 0.54. Thus, half of the total variation in cognitive ability can be attributed to shared family influences. In highly educated families, by contrast, siblings correlate at about 0.24. Thus, child-specific influences are more important in highly educated families. As indicated by the z-values, differences in the similarity between medium- and highly educated families are statistically significant ( $z$ -value = 2.03), as are differences between less and medium-educated families ( $z$ -value = 2.34). Also in absolute terms, shared family background influences decrease sharply, whereas child-specific influences increase in families from low to medium-educated families. Given that the cognitive ability scores are more different in more highly educated families than in less educated families, the results provide preliminary support for hypothesis H2.

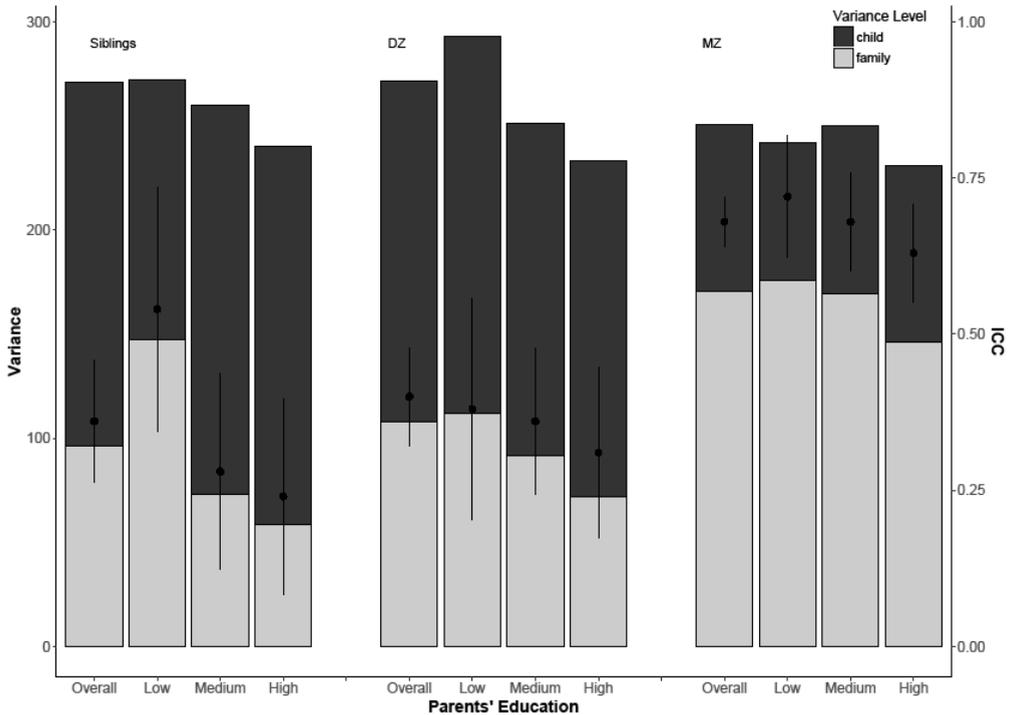
The similarity of DZ twins also decreases from less to highly educated families. In less educated families, the similarity of DZ twins is 0.38; in highly educated families it is 0.31. Although the decrease in the degree of similarity is not statistically significant, the results tend in the same direction, showing that the change in the degree of similarity is driven mainly by the decrease in the relative importance of shared family influences. This provides further indication that parents use their resources selectively once additional resources are available. Given that DZ twins and siblings differ only in the extent to which they are simultaneously exposed to the same family conditions, the significant decrease among siblings must be rooted in different family environments in which (full) siblings grow up.

Results for MZ twins reveal the same pattern. The similarity decreases from 0.72 in less educated families to 0.63 in highly educated families. The results for the variance components in absolute terms show the same trend: shared family influences decrease steadily from less to highly educated families, whereas child-specific influences – net of genes – become more important in the MZ sample. Thus, even for MZ twins, who are overall more similar than siblings and DZ twins because of their shared genetic make-up and shared rearing, differences are the more pronounced the more educated parents are.

Finally, I report the findings on the mean of cognitive ability (Table 3, Constant). For siblings, DZ twins, and MZ twins this mean level of cognitive ability increases with parents' education. The more resources parents have, the higher the mean value of cognitive ability. Since parents transmit 50% of their genes to their children the increase in the mean value of cognitive ability is also driven by direct genetic effects. To parcel out ge-

netic transmission, I would need the information on the correlation of children's and parents' genotypes, which I consider to be a study in its own right. However, parents' genes that are not transmitted also affect children's outcomes, since parents select environments based on their genetic makeup (indirect genetic effects) (Belsky et al. 2018). Previous research shows that environmental conditions created by more educated parents enhance genetic expression for cognitive skills such as IQ (i.e., they provide a rearing environment in which children can actualize their genetic potential (e.g., Guo/Stearns 2002; Turkheimer et al. 2003). Thus, parents pass down genetic influences that affect children's cognitive ability; however, whether children realize their genes and innate talent depends on the rearing environment their parents provide.

Figure 1: Sibling and twin similarity in cognitive ability according to parents' education



Interpreting the results for the mean values of cognitive ability along with the findings concerning the variance components, I find lower means for disadvantaged siblings and twins but a greater relative importance of shared family influences. This supports my expectation concerning family differences due to stratified parenting: Disadvantaged parents often lack the resources to make stimulating investments, which explains why disadvantaged children have, on average, lower levels of cognitive ability scores than do advantaged children. Given that investments of disadvantaged parents are more uniform and are intended to meet basic needs, siblings are also more alike in terms of cognitive ability (shared family influences are more important). Advantaged parents, by contrast, provide more child-specific inputs and address their children's need individually, which accentu-

ates differences in cognitive ability among siblings more strongly (shared family influences are less important). In all three samples, the relative importance of shared family influences is most pronounced in less educated families, which leads me to conclude that the same family influences that account for the similarity of siblings and twins in less educated families are also associated with lower levels of cognitive ability and are rather detrimental to the realization of cognitive ability. As discussed earlier, effects that siblings have on one another might lead to misleading results, particularly if sibling effects systematically differ according to parents' education. Sensitivity analyses have shown that the pattern identified exists over and above siblings' and twins' closeness (Appendix A2). The change in the similarity of siblings and twins cannot be attributed to systematic differences in the closeness of the sibling and twin relationship.

Taken together, the results show that in all three samples, shared family influences are more important in less educated families. The more education parents have, the less alike the cognitive ability scores of siblings, DZ twins, and MZ twins. This contradicts the expectation that highly educated parents compensate for differences, whereas less educated parents reinforce differences for efficiency reasons (H1). Instead, the results support the expectation that parents make equal investments and but adopt different parenting concepts that accentuate differences among advantaged siblings (H2). Given that the analyses are based on a sample of young adults, the results show that shared family influences have a lasting impact on cognitive ability, which is stronger for less educated families. As the findings concerning the mean value of cognitive ability have shown, these influences are not necessarily conducive to the realization of cognitive ability – in fact, quite the opposite.

## 5. Discussion and conclusion

I studied sibling similarity in cognitive ability and asked whether the degree of similarity varies with parents' education. In contrast to previous research, I extended the established sibling correlation approach to DZ and MZ twins. This acknowledges the increasing evidence that genetic variation matters for cognitive ability and allows us to capture shared family influences more comprehensively, and thus to test rigorously the link between sibling similarity and parents' education.

To explain a varying degree of similarity, I first referred to economic approaches that model parents' investment decisions within the household (Becker/Tomes 1976; Behrman/Pollak/Taubman 1982). Against this backdrop, I tested the hypothesis that sibling similarity in disadvantaged families is lower for efficiency reasons, whereas highly educated families compensate for, and thus equalize, differences among siblings (Conley 2004, 2008). I then introduced the idea that parents might also invest equally in and accept differences among their children. I drew on the literature on stratified parenting (e.g., Cheadle/Amato 2011; Kalil/Ryan/Corey 2012; Lareau 2011; Lareau/Weininger 2003) and put it in a within-family perspective. Because advantaged parents adopt an active role in shaping the developmental processes of their children and tend to provide more skill-enhancing and specific inputs in line with children's potentials and needs, I hypothesized alternatively that siblings from advantaged families are less similar in terms of cognitive ability compared with siblings from disadvantaged families.

My analyses yielded two findings. First, young adult siblings, DZ twins, and MZ twins in highly educated families are less alike in terms of cognitive ability compared with young adult siblings, DZ twins, and MZ twins in less educated families. This contradicts the hypothesis concerning stratified investments rationales, according to which sibling similarity increases with parents' social background (H1), and supports the hypothesis concerning equal investments and stratified parenting (H2).

Systematic differences in the degree of similarity in cognitive ability are significant in the sibling sample. This is in line with US findings for literacy skills (Conley/Pfeiffer/Velez 2007) but differs from the finding for Germany (Grätz 2018). One explanation of the divergent findings could be that the families I studied have more children (twins and at least one sibling) than the families in the study by Grätz (2018). Unfortunately, this study does not provide information about the variance components in absolute terms. The ICC is a standardized measure that does not change if the variances of shared family and child-specific influences in absolute terms change at the same time. Thus, there might be some variation in the relative importance of shared family influences that did not show up in the ICC. To evaluate to what extent results differ substantially, we would also need information on the family level variation in absolute terms.

For both DZ twins and MZ twins, the results reveal the same pattern. The similarity decreases according to parents' education, though it is not statistically significant. Nonetheless, both the results for the variance components in absolute terms and for the ICC confirm that shared family influences decrease the more educated parents are. Thus, the more resources parents have, the more important are processes within the family that accentuate differences within the family.

In addition, I found that the mean level of cognitive ability increases with parents' education, whereas the relative importance of shared family influences decreases. These divergent trends show that the same shared family influences that make siblings and twins more alike are also associated with lower levels of cognitive ability. This is a very important aspect, and more research is needed to understand what kind of influences affect siblings equally and hamper the realization of cognitive ability in less educated families. In advantaged families, by contrast, parents often provide additional inputs that foster children's talents. These influences are more child specific, which leads to higher levels of cognitive ability and promotes differences in cognitive ability among their children. Given that differences between siblings and twins from advantaged and disadvantaged backgrounds remain even as the children grow older, my results indicate a long-lasting impact of parenting on cognitive ability.

Second, my results show that the association between parents' educational background and sibling and twin similarity is not affected by the closeness of the sibling and twin relationship. I thereby address a major limitation of studies on sibling similarity. In a similar vein, my results reveal a very similar trend for siblings, DZ twins, and MZ twins, which shows that there is no "twinning effect" – that is, that twins behave profoundly differently from (full) siblings.

However, it is important to note that I used an indicator that was measured at the same time as cognitive ability. Since the quality of the sibling and twin relationship might change over the life course, it is important to back up my results – ideally, with longitudinal data. To the extent that there are no profound changes in the sibling and twin relationship until early adulthood, my results are reliable.

This study is the first to adopt a genetically sensitive approach to sibling similarity in cognitive ability. The results provide strong indications for parent's investment decisions that are not in line with economic theories, rather parents invest equally in their children but in distinct ways that differ according to parents' educational background. My findings challenge the implicit assumption that shared family influences such as parents' education influence children in similar fashion. Moreover, if children are raised in advantaged families, shared family influences – those that differ between families – are less important. Genetically sensitive research can help us to better understand what kinds of parental investment – net of genetic influences – result in within-family stratification, and to formulate informative policy suggestions to enhance the achievements of children from less educated families.

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## Appendix

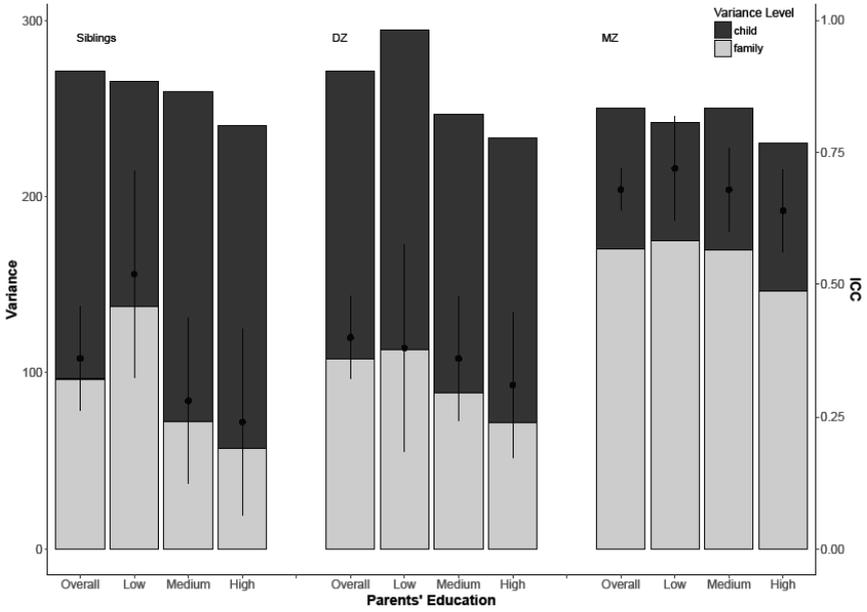
*Table A1:* CASMIN educational classification

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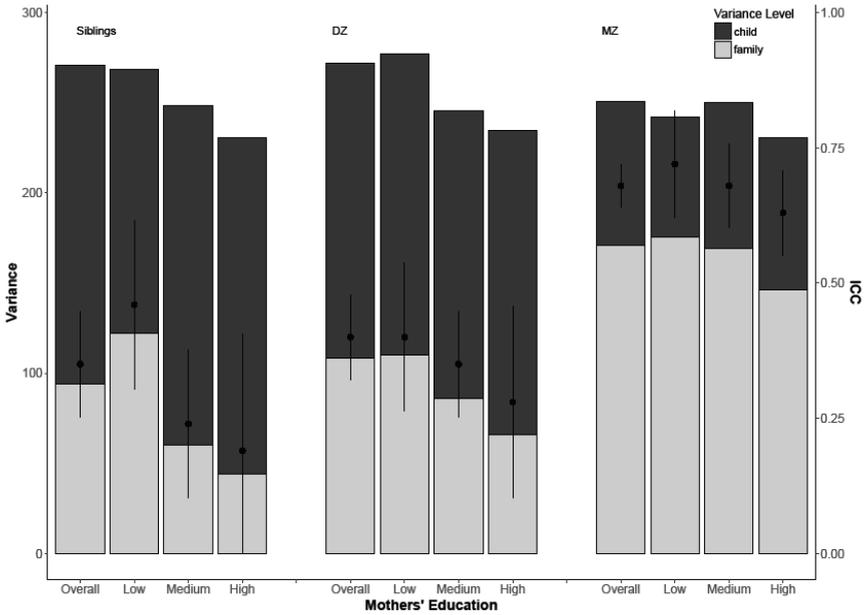
1a	inadequately completed
1b	general elementary education
1c	basic vocational qualification
2a	intermediate vocational qualification
2b	intermediate general qualification
2c_gen	general maturity certificate
2c_voc	vocational maturity certificate
3a	lower tertiary education
3b	higher tertiary education

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*Table A2:* Sibling and twin similarity in cognitive ability according to parents' education (controlled for siblings and twins closeness).



*Table A3:* Sibling and twin similarity in cognitive ability according to mothers' education.



*Kristin Hajek*

# Sex and housework: Does perceived fairness of the distribution of housework actually matter?

## **Abstract:**

Recent findings suggest that couples who perceive their housework distribution to be fair have more frequent sexual encounters and are more satisfied with their sex life. However, past research has relied on between-person comparisons and might therefore be biased due to unobserved confounders. By applying fixed effects panel models, this study seeks to eliminate all time-constant, group-specific heterogeneity. Using data from 1,315 cohabiting and married couples from the German Family Panel (pairfam), I have examined how changes in the distribution of housework and the perception of fairness affect sexual satisfaction and sexual frequency. Moreover, I distinguish between core (traditionally female) and non-core (traditionally male) household tasks to verify the hypothesis that a gender-stereotypic distribution of household tasks fosters sexual activity. No effect of the division of labor or the perception of fairness thereof on sexual satisfaction and sexual frequency could be found.

**Key words:** housework distribution, fixed effects, pairfam, perceived fairness, sexual frequency, sexual satisfaction

## **1. Introduction**

More often than not, housework is distributed traditionally between men and women in cohabiting relationships (Bianchi et al. 2012). Over the past few decades, men's share of housework has increased, but women still tend to carry most of the workload in the home (Bianchi et al. 2000; Bianchi et al. 2012; Blair/Lichter 1991; Klünder/Meier-Gräwe 2018). Moreover, studies show that partnership characteristics are influenced by the distribution of unpaid family work. For example, if the man's share of housework increases, the woman's partnership satisfaction seems to rise and conflicts occur less often (Amato et al. 2003; Coltrane 2000). The likelihood for second births is also higher if the father participates to a greater degree in housework and child care (Cooke 2004). Therefore, an equal distribution of housework could be beneficial to a partnership. On the other hand, some researchers suggest that it is actually the perceived fairness of the division of labor that influences partnership satisfaction, rather than the actual distribution of household

tasks (Coltrane 2000). If individuals perceive their share of housework to be justified, they appear to be happier with their relationship (Coltrane 2000). However, relatively few studies to date have addressed how exactly housework distribution and the perceived fairness thereof influence a couple's sexual relationship.

Sexual frequency and satisfaction are both important factors in an intimate relationship. Sexuality has been found to be related to marital satisfaction (Smith et al. 2011) as well as union stability (Yabiku/Gager 2009). Therefore, it is important to examine possible influences of housework on a couple's sex life. Since the Kinsey reports (Kinsey et al. 1948), the frequency of sexual intercourse and sexual satisfaction in relationships have received considerable attention in the social sciences. However, due to the lack of longitudinal data, the majority of studies has relied on cross-sectional analyses. Kornrich and colleagues (2013) examined married couples in the United States and found a positive correlation between a gender-stereotypic division of housework and sexual frequency. However, they analyzed decades-old, cross-sectional data and did not take into account the perceived fairness of a couple's housework distribution.

Using data from the German Family Panel (pairfam), a randomly sampled panel survey with focus on partnership and family dynamics, I have examined how changes in the distribution of housework and the perception of fairness affect sexual frequency and sexual satisfaction for cohabiting and married couples from a longitudinal perspective. Johnson and colleagues (2016) also analyzed pairfam data in this regard with autoregressive cross-lagged (ARCL) models. They found an association between men's perceived fairness of housework distribution and a couple's sex life, but no association to the actual distribution of housework. However, Johnson and colleagues did not distinguish between core (traditionally female) and non-core (traditionally male) tasks as suggested by Kornrich et al. (2013), and thus cannot fully refute the findings of Kornrich and colleagues (2013). By categorizing household tasks into traditionally male and female, the following analyses aim to verify the hypothesis that a gender-stereotypic distribution of household tasks stimulates sexual scripts and leads to an increase in sexual intercourse. Further, both studies mentioned above may be biased due to unobserved heterogeneity, with one relying on between-person comparisons and the other not differentiating between and within variation. By applying fixed effects regression models, I can eliminate all couple-specific time-constant heterogeneity and examine whether a change in the division of household labor and/or the perception of fairness thereof actually influences sexual satisfaction and frequency in intimate relationships.

## 2. Theoretical framework

### 2.1 *Actual distribution of housework*

Most heterosexual cohabiting couples continue to maintain a traditional division of household tasks. While women tend to carry the majority of the total workload, they spend more time completing core household tasks (e.g., laundry, cooking, cleaning) whereas men focus on more non-core household tasks such as gardening and repairs

(Bianchi et al. 2000; Dechant et al. 2014). Kornrich et al. (2013) suggest that a gender-traditional division of labor stimulates a so-called sexual script which leads to an increased frequency of sexual intercourse. Sexual scripts are formed by culture to define with whom, how, and when individuals should have sex (Simon/Gagnon 1986; Dworkin/O'Sullivan 2007). Through socialization we internalize cultural scripts that define situations as sexual, and together with our own learning experiences, form individualized interpersonal and intrapsychic scripts (McCormick 2010). Teenagers learn traditional sexual scripts in which men initiate sexual encounters and women are mainly portrayed as sexual objects (Kim et al. 2007). Gender differences and gendered behaviors supposedly play a crucial role in heterosexual attraction, and Kornrich et al. (2013) argue that femininity and masculinity are linked to sexual behavior by way of such sexual scripts: The display of gender differences through traditional gender behavior, such as the distribution of housework, fuels internalized sexual scripts which creates sexual attraction and leads to sexual interactions (Kornrich et al. 2013). However, the distribution of housework is only one domain in which couples are able to display gender and consequently stimulate traditional sexual scripts.

One opposing argument is based on exchange theory and does not distinguish between different types of housework. It assumes that neither men nor women enjoy doing housework, although housework traditionally falls into the domain of women (Coltrane 2000). On the other hand, men seem to have a higher desire for sexual intercourse, as they report more intense sexual desires, spontaneous thoughts about sex, and sexual fantasies than do women (Baumeister et al. 2001). Therefore, within this perspective, sex is seen as a female resource which can be exchanged for other goods, including housework (Baumeister/Vohs 2004), which could lead to a positive correlation between men's share of housework and a couple's sexual frequency.

However, it is debatable whether women see sexual interaction as a way to trade in for other goods, implying that there might be another explanation for a positive association between men's participation in housework and a couple's sexual frequency. For example, Amato and colleagues (2003) show that husbands' participation in household tasks is linked to wives' marital happiness. Marital happiness has been shown to be associated with both sexual frequency and sexual satisfaction (Smith et al. 2011). Women that are satisfied with their partnership might therefore engage in more frequent sexual encounters. The more the male partner participates in household tasks, the happier the female counterpart could become with the relationship, and the higher the sexual frequency and satisfaction might be.

## *2.2 Perceived fairness of housework distribution*

Most women perform more household tasks than their partners, but only 20 – 30% of women perceive the existing distribution of housework to be unfair (Mikula 1998). A couple with a traditional gender ideology might not perceive an unequal distribution of housework to be unfair. Moreover, a woman that does most of the housework might perceive her share of housework to be fair if her partner works more hours in paid labor and has a higher salary. The distributive justice framework proposed by Thompson (1991) attempts to explain women's sense of fairness in the distribution of household work by tak-

ing the outcome value, comparison referents, and justifications for their behavior into account. For example, a woman might perceive the division of household tasks as fair if she enjoys doing the housework herself, if she compares herself to other women that carry most of the household workload, and/or if she can justify her participation in the housework in another way (Nameda 2013: 34). Perceived inequity is associated with depression and distress (Keith/Schafer 1987), which might be reflected in relationship satisfaction. Therefore, researchers argue that the perception of the fairness of housework division is more influential to relationship satisfaction than the actual distribution (Coltrane 2000). If couples perceive their distribution of housework to be fair, they are happier with their relationship (Frisco/Williams 2003) and thus also with their sex life (Smith et al. 2011). The perception of fairness may indeed be more influential to a couple's sexual satisfaction and frequency than the actual distribution of housework. Based on these considerations, the following analyses will examine both the actual distribution of housework tasks as well as the perception thereof.

### 3. Previous research

Few previous studies have examined the relationship between the division of household tasks and a couple's sexual intercourse, some of which reporting results from small, non-random samples. Chethik, for example, studied 300 couples in marital therapy and found that if the male partner participates in household tasks, he is more satisfied with his sex life (Chethik 2006; cf. North 2007). Schwartz (1995), however, suggests that more egalitarian couples have less satisfying sex lives. Two studies analyzed data from the National Survey of Families and Households (NSFH): Gager and Yakibu (2010) found that the frequency of sexual intercourse increases with more time spent doing housework for both men and women, although they do not consider the proportion of housework men and women engage in. Kornrich et al. (2013) use the NSFH from 1992 and 1994 to distinguish between non-core (e.g., repairs on the car or in the house) and core housework (e.g., cleaning, laundry). They found that a traditional, gender-based division of household labor goes hand in hand with a higher frequency of sexual intercourse among married couples. However, focusing on married couples only is incomplete, as premarital sex is an ever-increasing phenomenon (Cohen/Manning 2010; Lichter et al. 2010; Yucel/Gassanov 2010). Moreover, as Schröder and Schmiedeberg (2015) have shown, relationship duration, not marital duration, has an influence on sexual frequency. Therefore, it is pivotal to also take unmarried relationships into account. As the division of household tasks and traditional gender beliefs have changed since the 1990s, Carlson et al. (2016) use more recent data to reassess the findings on housework and sexual frequency and satisfaction. They analyzed MARS data from 2006, and found no significant difference in sexual frequency and satisfaction between traditional and egalitarian couples. However, counter-conventional couples (men doing most of the housework) reported lower sexual frequencies and satisfaction than the rest of the sample. On the other hand, an analysis of the National Survey of Midlife in the United States (2004-2006) found lower sexual satisfaction for couples if the female partner performs more housework than their male counterparts and if the household task arrangement is perceived to be unfair (Barrett/Raphael 2018).

However, this only holds for the distributional perspective; the authors do not find any association between sexual satisfaction and reported hours of housework. Moreover, no effect was found for sexual frequency.

One of the main shortcomings in the above-mentioned studies is the use of cross-sectional data. Cross-sectional analyses are not sufficient to examine whether the division of household labor is related to sexual intercourse, as they might be biased due to unobserved differences between couples with a traditional division of labor and more egalitarian couples. The only known longitudinal study has been conducted by Johnson and colleagues (2016) using pairfam data to compute ARCL models in order to examine the effect of the division of housework on a couple's sex life. Controlling for relationship duration, age, the number of children in the household, relationship satisfaction, residence in former East Germany, and self-rated health, they found no relationship between the two, but they did find that male partners who perceive their housework contribution to be fair report higher sexual satisfaction and a higher frequency of intercourse (Johnson et al. 2016). However, the authors only considered core household tasks. Therefore, they cannot fully test whether a gendered division of household tasks may have an effect on a couple's sexual encounters. Most importantly, ARCL models are likely to have estimation biases. These models summarize the cross-lagged association between two constructs across time, but do not dissect between and within-person variation, and are thus not able to appropriately control for unmeasured variables (Pan et al. 2015). Panel data per se do not solve the problem of unobserved heterogeneity, and estimation techniques that rely on between-variation are often biased (Brüderl/ Ludwig 2015). In contrast, fixed effects estimations only consider intra-individual changes over time, and can thus discover whether a change in the division of household labor, or the perception of fairness thereof, within a partnership actually leads to a change in sexual frequency and satisfaction while controlling for time-constant unobserved heterogeneity. Using longitudinal data from the German Family Panel between 2009 and 2015, this study attempts to resolve these issues.

## 4. Data

### 4.1. Sample

The German Family Panel pairfam is a nationwide randomly sampled longitudinal study that focuses on partnership and family dynamics in Germany (<http://www.pairfam.de>). Respondents from the birth cohorts 1991-93, 1981-83, and 1971-73 are surveyed annually. The first wave was conducted in 2008 and comprised a sample of over 12,000 focal, or anchor, respondents. Most questions are asked face-to-face by the interviewer (CAPI), but a self-administered module (CASI) is included for more sensitive questions such as those related to sexual behavior. In addition to the panel approach, pairfam implements a multi-actor design, meaning the anchor's partners, parents, and children are interviewed as well. Nonresponse patterns are similar to other panel studies, and bias due to selective attrition does not seem to represent a large issue (Müller/Castiglioni, 2015). A more in-depth description of the study can be found in Huinink et al. (2011).

This analysis is based on data from the anchor and partner surveys of waves 3, 5 and 7, Release 7.0 (Brüderl et. al. 2016).<sup>1</sup> The sample is restricted to married and unmarried cohabiting couples for which both partners took part in the survey and to the birth cohorts 1981-83 and 1971-73, as respondents of the youngest cohort were approximately 16 in the first wave and rarely lived together with their partner. The complete sample consists of 6,268 couple-year observations. Homosexual couples (56 observations) and respondents that have never had sex (2 observations) were excluded. Furthermore, 118 couples who stated that none of the available categories of housework distribution applied to their situation and 211 couples that employ third parties to do all of their housework were eliminated. In addition, 1,643 observations with missing values on the included variables and 8 cases with inconsistent data were excluded.<sup>2</sup> After restricting the sample to couples that participated in at least two waves (dropping 1,046 observations) the final sample includes 3,192 observations from 1,315 couples.

#### 4.2. Descriptive statistics

A summary of the variables used for these analyses can be found in Table 1. Based on waves 3, 5, and 7, the first column reports the percentage of observations for categorical variables and mean values with standard deviation in brackets for metric variables. The second column indicates the share of respondents in each category in at least one of the three waves (only for categorical variables). The last column shows the percentage of respondents that changed status between waves. For example, over all waves, 80.1% of all observations were married (Column 1). About 84.6% were married in at least one wave (Column 2) and 11.1% of couples changed their marital status between waves (Column 3).

Sexual satisfaction was measured on a scale ranging from 0 (*very unsatisfied*) to 10 (*very satisfied*). The mean satisfaction with sexual intercourse over all waves is 6.3. The frequency of sexual intercourse with the main respondent's reported partner in the last three months was measured on a scale from 1 to 7 (*never/not in the past 3 months, once per month or less, 2-3 times per month, once per week, 2-3 times per week, more than 3 times per week, daily*). In order to apply regression models for count data, these answer categories were recoded to indicate the rounded mid-points of the respective class (frequency of sexual intercourse per month: 0, 1, 3, 4, 10, 20, 30). Over all waves, the mean frequency of sexual intercourse is 4.6, meaning that on average, co-residing couples have sex 4 to 5 times per month. Over 64.6% of couples experienced a change in their sex frequency between waves.

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1 The frequency of sexual intercourse was not included in the first wave and the perception of fairness in the distribution of housework was only asked in waves 1, 3, 5 and 7.

2 Observations of those who reported to work over 80 hours a week were excluded.

*Table 1: Descriptive statistics (N = 3,192 observations from 1,315 couples)*

Variable	Percent/ Mean (SD)	Percent of couples in the category in at least 1 wave	Percent of couples with change between waves
<i>Metric variables:</i>			
Sexual satisfaction <sup>a</sup>	6.3 (2.5)		80.7
Frequency of sexual intercourse per month <sup>b</sup>	4.6 (4.5)		64.6
Distribution of core housework <sup>c</sup>	2.1 (0.7)		65.6
Distribution of non-core housework <sup>d</sup>	4.3 (0.7)		67.2
Health status male partner <sup>e</sup>	3.7 (0.9)		61.0
Health status female partner <sup>f</sup>	3.6 (0.9)		67.0
Male partner's paid working hours	40.9 (13.8)		74.3
Female partner's paid working hours	22.5 (17.1)		74.6
Female partner's age	35.2 (5.6)		100.0
<i>Categorical variables:</i>			
Distribution of household tasks perceived as fair <sup>g</sup>	46.4	64.8	37.4
<i>Relationship duration</i>			
0-1 years	0.4	1.1	1.1
1-2 years	1.5	3.6	3.6
2-3 years	2.3	5.6	5.6
3-5 years	7.0	16.4	16.2
5-7 years	9.3	22.3	22.3
7-10 years	17.5	34.0	31.2
10-13 years	18.2	36.0	33.2
13-16 years	14.8	29.4	27.9
>16 years	29.1	35.4	13.2
Married	80.1	84.6	11.1
<i>Age of youngest child in the household</i>			
No children in household	22.7	27.9	10.0
0-2 years old	17.4	34.9	32.9
2-6 years old	27.9	48.4	40.8
6-13 years old	25.2	36.4	23.4
13-25 years old	6.9	11.0	7.8
<i>Wave</i>			
Wave 3	28.1	68.1	68.1
Wave 5	37.9	92.1	92.1
Wave 7	34.0	82.5	82.5

Notes: <sup>a</sup> Sexual satisfaction: range 0-10. <sup>b</sup> Frequency of sexual intercourse per month: range 0-30. <sup>c</sup> Distribution of core housework: range 1-5. <sup>d</sup> Distribution of non-core housework: range 1-5. <sup>e</sup> Health status male partner: range 1-5. <sup>f</sup> Health status female partner: range 1-5. <sup>g</sup> Distribution of household tasks perceived as fair: 0 = not fair, 1 = fair.

The data set contains one item summarizing the distribution of core housework (laundry, cooking, cleaning) and one concerning non-core housework (repairs in and around the house, car maintenance). The housework variables were measured on a scale from 1 (*my partner does all of the housework*) to 5 (*I do all of the housework*), which have been recoded so that the value 1 reflects that the female partner does all of the housework; value 2 means that the female partner does most of the housework; value 3 reflects that the couple shares the housework equally; value 4 means that the male partner does most of the housework; and value 5 reflects that he does all of the housework. If the couple employs household help, they were asked to only refer to the portion of work done by the respondent themselves and/or the partner. As individuals tend to overestimate their share of

housework tasks (Coltrane 2000), the female and male statements of housework distribution were averaged per couple (adding both scales and dividing them by two). As expected, most men do the traditionally male tasks and most women engage in traditionally female housework. Less than 1% of men do all of the core housework and less than 1% of women do all of the non-core housework (numbers not in the table). Over 65% of couples change their distribution of core and/or non-core housework between the waves. About 19% of couples agree that couples agree that they share core housework equally and 6% agree to share non-core housework equally (numbers not in the table).

The perceived fairness of housework distribution was also measured proportionally on a scale of 1 to 5 (*I do a lot more than my fair share, I do a bit more than my fair share, I do my fair share, I do a bit less than my fair share, I do a lot less than my fair share*). A dichotomous variable was generated using responses from both partners indicating whether they perceived their distribution of housework to be fair, or if one or both of them perceived it to be in some way unfair. More than half (64.8%) of the couples perceived the distribution of housework in their cohabiting relationship to be fair in at least one wave. Moreover, 37.4% experienced a change of one or both partners' perception of fairness between waves.

Relationship duration, marital status, the age of the youngest child in the household, health status of both partners, both partners' paid working hours, and women's age were included as control variables, as they can influence both sexual satisfaction and frequency as well as the housework distribution. Sexual frequency and satisfaction are expected to decline with relationship duration (Schröder/Schmiedeberg 2015) and age (Call et al. 1995). The distribution of housework is expected to become more traditional with age and an increase in relationship institutionalization (Coltrane 2000). Non-married cohabiting partners should have a less traditional housework distribution and a higher sexual frequency than do married couples (Call et al. 1995). The age of the youngest child in the household (*no children, youngest child 0-2 years, 2-6 years, 6-13 years, 13-25 years old*) should create stronger situational constraints the younger the children, as they demand more care and impose more hindrances on parents (Call et al. 1995). Therefore, a couple's sexual satisfaction and frequency of sexual encounters might decline with young children in the household. Furthermore, women tend to reduce their working hours and increase their time spent doing housework after childbirth (Bianchi et al. 2000). The transition to parenthood and the age of a child also influence women's perception of fairness of housework distribution (Perales et al. 2015). Lower frequency of sexual intercourse and lower sexual satisfaction might also be caused by declining health (Call et al. 1995). Furthermore, health status can influence the amount of housework a person is able to do. Therefore, the health status of both male and female partners was included (*1 = bad, 2 = not so good, 3 = satisfactory, 4 = good, 5 = very good health*). The working hours of both partners have been included in the analysis as well, in order to control for time constraints on a couple's sex life and the time available for household chores (Coltrane 2000). As for paid working hours and health status, responses from both partners were used. Moreover, wave dummies are included in the analysis. As fixed effects models observe individual changes over time, it is not necessary to control for time-constant variables such as religiosity or migration status.

### 4.3. *Statistical model*

The following analysis specifies linear regression models with cluster-robust standard errors for the dependent variable sexual satisfaction, and Poisson regression models for sexual frequency. Pooled OLS (POLS) as well as random (RE) and fixed effects (FE) models are estimated. POLS models treat the data as cross-sectional and infer the causal effect from between-variation only. RE models (as well as ARCL models) consider personal changes over time, but do not parse within and between-person variation. Between-person variation can be biased by person-specific error (Brüderl/Ludwig 2015), meaning that couples with higher sexual satisfaction and an egalitarian housework distribution could differ from couples with lower sexual satisfaction and a less egalitarian housework distribution on unobserved characteristics. The fixed effects estimator discards between-variation and can therefore not be biased by person-specific, time-invariant characteristics. However, fixed effects models still do not solve the problem of unmeasured time-variant variables (Brüderl/Ludwig 2015). By comparing the POLS and RE results to those from the FE models, I can examine whether a change in the distribution of housework leads to a change in sexual encounters, or if differences in a couple's sexual habits are due to unobserved time-invariant confounding variables.

## 5. Results

### 5.1. *Actual distribution of housework*

Table 2 displays the POLS regression, RE, and FE panel models concerning sexual satisfaction. The effects of the distribution of core and non-core housework are rather small and not significant in any model. The same results are visible when sexual frequency is used as dependent variable (see Table A.1 in the appendix). A correlation between the distribution of household tasks and sexual frequency or satisfaction can therefore not be confirmed with these analyses.

### 5.2. *Perceived fairness of housework distribution*

All models were additionally run with perceived fairness as the independent variable and all control variables as used in the previous analysis. Estimates for sexual satisfaction are displayed in Table 3. If the distribution of housework was perceived as fair by both partners, the sexual satisfaction increased, but only in the POLS and RE models. In the FE model, the effect is substantially smaller and non-significant. The effects on sexual frequency show a similar pattern: the POLS model indicates a significant effect of the perception of fairness of housework distribution on sexual frequency, but not the RE or FE models (Table A.2 in the appendix). A change in the perception of fairness seems not to have an effect on the frequency of sexual intercourse or sexual satisfaction.

### 5.3. Validity analyses

Missing data may bias the results if item non-response is selective. However, if selectivity occurs due to inter-individual differences regarding respondents' willingness to answer questions, FE models inherently control for this. Observations with missing values for any of the interesting variables were deleted in the data preparation process (1,643 cases), most of which due to missing values for sexual frequency. The mean and standard errors are almost identical for household task distribution and the perception of fairness thereof between couples who did not want to answer the question regarding sexual frequency and the ones who did give valid responses: t-tests find no significant difference between the groups. Therefore, bias due to missing data is expected to be rather small, although cannot be ruled out completely.

*Table 2:* Summary of pooled OLS (POLS), random (RE), and fixed effects (FE) regression analyses estimating sexual satisfaction

Variable	POLS	RE	FE
Distribution of core housework	0.016	-0.015	-0.087
Distribution of non-core housework	0.143	0.124	0.066
<i>Relationship duration (ref.: more than 16 years)</i>			
0-1 years	1.514*	1.327*	1.028
1-2 years	0.494	0.479	0.247
2-3 years	0.868*	0.588	0.365
3-5 years	0.133	0.117	0.091
5-7 years	0.163	0.170	0.285
7-10 years	0.013	0.015	0.142
10-13 years	-0.011	0.051	0.231
13-16 years	-0.178	-0.022	0.179
Married	0.568***	0.285*	-0.330
<i>Age of youngest child in the household (ref.: no children)</i>			
0-2 years old	-0.535**	-0.655***	-0.935***
2-6 years old	-0.268	-0.350*	-0.641*
6-13 years old	-0.000	-0.027	-0.333
13-25 years old	0.348	0.142	-0.422
Health status male partner	0.269***	0.194***	0.099
Health status female partner	0.249***	0.217***	0.167**
Male partner's paid working hours	-0.001	0.001	0.004
Female partner's paid working hours	-0.001	-0.003	-0.006
Female partner's age	-0.038**	-0.033*	-0.260
<i>Wave (ref.: Wave 3)</i>			
Wave 5	-0.040	-0.073	0.400
Wave 7	-0.174	-0.212*	0.760
N (observations)	3,192	3,192	3,192
N (couples)	1,315	1,315	1,315

*Notes:* Coefficients from linear regression models. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

**Table 3:** Summary of pooled OLS (POLs), random (RE), and fixed effects (FE) regression analyses estimating sexual satisfaction

Variable	POLS	RE	FE
Distribution of household tasks perceived as fair	0.469***	0.271**	0.024
<i>Relationship duration (ref.: more than 16 years)</i>			
0-1 years	1.431*	1.273*	1.012
1-2 years	0.504	0.459	0.237
2-3 years	0.881*	0.602*	0.376
3-5 years	0.121	0.102	0.093
5-7 years	0.134	0.150	0.289
7-10 years	0.000	-0.003	0.144
10-13 years	-0.019	0.042	0.234
13-16 years	-0.167	-0.020	0.179
Married	0.551***	0.285*	-0.333
<i>Age of youngest child in the household (ref.: no children)</i>			
0-2 years old	-0.492**	-0.626***	-0.926***
2-6 years old	-0.209	-0.313*	-0.632*
6-13 years old	0.032	-0.011	-0.332
13-25 years old	0.368	0.158	-0.421
Health status male partner	0.266***	0.195***	0.097
Health status female partner	0.238***	0.215***	0.165**
Male partner's paid working hours	-0.001	0.002	0.004
Female partner's paid working hours	-0.000	-0.003	-0.007
Female partner's age	-0.040**	-0.034*	-0.261
<i>Wave (ref.: Wave 3)</i>			
Wave 5	-0.049	-0.073	0.410
Wave 7	-0.172	-0.208*	0.776
N (observations)	3,192	3,192	3,192
N (couples)	1,315	1,315	1,315

Notes: Coefficients from linear regression models. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Source: pairfam waves 3, 5, 7, Release 7.0 (own calculations)

The distribution of housework chores was measured on a scale from 1 to 5 and treated as a linear variable in the regression analyses. The introduction of quadratic terms for the distribution of housework or treating it as a strictly categorical variable did not produce substantially different results (Table A.3 and A.4 in the appendix). Moreover, using the femlogit ado introduced by Klaus Pforr (2014), multinomial logit fixed effects models that treat the frequency of sexual intercourse as a categorical variable were estimated. Neither the distribution of housework nor the perceived fairness thereof showed any significant effect in these models (see Table A.5 in the appendix). Analyses concerning the actual distribution of housework were able to be run over 6 or even 7 waves.<sup>3</sup> The additional information did not lead to fundamental changes in the results (Table A.6 in the appendix). Therefore, for a better comparison, all models presented here are based on the same sample as the model estimating the effect of the perception of fairness of housework distribution (waves 3, 5 and 7). In addition to the variables included by Johnson and colleagues (2016), my analyses also control for marital status and both partners' paid work-

3 The estimation with the frequency of sexual intercourse as the independent variable was able to be run over 6 waves. With sexual satisfaction as the independent variable, 7 waves were available for analysis.

ing hours. Running the analyses with the same control variables as Johnson et al. (2016) and only with core housework constructed analogously to Johnson and colleagues did not produce different results (Table A.7 and A.8 in the appendix). Distinguishing between men's and women's reports of sexual satisfaction and frequency also did not reveal different outcomes (Table A.9-A.12 in the appendix). Results seem to be stable regardless of variable specification and sample composition. Admittedly, it is easier to show that a non-effect is robust against several methodological decisions than a positive or negative effect. However, none of the main coefficients were significant – even at the 10% level.

## 6. Discussion

### 6.1. Summary

Using data from the German Family Panel (*pairfam*), this study investigates the correlation between the distribution of housework and sexual encounters within co-residing relationships. Pooled OLS, random effects, and fixed effects panel regression models found no correlation between the actual distribution of core and non-core housework and the frequency of intercourse or the level of sexual satisfaction. Couples that perceive the household distribution to be fair seem to differ from couples that do not on one or more unobserved variables, which also affects their sexual habits. However, a change in the perception of fairness seems to have no effect on couples' sexual satisfaction or frequency. Therefore, the assumption that the perception of fairness influences relationship satisfaction and that this might influence a couple's sex life cannot be confirmed. Moreover, neither the exchange theory nor sexual scripts theory could be confirmed by this analysis: The hypotheses that women exchange sex for housework or that a gender-traditional division of housework activate sexual scripts and consequently increases the frequency of intercourse and/or sexual satisfaction are not visible in the *pairfam* data.

In contrast to Kornrich and colleagues (2013), the POLS regression showed no correlation between the distribution of housework and the frequency of intercourse. There are several reasons that might explain these differences. Firstly, Kornrich et al. (2013) used data from 1992-1994 gathered in the United States, whereas these analyses are based on more recent German data. Interestingly, two analyses of U.S. data from 2004 and 2006, respectively, found no differences in sexual frequency between traditional and egalitarian couples (Barrett/Raphael 2018; Carlson et al. 2016). Therefore, the differences to Kornrich et al. (2013) might not stem from cultural differences between countries, but from changing gender attitudes in the United States over the past decades. Secondly, these three studies only analyze cross-sectional data, while *pairfam* data allows for panel regression models. Longitudinal analyses are better suited for this analysis as changes over time in the distribution of household tasks and its effect on couple's sexual behaviors can be examined. By linking year-by-year changes in the independent variable to the dependent variable, their association can be analyzed more closely and selection effects due to unobserved stable characteristics can be ruled out.

The POLS and RE models here show a correlation between the perception of housework distribution fairness and sexual frequency and satisfaction in accord with the findings of Johnson and colleagues (2016) who also used pairfam data. However, this effect is not visible in the FE regression models. There are three major differences between the analyses of Johnson et al. (2016) and mine. Firstly, control variables differ slightly. Secondly, my analyses also consider the share of non-core household tasks and both partners' indication of household task distribution. Thirdly, Johnson et al. (2016) computed ARCL models, while I conduct fixed effects panel models. As I also run the analyses with the same variables as Johnson et al. (2016) and the results did not change, the different methods must account for the differing results. Longitudinal data analysis does not solve the problem of unobserved heterogeneity, *per se*. ARCL as well as RE regression models consider personal changes over time, but do not distinguish between within and between-variation. By applying FE models, my results are based on a within-person comparison solely, controlling for unobserved time-constant heterogeneity. This hints towards time-stable unobserved confounders which bias the POLS and RE models here as well as the results found by Johnson and colleagues (2016). Less educated couples or couples with more traditional gender roles might have more sexual encounters and engage in more traditional housework distribution. Future research might investigate which factors confound this association.

## 6.2. *Limitations*

One shortcoming of this analysis is that the questionnaire did not explicitly state that respondents should regard the sexual satisfaction with their reported current partner. However, it was implied, as in the previous question respondents were specifically asked about the sexual frequency with their current partner. Nonetheless, it cannot be ruled out that some answers might be biased if the respondent referred to more than one sexual partner. Furthermore, the housework distribution is collected proportionally on a scale of 1 to 5 in the pairfam study. Admittedly, proportionate questions are not ideal and hourly estimates of time spend on housework or time diaries would produce more accurate results. To account for a possible bias of this rather subjective measurement, the mean value of both partners' statements regarding housework distribution has been considered. However, future studies should seek to replicate these results with hourly measures of time spent completing household tasks. Moreover, the analyses presented are only based on three waves, compared to some extended analyses that included 6 or 7 waves (see appendix). However, the additional information did not lead to different results.

## 6.3. *Conclusion*

This investigation aimed to better understand the relationship between household task distribution, its perceived fairness, and couples' sexual satisfaction and frequency. Responses from both partners regarding the distribution of housework and the perceived fairness thereof have been considered, and core and non-core household tasks were differentiated in pooled OLS, random effects, and fixed effects panel regressions. The results suggest that changes in the household distribution of chores or in the perceived fairness thereof do not affect a cou-

ple's sexuality in terms of frequency nor satisfaction. In sum, couples needn't worry about negative effects on their sex life when deciding who is going to do the dishes today.

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## Appendix

*Table A.1:* Summary of pooled OLS (POLS), random (RE), and fixed effects (FE) Poisson regression analyses estimating the frequency of sexual intercourse

Variable	POLS	RE	FE
Distribution of core housework	-0.022	-0.044	-0.045
Distribution of non-core housework	0.037	0.005	-0.028
<i>Relationship duration (ref.: more than 16 years)</i>			
0-1 years	0.996***	1.011***	1.125***
1-2 years	0.618***	0.668***	0.767**
2-3 years	0.431***	0.352**	0.448
3-5 years	0.184*	0.117	0.208
5-7 years	0.012	0.024	0.135
7-10 years	0.020	0.005	0.102
10-13 years	0.005	0.013	0.096
13-16 years	-0.089	-0.081	-0.029
Married	0.150*	0.116	0.091
<i>Age of youngest child in the household (ref.: no children)</i>			
0-2 years old	-0.320***	-0.399***	-0.513***
2-6 years old	-0.068	-0.155*	-0.315**
6-13 years old	0.105	-0.022	-0.245*
13-25 years old	0.222**	-0.018	-0.320*
Health status male partner	0.046*	0.041*	0.036
Health status female partner	0.059**	0.056**	0.052**
Male partner's paid working hours	0.001	0.000	0.000
Female partner's paid working hours	-0.000	0.001	0.002
Female partner's age	-0.019***	-0.016**	-0.010
<i>Wave (ref.: Wave 3)</i>			
Wave 5	-0.062	-0.059*	-0.041
Wave 7	-0.105*	-0.096**	-0.061
N (observations)	3,192	3,192	3,126
N (couples)	1,315	1,315	1,286

*Notes:* Coefficients from Poisson regression models. In the FE model, 29 couples (66 observations) were dropped due to all-zero outcomes. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

*Table A.2:* Summary of pooled OLS (POLS), random (RE), and fixed effects (FE) Poisson regression analyses estimating the frequency of sexual intercourse

Variable	POLS	RE	FE
Distribution of household tasks perceived as fair	0.078*	0.015	-0.016
<i>Relationship duration (ref.: more than 16 years)</i>			
0-1 years	0.974***	0.998***	1.120**
1-2 years	0.614***	0.655***	0.750**
2-3 years	0.429***	0.350**	0.437
3-5 years	0.178	0.113	0.201
5-7 years	0.003	0.016	0.125
7-10 years	0.016	0.002	0.095
10-13 years	0.003	0.011	0.091
13-16 years	-0.087	-0.082	-0.034
Married	0.150*	0.117	0.091
<i>Age of youngest child in the household (ref.: no children)</i>			
0-2 years old	-0.306***	-0.394***	-0.512***
2-6 years old	-0.050	-0.146*	-0.312**
6-13 years old	0.118*	-0.014	-0.241*
13-25 years old	0.233**	-0.007	-0.309*
Health status male partner	0.046*	0.040*	0.035
Health status female partner	0.058**	0.055**	0.052**
Male partner's paid working hours	0.001	0.001	0.001
Female partner's paid working hours	-0.000	0.000	0.001
Female partner's age	-0.020***	-0.016**	-0.010
<i>Wave (ref.: Wave 3)</i>			
Wave 5	-0.063	-0.059*	-0.040
Wave 7	-0.105*	-0.095**	-0.059
N (observations)	3,192	3,192	3,126
N (couples)	1,315	1,315	1,286

*Notes:* Coefficients from Poisson regression models. In the FE model, 29 couples (66 observations) were dropped due to all-zero outcomes. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

*Table A.3:* Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction including a quadratic term of housework distribution

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.143	0.042
Distribution of core housework squared	0.021	-0.028
Distribution of non-core housework	-0.260	-0.453
Distribution of non-core housework squared	0.029	0.067
N (observations)	3,126	3,192
N (couples)	1,286	1,315

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 29 couples (66 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

**Table A.4:** Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with ordinal variable housework distribution

Variable	Frequency of sexual intercourse	Sexual satisfaction
<i>Distribution of core housework</i>		
<i>(ref.: housework is distributed equally)</i>		
Female partner does all of the housework	0.089	-0.058
Female partner does most part of the housework	0.014	-0.142
Male partner does most part of the housework	0.071	-0.036
Male partner does all of the housework	-0.120	-1.154
<i>Distribution of non-core housework</i>		
<i>(ref.: housework is distributed equally)</i>		
Female partner does all of the housework	0.415	-0.204
Female partner does most part of the housework	-0.039	0.173
Male partner does most part of the housework	-0.061	-0.003
Male partner does all of the housework	-0.053	0.134
N (observations)	3,126	3,192
N (couples)	1,286	1,315

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 29 couples (66 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

*Table A.5:* Summary of multinomial logit fixed effects regression analyses estimating the frequency of sexual intercourse

Variable	Frequency of sexual intercourse	Frequency of sexual intercourse
<i>No sexual intercourse in the last 3 months</i>		
Distribution of core housework	0.471	–
Distribution of non-core housework	-0.161	–
Perceived fairness of distribution of household tasks ( <i>ref.: not fair</i> )	–	-0.416
<i>Once a month or less frequently</i>		
Distribution of core housework	0.225	–
Distribution of non-core housework	-0.107	–
Perceived fairness of distribution of household tasks ( <i>ref.: not fair</i> )	–	-0.130
<i>Reference: Two or three times a month</i>		
<i>Once a week</i>		
Distribution of core housework	-0.026	–
Distribution of non-core housework	0.056	–
Perceived fairness of distribution of household tasks ( <i>ref.: not fair</i> )	–	-0.087
<i>Two or three times a week</i>		
Distribution of core housework	-0.164	–
Distribution of non-core housework	-0.341	–
Perceived fairness of distribution of household tasks ( <i>ref.: not fair</i> )	–	-0.099
<i>More than three times a week</i>		
Distribution of core housework	0.090	–
Distribution of non-core housework	-0.511	–
Perceived fairness of distribution of household tasks ( <i>ref.: not fair</i> )	–	-0.638
N (observations)	2,129	2,129
N (couples)	848	848

*Notes:* Coefficients from multinomial logit regression models. 467 couples (1063 observations) were dropped due to all-positive or all-negative outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

*Table A.6:* Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with different sample sizes

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.014	0.044
Distribution of non-core housework	-0.012	0.067
N (observations)	8,633	11,034
N (couples)	2,237	2,726

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 44 couples (139 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam, Release 7.0 (own calculations)

**Table A.7:** Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with same variables as Johnson and colleagues (2016)

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.068	-0.058
N (observations)	3,155	3,219
N (couples)	1,300	1,328

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 28 couples (64 observations) were dropped due to all-zero outcomes. All models include relationship duration, age of the youngest child in the household, health status of both partners, female partner’s age, relationship satisfaction, residence in former East Germany, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam, waves 3, 5, 7, Release 7.0 (own calculations)

**Table A.8:** Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with same variables as Johnson and colleagues (2016)

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of household tasks perceived as fair	-0.028	-0.120
N (observations)	3,155	3,219
N (couples)	1,300	1,328

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 28 couples (64 observations) were dropped due to all-zero outcomes. All models include relationship duration, age of the youngest child in the household, health status of both partners, female partner’s age, relationship satisfaction, residence in former East Germany, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam, waves 3, 5, 7, Release 7.0 (own calculations)

**Table A.9:** Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only female partner’s reports)

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.017	-0.068
Distribution of non-core housework	-0.051	0.003
N (observations)	1,539	1,579
N (couples)	635	652

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 17 couples (40 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner’s age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

*Table A.10:* Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only male partner's report)

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.077	-0.079
Distribution of non-core housework	-0.015	0.094
N (observations)	1,587	1,613
N (couples)	651	663

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 12 couples (26 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

*Table A.11:* Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only female partner's report)

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of household tasks perceived as fair	-0.047	0.036
N (observations)	1,539	1,579
N (couples)	635	652

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 17 couples (40 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

*Table A.12:* Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only male partner's report)

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of household tasks perceived as fair	0.017	0.014
N (observations)	1,587	1,613
N (couples)	651	663

*Notes:* Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 12 couples (26 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Source:* pairfam waves 3, 5, 7, Release 7.0 (own calculations)

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## Chinese parent-child relationships in later life in the context of social inequalities

### **Abstract:**

This paper examines how parent-child relationships vary against the backdrop of socio-economic inequalities evident in China. China is both an increasingly unequal and rapidly ageing country. Understanding how the relationships that older Chinese have with their children are associated with social inequalities is therefore of paramount importance. We do this by examining the effect of socio-economic indicators of the parent and child on their relationship in a multilevel, multinomial logit model of parent-child dyads using data from the Chinese Family Panel Study. First, the relationships we observe are not unidimensional and display complex patterns which deviate heavily from a 'strong versus weak' description of family ties. The results do not support a family displacement perspective of parent-child relationships but instead suggest that educational and financial resources facilitate support that is associated with greater emotional closeness and negates the need for support which places an emotional strain on the parent-child relationship.

**Key words:** intergenerational support, China, inequality, latent class analysis

### **Introduction**

China presents a fascinating opportunity to examine parent-child relationships given rapid economic development, increasing inequalities, and a unique and highly specific social and cultural context with regards to family ties. For example, incomes more than doubled in the last ten years (IMF 2016), leading to considerable inequalities within society but also within families (W. Cheng/Wu 2015; Kanbur/Zhang 2009). Educational opportunities such as access to higher education have also expanded rapidly over the past 20 years, meaning that educational inequalities within and between generations is an ingrained feature of modern Chinese families (Emran/Sun 2011). In addition, the mass migration of individuals from rural to urban areas, particularly amongst younger generations, has led to increasing proportions of aging parents who are separated from their adult children (Cong/Silverstein 2011; Connelly/Maurer-Fazio 2015; Guo/Chi/Silverstein 2012). This trend of modernization has

transformed Chinese society and, given the relative shift in resources between generations, the impact on Chinese families is not likely to be immune to this change. This paper seeks to examine how Chinese parent-child relations in later life are situated in this unique socio-economic context through the creation of a relationship typology and scrutiny of the typology's association with a variety of socio-economic factors.

The multiple dimensions of intergenerational ties are best understood as a complex multi-faceted set of arrangements within the context of a longstanding and often at times mixed affectual and emotional relationship (Dykstra/Fokkema 2011; Ferring/Michels/Boll/Filipp 2009; Silverstein/Bengtson, 1997; Silverstein/Gans/Lowenstein/Giarrusso/Bengtson 2010; Steinbach 2008; Van Gaalen/Dykstra 2006). Empirical studies of parent-child relations have revealed complex, multi-dimensional relationships described by the intergenerational solidarity model, which identifies several underlying dimensions including, but not limited to, affectual and functional solidarity (Bengtson/Roberts 1991). To consider the different dimensions of parent-child relationships independently, focusing only on separate elements of the solidarity model (for example, associational or the structural part of the relation), neglects many of the nuances that exist within parent-child relationships that cannot be captured by the idea of strong versus weak family ties (Reher, 1998). Research on modernity and family relations in later life is relatively less common but there is strong empirical evidence in support of the intergenerational solidarity model, including from China (Ikels 2006; Lei 2013; Ruggles 2007).

Modernization theory identifies greater economic resources as the most important reason for a variety of social outcomes and sees higher incomes and independence as juxtaposed to complex family arrangements and interdependence in traditional societies (Parsons 1960; Slater/Goode 1964). With regards to intergenerational relations, it can be argued that they are "situationally dependent and shaped by local circumstances of history, economics, social organization, and demography and by personal circumstances of wealth, gender, and family configuration" (Ikels 2004: 2). Previous empirical research on modernization theory and the family has focused on its impact on family formation, the distribution of household work and the first and second demographic transitions, whereas research on later life too frequently uses filial piety and cultural norms to explain findings that vary in the separate dimensions of the solidarity model.

In this paper, we seek to examine whether higher incomes, education and geographical mobility that result from rapid and extensive modernization are indeed associated with 'modern family behaviours' identifiable by withering parent-child relations or whether these relationships are still prescient. How do Chinese who have benefitted from sustained and rapid economic development differ in their family relationships from those who are less fortunate? What types of parent-child relationships can we expect to find when a child of a rural labourer has a university degree? How do the parent-child relationships of the 245 million urban migrants differ from those who stayed behind? Do the social inequalities arising out of modernization result in inequalities in parent-child relations? In our analysis, we use representative data of the Chinese population over 60 from the Chinese Family Panel Study (CFPS). Educational mobility, economic prosperity and migration patterns are not evenly distributed across the population of China and there are large differences between urban and rural areas as well as across provinces. The aim of this paper is to give a comprehensive overview of how Chinese parent-child relationships

in later life compare for different groups within China and therefore capture the true depth and breadth of social transformation within China. The representative sample of the Chinese population allows for a clear identification of how groups with diverse socio-economic circumstances maintain family ties, and to our knowledge is the first study to encompass both rural and urban Chinese populations.

## **Parent-child relationships in China**

Research on later life parent-child relationships in China has been developing rapidly in the past few years. For example, Guo et al. (2012) analysed the parent-child relations of the over 60's in rural parts of Anhui province, situated in Eastern Central China on the Yangtze River. Their findings suggest that the considerable number of migrant children providing remittances to their parents reflect the strong filial obligations that Chinese adult children have toward their parents and that many migrant children engage in complex exchanges of support which reflect collaborative and mutually beneficial parent-child relations in the context of massive rural-to-urban migration. These findings emphasise that, in contrast to the European and North American context, Chinese parent-child relations are greatly shaped by migration. This is exacerbated by the Hukou household registration system (T. Cheng/Selden 1994), adding dynamics to Chinese families that are not found elsewhere. Each individual is registered with either an urban or rural hukou. If you have a rural hukou, you can live in an urban area but you do not have the same status as someone with an urban hukou.

The strict hukou system denies migrants access to many of the social services in urban areas such as schools, welfare systems and certain forms of employment (Cao/Liu 2015; Y. Chen/Feng 2013; Han et al. 2014; Li et al. 2014; Y. Wen/Hanley 2015) and therefore Chinese who migrate to urban areas maintain complex family ties with those they left behind. When their own children migrate, old parents frequently continue to live in a rural area, possibly by themselves or taking care of grandchildren (Biao 2007; M. Wen/Lin 2012). Thus, intergenerational support is related to migration also in the form of childcare for children who are left behind with grandparents in rural areas. Urban migrants therefore maintain close relations, often sending financial support back to their parents (Cai 2003; Secondi 1997). Regarding gender, women represent approximately half of all migrant workers (National Bureau of Statistics of China 2016). The large-scale migration of women into urban areas where they have limited access to childcare has therefore led to complex intergenerational arrangements. Older Chinese care for their grandchildren in what appears to be exchange for both long and short term financial support (Cong/Silverstein 2011). An open question remains, however, as to how this exchange fits within the wider parent-child relationship and particularly its association with emotional aspects (Silverstein/Bengtson 1997; Tu, 2016).

Despite the attention that exchange-based relationships with migrant children have received, they are less prevalent than relationships where children provided financial support to family left behind in rural areas without any identified reciprocation (Cong/Silverstein 2011). This particular type of relationship is possibly attributable to two factors: the absence of social support mechanisms for the elderly which means that older persons

are heavily reliant on family networks for subsistence (Connelly/Maurer-Fazio 2015), and the high degree of filial piety within Chinese society, traditionally associated with Confucian patrilineal, family values (Hamilton 1990; Zhan/Montgomery 2003).

Parent-child relations are also influenced by the changing policy context for Chinese families. China is currently undergoing the implementation of nationwide pension reforms (OECD 2015). These include the introduction of the New Rural State Pension as well as expansion of individual accounts alongside the urban pension system. Yet these pension reforms vary in the implementation across provinces and between rural and urban areas creating further inequalities in the incomes of Chinese older persons (Wu 2013). This could potentially impact upon parent-child dynamics with a reduced reliance on the support provided by children (Kohli 1999), and the reduced dependence on the financial contributions of children could have various implications. First, it could reduce the levels of remittances by children whose parents are now more financially independent. Second, rural children may be less inclined to migrate in the first instance, given that there is potentially a reduced need for remittances. Finally, it could be largely neutral in its effect on parent-child relations, indicating that parent-child relations are not a reflection of parental dependence but instead rooted in short or long-term exchange mechanisms or traditions of filial piety. These questions are complex and go beyond the scope of this paper, but they highlight the need for analysis that is nationally representative and accounts for the diverse contexts within China with regards to family relations.

A drawback of existing research on intergenerational ties in China is the limited frame of reference which has been used, focusing predominantly on a select population in isolation such as rural residents in a specific province or urban migrants within specific cities. As stated at the outset, considerable socioeconomic differences exist within China and by investigating the population of older Chinese persons together, it is possible to examine how parent-child relations differ between urban and rural, rich and poor, highly educated and low educated and those with access to social services and those with none. For example, per capita disposable incomes of urban residents are three times that of rural residents (China Statistical Yearbook 2014). This is particularly important considering the significant social inequalities evident across China. In addition, the limited frame of reference within existing research is not only empirical. The analytical frameworks used in the analysis of Chinese family ties have tended to do so in a comparative approach, focusing on what separates Chinese families from North American or European families. In this paper, we instead aim to understand how families with diverse social circumstances, differ in their parent-child relationships.

### *Family relations and social inequalities*

The process of modernization in China has been rapid, extensive and reached into all areas of Chinese society resulting in significant inequalities in resources. Following theories of modernization (Offer 1998; Slater/Goode 1964), it is tempting to expect that family relations will be more intense when there are strong resource constraints necessitating mutual loyalty and support. These are commonly referred to as traditional family relations. Conversely, economic growth and social upheaval are thought to lead to weakening of family interdependence in what are commonly referred to as 'modern family relations' (Yan 2010;

Zore-Maver 2002). It might be expected that modernity within society (i.e. higher incomes, higher education and higher urbanicity) will lead to more ‘modern’ family relations. Yet this is an assertion that has been challenged by scholars who argue that a more complex interplay between social context and parent-child context exists (Szydlik 2008).

Among the old, the impact of modernization is evident in higher income levels. These higher incomes amongst older persons in China have been through two processes. (1) The expansion of state capacity has included the development of a range of first and second pillar pension arrangements. (2) The general increase in wages and prosperity over the past 30 years has raised living standards across China and enabled higher savings levels and development of third pillar pensions. The number of urban residents in receipt of a basic pension doubled between 2000-2010 and the number of rural residents in receipt of a pension doubled between 2009-2012 alone (China Statistical Yearbook 2013). This represents a large shift in basic income provision amongst China’s older population but these developments have been uneven. Following a modernization perspective, we hypothesize that parents with higher income levels are less likely to have traditional relationships in which they are the recipient of substantial transfers and support (H1).

Among the young, modernization is evident in inequalities in levels of education. The percentage of school leavers going on to university rose from just 3% in 1993 to 27% in 2013 (China Statistical Yearbook 2014). There are several consequences for intergenerational relations of this: (1) increases in education lead to a shift in the balance of resources between generations over time with younger generations outperforming their parents on the labor market, sometimes by significant amounts (Emran/Sun 2011); (2) tertiary education often requires the child to move away from their parents at least for the duration of their studies and greatly increases the chances that they will stay away once their studies end (geographical mobility) (Kalmijn 2006), and (3) tertiary education itself is potentially associated with extensive value differences across generations, potentially leading to normative discordance including familial values and potentially notions of filial piety (Inglehart/Baker 2000). We argue that children with higher levels of education will be more likely to have modern parent-child relationships with little exchange up and down generational lines (H2).

In addition to a reduction in exchange between parent and children, it is anticipated that modernization could lead to a reduction in exchanges that qualify as emotionally strained. These strained parental-child relationships are marked by intergenerational support alongside a weaker emotional relationship and reflects existing findings which suggest that intergenerational support does not always exist alongside close emotional ties (van Gaalen/Dykstra/Komter, 2010). The lower levels of dependence for higher income parents and highly educated children should allow for relationships with less resource constraints and thus potentially less emotional conflict or tension. This leads to the hypothesis that parents with higher incomes and children with higher education levels are less likely to give and receive intergenerational support alongside emotional distance (H3).

In addition to inequalities in income and access to higher levels of education, socio-economic development in China has resulted in approximately 245 million individuals moving to urban areas but remaining formally registered in rural areas under the hukou system (China Statistical Yearbook 2014). Around 55% of older adults (ibid.) live in urban areas, yet their intergenerational ties are largely absent from the literature which focuses mainly on rural residents.

Urban Chinese maintain relations with their family but potentially in forms that differ markedly from the rural population, particularly given the hukou system. Amongst these urban Chinese only 56% (CFPS 2010) have an urban hukou and it should be expected that their circumstances are very different, given that those without an urban hukou lack access to public and private services. Hence, in line with theories of modernization we expect that children residing in an urban area that also have an urban hukou will be more likely to have modern parent-child relationships with more limited exchange than both rural residents and rural-urban migrants (H4). This assumption is based on the vast differences in social services found between urban and rural areas of China. With poorer social services available to urban migrants and those family left behind, it is anticipated that these groups will continue to rely on family support mechanisms. Poor social services in rural areas will require migrant children to send remittances home to their parents, and poor access to educational and childcare services will lead to greater support provided by the family left behind. This view of modernisation is closely aligned with crowding-out theories of family relations which see public services as a substitute to family provided care. However, we caution against a strict interpretation of crowding-out theory and instead anticipate that family relations will allow family members to specialize in the particular forms of care and support that they are best placed to provide (Igel/Brandt/Haberker/Szydlík, 2009). This ability to specialize in the types of provision offered could enable support exchange which places less of an emotional strain on the relationship. Therefore, we expect that the prevalence of intergenerational support alongside emotionally distant relationships to be lower amongst urban residents than migrants or rural residents (H5).

## Data and methods

We use data on parent-child dyads from the first wave of the Chinese Family Panel Study collected in 2010. The Chinese Family Panel Study is a household panel study conducted in 33 Chinese provinces (Xie/Hu 2014). The response rate in 2010 was 81.3 percent at the household level and 84.1 percent at the individual level. We restrict our sample of parents (the anchor) to the respondents over 60, given that questions about intergenerational support were specifically asked to this subpopulation. This left a sample of 5,412 individuals. Once individuals with missing values on variables of interest were excluded, 4,673 individuals were left in the analytical sample. The impact of this is presented in table 2. The average number of children for respondents is 2.7, and there are a total of 12,958 parent-child dyads. The sample consists of 4,568 parents and each parent is asked specifically about their relations with each child in turn. 30 respondents refused to provide an answer regarding at least one of the indicators for at least one of their children and were thus excluded from the analysis. This provides us with a multi-level structure for our analysis such that parent-child dyads are nested within parents, therefore expanding on previous research that has focused on individual parent-child dyadic relations (Van Gaalen/Dykstra 2006), or that has aggregated sibling information to form a general family pattern (Dykstra/Fokkema 2011). The high number of children per respondent is due to the fact that those over 60 were unaffected by China's one-child policy.

In order to measure the various dimensions of the parent-child relationship, a total of 7 survey instruments were used (please refer to Table 1). The first instrument indicates emotional closeness where 1 = Not Close; 2 = Close; 3 = Very Close (Question F1)<sup>1</sup>. The remaining indicators are dichotomous indicators of whether support was exchanged with the specific child and include (1) giving grandparental childcare, (2) receiving care and support in the household; (3) giving financial help; (4) receiving financial help; (5) helping the child with housework; (6) receiving help from the child with housework. Respondents were asked to indicate whether they had engaged in any of these activities over the past 6 months with their children and then asked to stipulate which children (Question F2)<sup>2</sup>.

*Table 1: Parent-Child Relationship Indicators*

Variable	Observations	Proportion of Sample
Gave Financial Help	849	6.57%
Received Financial Help	3,736	28.92%
Gave help with Housework	1,732	13.41%
Received help with Housework	1,760	13.62%
Provide Childcare for Grandchild	1,846	14.29%
Received Care from the Child	3,039	23.52%
<i>Relationship Quality</i>		
Not Close	2,662	20.61%
Close	6,099	47.21%
Very Close	4,158	32.19%

Parental income was measured as the log of the equivalized household income in the last 12 months. The education level of the parent was coded into three levels (low, medium and high), reflecting those who have not graduated from high school, those who have only graduated from high school and those who have had education beyond high school respectively. The same coding was used to establish the child's education. However, in the analysis we use different reference categories given the differing distributions between parents and children. Amongst the parents, 55% didn't graduate from high school. Amongst the children, 73% graduated from high school, but went no further. Given this, for the parent's we use 'low education' as our reference and amongst the children we use 'medium education' as the reference category.

Residence and migration is captured through an indicator of whether an individual is a rural resident, urban resident or urban migrant (living in a city without an urban hukou which is a combination of variable Urban and qa2). Parents did not specifically report whether children lived in an urban area. We assumed that if a child is living in a county different from the parental home and their parents do not have an urban hukou, then they are living in an urban area. We checked this using the general sample from the CFPS, where 94% of those individuals not living within 50 km of their county of birth and whose parents did not have an urban hukou, lived in urban areas. We also assumed that a child was living in an urban area if they were living in the same county as their parents and their parents were themselves urban migrants. Weighting of the data was applied

1 Original question: In the past 6 months, how was the relationship between you and “##”?

2 In the past 6 months, have you engaged in any of the following activities with your children? [Select all that apply].

throughout the analysis using 'rswt\_nat' to provide a representative sample of parents over the age of 60 in the 33 provinces for which the CFPS provides data.

*Table 2: Parent and Child Characteristics*

Variable	Full Sample		Analytic Sample	
	obs	Mean	Obs	Mean
<b>Parent Characteristics</b>				
Age	5,412	69.36	4,658	69.31
Log Income	4,858	9.10	4,658	9.10
Number of Children	5,412	3.05	4,658	3.02
Male	5,412	50.26%	2,359	50.64%
<b>Migrant Status</b>				
Rural Resident	2,839	52.66%	2,433	52.23%
Urban Migrant	875	16.17%	726	15.59%
Urban Resident	1,698	31.17%	1,499	32.18%
<b>Health Status</b>				
Healthy	4,306	79.61%	3,722	79.91%
Poor Health	1,103	20.39%	936	20.09%
<b>Marital Status</b>				
Single/Widowed/Divorced	1,350	24.94%	1,159	24.88%
Married	4,062	75.06%	3,499	75.12%
<b>Employment Status</b>				
Not Retired	1,349	24.93%	968	20.78%
Retired	4,063	75.07%	3,319	71.26%
<b>Education Status</b>				
Low	3,083	57.01%	2,601	55.84%
Medium	2,148	39.73%	1,899	40.77%
High	176	3.26%	158	3.39%
<b>Child Characteristics</b>				
Age	14,750	41.67	15,282	40.21
Male	15,242	53.34%	6,975	53.99%
<b>Birth Order</b>				
1	5,395	35.40%	4,658	36.06%
2	4,141	27.16%	3,512	27.18%
3+	5,708	37.44%	4,749	36.76%
<b>Marital Status</b>				
Single	1,083	7.11%	1,119	7.33%
Married	13,976	91.77%	13,978	91.55%
Widowed	171	1.12%	171	1.12%
<b>Education Status</b>				
Low	2,553	16.81%	2,556	16.81%
Medium	11,090	73.02%	11,105	73.02%
High	1,545	10.17%	1,547	10.17%
<b>Migration Status</b>				
Rural Resident	8,728	57.25%	7,318	56.65%
Urban Migrant	1,879	12.33%	1,503	11.63%
Urban Resident	4,637	30.42%	4,098	31.72%

The first stage of the analysis consists of a Latent Class Analysis, a statistical approach used to find groups or subtypes of cases in multivariate categorical data. A latent class approach was used in order to examine the multidimensional nature of parent-child rela-

tions. All parent-child dyads are analysed and assigned to a class, and the Bayesian Information Criterion is used to assess best model fit, with lower BIC indicating a better fit. The best fitting model was used to determine the number of classes and the analysis was conducted with the R package *poLCA*. Once parent-child dyads are assigned a class, a multilevel, multinomial random intercept logit model is fitted using *MLwiN* to investigate the associations between the class membership of each parent-child dyad with socio-demographic indicators of parent and child used as controls: gender, age, marital status, income, residence status, hukou status, education level and the child's birth order. These were selected based on the existing research on intergenerational relations (Bengtson/Roberts 1991; Cong/Silverstein 2011; Dykstra/Fokkema 2011) and the hypotheses laid out in the previous section. A multilevel logit was used given that for each parent, there were several parent-child dyads representing each of their children and they were therefore nested within the parental level. Please refer to Table 2 for the descriptive statistics of all used indicators.

## Results

### *Latent Class Analysis*

*Table 3:* Results of Latent Class Analysis

	Detached	Intensive Exchange	Upward Support	Downward Support	Upward Financial Support	Care Dependent
Upward Financial Help	6%	50%	4%	13%	2%	0%
Downward HH help	0%	64%	70%	33%	100%	4%
Upward HH help	8%	97%	12%	55%	0%	0%
Downward GK care	4%	97%	74%	5%	0%	0%
Upward Care	6%	86%	4%	86%	1%	0%
	1%	81%	68%	25%	0%	100%
Not Close	28%	8%	6%	9%	19%	20%
Close	50%	40%	44%	36%	50%	46%
Very Close	22%	51%	50%	55%	31%	34%
Proportion of Sample in Class	50%	2%	12%	10%	16%	10%

The Latent Class Analysis (LCA) identified six classes of parent-child relationships. The LCA propensities are presented in table 3. The results show a large dominant group of parent-child dyads through which little exchange is identified, labeled as “autonomous”. Previous research, based on rural parents only, had suggested that this constituted around 30% of parent-child dyads (*ibid*). Our analysis, inclusive of urban residents and urban migrant parents, suggests that this is far higher amongst the wider Chinese population with 50% of parent-child relationships, exhibiting little to no exchange. We would refrain, however, from presenting these relationships in a negative light and have thus opted for the label ‘autonomous’ to reflect the lack of exchange without attaching negative connotations. These relationships may represent a ‘dormant’ relationship rather than one in which the parent and child are averse to exchange. Nevertheless, the relationships also exhibit

the lowest propensity for emotional closeness, suggesting that a lack of exchange is associated with emotional distance.

Standing in direct contrast to this class is the 'intensive exchange' class (2%). These are parent-child relations in which there is a high propensity for exchange across all the indicators included. This suggests a very complex and intricate pattern of interdependence in which parents and children are simultaneously providing help to each other, often in the same form (e.g. upward and downward financial support or upward and downward care giving), suggesting a considerable degree of resource pooling and close cooperation. These relationships are marked by a high propensity for emotional closeness, suggesting that the functional exchange operates in a cooperative and emotionally positive relationship.

The third and fourth classes represent uni-directional support relationships and are differentiated by whether the support is provided by the child to the parent (upward support, 12%) or whether the support is provided by the parent to the child (downward support, 10%). The propensity for each activity is more balanced than in the second class, suggesting a greater diversity in arrangements of support. For example, the propensity to provide upward care in class 3 is 68%. This is high, suggesting that this is a common, but not so high as a defining factor of such relationships. Instead, these arrangements indicate general support that comes as a combination of some or all of financial help, housework help or care. The propensity toward emotional closeness in these two classes which is similar to that in the second class suggests very little emotional tension. These types of relationships are far more common than intensive exchange based relationships and together represent 22% of all the parent-child relationships in the analysis.

These classes stand in contrast to the final two classes which share two specific features. Firstly, they are focused on two specific forms of support. Class 5 (upward financial support, 16%) is dominated by an absolute propensity to provide upward financial support and a low propensity to provide or receive anything else. Class 6 (care dependent, 10%) is a group dominated by an absolute propensity for the provision of care by the child to the parent. The second commonality is the very low propensity for emotional closeness in these classes. The propensity is not quite as low as that in the 'autonomous' class but it is far below the levels observed for "intensive exchange", "upward support" and "downward support" classes. Taken together, this suggests that the relationship is focused around a very narrow functional dependence and that this is associated with a lack of emotional closeness. We argue that these two classes therefore represent relationships where functional support is observed alongside a lack of emotional closeness (Luescher/Pillemer 1998).

Latent Class Analysis provides a way in which to simplify, cluster and organize parent-child relations. The analysis provides a clear typology of six classes which can help more effectively assess the degree to which parent-child relations vary within China. These six classes fit within three broad patterns: (a) extensive exchange and support alongside an emotionally close relationship [Classes 2, 3 and 4 = 24% of dyads], (b) autonomous and largely independent parent and child [Class 1 = 50% of dyads] and (c) relationships distinguished by exchange upon a singular vector and relatively low propensity for emotional closeness [Classes 5 and 6 = 26% of dyads]. These three patterns help elaborate on the hypotheses in that we would expect indicators of modernization to be associated with a greater number of autonomous relationships (H1, H2, H4) and a lower number of relationships with support but lacking emotional closeness (H3, H5).

*Multilevel modelling*

The multilevel, multinomial, random intercept logit model shows the odds of class membership relative to the class ‘Autonomous’. ‘Autonomous’ was chosen as the baseline category because it is the most numerous and also represents a situation in which there is an ‘absence’ of a relationship which makes the interpretation of the odds more meaningful. From table 4, we observe that parents with higher income have markedly different parent-child relationships than those with lower income, but not in the direction hypothesized (H1). A parent in the highest decile of income is 54.5% more likely to have a relationship of intensive exchange when compared with someone from the lowest decile<sup>3</sup>. This is a considerable effect size and suggests that, whilst such relationships are rare, they are rarest amongst parents with low income. Similarly, high income parents are 19.3% more likely to have ‘Downward Support’ relationships relative to ‘Autonomous’ relationships than low income parents. By contrast, high income parents are 23.9% and 14.7% less likely to have a relationship exhibiting ‘Upward Financial Support’ or ‘Care Dependent’ respectively relative to an ‘Autonomous’ relationship than low income parents, supporting H3.

With regards to a child’s educational attainment, those with children with higher education are 28% more likely to be in an ‘Upward Financial Support’ relationship relative to an autonomous relationship than someone who has completed high school (medium education). This does not necessarily mean that they are more likely to provide financial support. Upward financial support can also be observed in other classes such as classes 2 and 3, where it represents a wider set of support giving. The observation is therefore that higher educated children are more likely to have a relationship that is marked by the provision of financial help to parents alongside a lower propensity for emotional closeness and lower propensity for other forms of exchange. In short, they provide money but little else and lends some support for H2. This is the only statistically significant difference between those with higher education and those who have completed high school. When comparing those who did not complete high school with those who did, we can see that they are less likely to have ‘Upward Support’, ‘Downward Support’ or ‘Upward Financial Support’ relationships relative to an ‘Autonomous’ relationship. This runs counter to the direction hypothesized (H2).

Migration status is the third indicator identified as potentially shaping parent-child relations. First, we compare urban migrants with rural residents. Unsurprisingly we find that urban migrants are far less likely to have relationships that are marked by functional exchange (apart from ‘Upward Financial Support’) relative to an ‘Autonomous’ relationship than rural resident children, supporting H4. Somewhat surprisingly, we find that there appears to be no statistical difference in the likelihood of an urban migrant child and rural resident child having an ‘Upward Financial Support’ relationship despite strong evidence in the literature that remittances are a primary part of migrant intergenerational relationships. To examine this further, the model was run without child’s educational status and the Urban Migrant coefficient then became positive, large and highly significant poten-

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3  $\text{EXP}(10.82 \cdot \text{LOG}(1.316)) / \text{EXP}(7.17 \cdot \text{LOG}(1.316))$  where 10.82 and 7.17 represent the 90th and 10th percentile of Income (Log) respectively.

tially indicating that the relationship between migration and remittances is heavily mediated by the child's educational status and subsequent labor market earnings.

*Table 4:* Multilevel Multinomial Model of Parent-Child Relationships (Odds Ratios)

		Intensive Exchange	Upward Support	Downward Support	Upward Financial Support	Care Dependent	
<i>Parent</i>	Age	0.987 (0.018)	1.065 *** (0.009)	1.004 (0.009)	1.017 * (0.008=)	1.053 *** (0.0109)	
	Income (Log RMB)	1.316 *** (0.109)	1.039 (0.038)	1.118 ** (0.039)	0.848 *** (0.026)	0.904 ** (0.033)	
	Male	0.947 (0.156)	0.819 * (0.074)	0.737 *** (0.059)	0.988 (0.083)	1.043 (0.099)	
	Urban Resident	1.208 (0.307)	1.001 (0.135)	1.071 (0.136)	0.863 (0.112)	1.134 (0.164)	
	Urban Migrant	1.611 * (0.362)	1.461 ** (0.169)	1.135 (0.125)	0.922 (0.102)	1.481 ** (0.179)	
	Single or Widowed	1.629 * (0.320)	1.072 (0.111)	0.964 (0.096)	1.166 (0.113)	1.134 (0.123)	
	Medium Educated	1.299 (0.231)	1.074 (0.106)	1.121 (0.097)	1.039 (0.095)	1 (0.104)	
	High Educated	0.702 (0.300)	0.423 ** (0.126)	0.751 (0.170)	0.498 * (0.143)	0.391 ** (0.127)	
	Retired	0.899 (0.172)	1.099 (0.118)	1.057 (0.096)	1.19 (0.114)	1.256 * (0.142)	
	Unhealthy	0.947 (0.193)	1.406 *** (0.140)	0.714 *** (0.072)	1.171 (0.110)	1.091 (0.117)	
	Number of Children	0.669 *** (0.048)	0.885 *** (0.029)	0.81 *** (0.026)	1.02 (0.031)	0.89 *** (0.030)	
	<i>Child</i>	Age	0.939 *** (0.014)	0.991 (0.007)	0.921 *** (0.007)	1.002 (0.006)	0.995 (0.007)
		Male	2.539 *** (0.394)	1.016 (0.064)	3.386 *** (0.253)	0.911 (0.052)	1.064 (0.071)
		Birth Order = 2	0.558 *** (0.090)	0.797 ** (0.059)	0.624 *** (0.048)	0.837 ** (0.057)	0.728 *** (0.056)
		3+	0.542 ** (0.117)	0.916 (0.076)	0.618 *** (0.058)	0.919 (0.070)	0.798 * (0.070)
Urban Hukou		0.999 (0.250)	0.813 (0.109)	1.023 (0.128)	0.766 * (0.099)	0.696 * (0.100)	
Urban Migrant		0.229 ** (0.104)	0.51 *** (0.065)	0.574 *** (0.077)	1.168 (0.101)	0.591 *** (0.074)	
Single		0.816 (0.181)	1.088 (0.128)	0.288 *** (0.042)	0.65 *** (0.081)	0.77 (0.104)	
Widowed		2.322 (1.438)	1.353 (0.338)	1.29 (0.457)	0.839 (0.222)	1.398 (0.356)	
Low Educated		0.776 (0.216)	0.699 *** (0.070)	0.674 ** (0.084)	0.695 *** (0.063)	0.889 (0.092)	
High Educated		1.06 (0.220)	1.138 (0.132)	0.988 (0.105)	1.978 *** (0.205)	1.024 (0.132)	

*Note:* \* <0.05; \*\* <0.01; \*\*\* <0.001. Standard Errors are in brackets. N1 = 12,919; N2 = 4,658. Log Likelihood = -18,008.35; Intercept = 2.718 \*\*\* (0.000)

When we compare urban resident children (with urban hukou) with rural resident children, it is shown that they are respectively 23.4% and 30.4% less likely to have ‘Upward Financial Support’ or ‘Care Dependent’ relationships relative to an ‘Autonomous’ relationship. This indicates that relationships with support but lacking emotional closeness are far less common for children with an urban hukou. Nevertheless, children with an urban hukou are not less likely to have ‘Upward Support’, ‘Downward Support’ or ‘Intensive Exchange’ based relationships relative to an ‘Autonomous’ relationship than a rural resident child, thus supporting H5.

With regards to other predictors of parent-child relationships, for older parents the parent-child relationship is one of receiving greater support, particularly with regards to classes ‘Upward Support’ ‘Care Dependent’ and ‘Upward Financial Support’. In line with general findings on intergenerational relations, fathers appear to have less support relationships than mothers and are more likely to have ‘Autonomous’ relationships (Luo/Waite 2014).

With regards to the characteristics of the child presented in table 4, sons are far more likely to be in relationships shaped by the receipt of support, and daughters are 70.4% less likely to be in a ‘Downward Support’ relationship relative to an ‘Autonomous’ relationship. This is in line with existing literature indicating the preferential support offered to sons in China (Cong/Silverstein, 2011). It would not, however, appear that daughters are more likely to be in upward support relationships such as ‘Care Dependent’ or ‘Upward Support’ as is generally the case in Europe and North America (Dykstra/Fokkema 2011). This is potentially because women provide support to their in-laws in China and this is not covered by the dyadic parent-child approach used here (F. Chen 2004). With regards to birth order of the child, we see a relatively consistent effect that children lower down the birth order are more likely to be ‘Autonomous’ than any other parent-child relationship type. This supports the existing literature which suggests that support relationships both upward and downward in China are concentrated upon the eldest child (Das Gupta et al. 2003).

## **Discussion and conclusion**

The aim of this paper was to establish how the diverse and dynamic Chinese social context impacts parent-child relationships and investigate a representative sample of the Chinese population that includes both urban and rural parent-child dyads. We paid special attention to income, education and migration status as key characteristics that shape intergenerational relations in contemporary China. Contrary to (H1), parental income was positively associated with membership of two classes relative to autonomous relationships (‘Downward Support’ and ‘Intense Exchange’). Both of these groups appear to describe family relationships that have strong provision of help and support including financial help, childcare and housework. The analysis suggests that it is parents from higher income groups that are more likely to be engaged in such patterns of exchange. This is in contrast to traditional theories of modernization where economic development and the increase in incomes at older ages provided for by pension systems and greater income over the life course are generally considered to reduce intergenerational interdependence

(Kohli 1999). The notion that a higher income means that there is less exchange with children at older ages, is not supported in our findings. And yet, higher income parents are less likely to have the two forms of relationship identified as being marked by intergenerational support alongside a lack of emotional closeness: 'Care Dependent' and 'Upward Financial Support'. This suggests that for the most intense forms of dependency, parents are able to use their resources to maintain some degree of autonomy, particularly from forms of dependence that are associated with lower emotional quality (Albertini/Kohli, 2013). This supports (H3) in suggesting that the reduction in dependency brought about by higher incomes is associated with a move away from support accompanied by emotional distance and interdependency.

At the outset of the paper, we suggested that the rapid expansion in education for younger generations and the subsequent social inequalities would likely be associated with dramatic differences in intergenerational relations. Modernization theory suggests that educational mobility lessens the degree of intergenerational exchange and support. When we compare those with higher education to those who graduated only from high school, however, we see very few differences and little evidence in support of this hypothesis. We do, however, see a greater prevalence of 'Upward Financial Support' relationships in this group reflecting their ability to provide remittances. This in itself may suggest that remittances should be viewed, as has been seen in findings from Anhui, as a return on the investment in the child and the closeness of the relationship (Ji/Guo/Feldman, 2015). Our typology offers a further insight, however, as it should be noted that this relationship is one that we identify as marked by greater emotional distance. This could reflect a few factors such as a discordance in normative values that is brought about by higher educational attainment, greater physical distance associated with higher educational attainment or even a resentment of the implicit 'pay back' involved in rapid social mobility and familial remittances. What the results appear to suggest, however, is that it should not be assumed that remittances are a sign that a parent-child relationship is one based on emotional closeness and that a multidimensional approach to familial relations is necessary.

When we look at the difference between those that have not completed high school and those who have, the results do not necessarily support the simple narrative offered by theories of modernization and their impact upon intergenerational relations. Contrary to (H2), the low educated were far less likely to be involved in exchanges of support with their parents. Not only that, those who had graduated high school were far more likely to be in relationships typified by a high propensity toward emotional closeness (Class 2, 3 and 4). It is unclear as to precisely why this might be and it lies beyond the power of this analysis to determine this. However, there are several theories that offer potential explanations. First, it could be that investment made in the child through better education leads to a more supportive and closer relationship between parent and child. Second, it could be that the resources afforded to the child by their education enable them to participate in and benefit from support and exchange with their parents. Third, it could be unobserved effects such as serious exogenous shocks (i.e. crop failure, death in the family, ill health) that disrupt both the child's educational development and the development of their relationship with their parent. The evidence is, however, not in support of the hypotheses that the higher educated would be less engaged in support (H2).

One further reason for this may be that the pace and scope of educational expansion in China has defused the effect of social mobility. Previous research on social mobility's effect on family ties has indicated that intergenerational support is only reduced when intergenerational mobility is the result of individual achievement and not the product of structural change such as an upward shift in the occupational distribution or the expansion of higher education (Kalmijn, 2006). The negative impact of increases in income, higher educational attainment and geographical mobility would only occur when they are brought about by individual differences in achievement or through choice. The inequalities in China we observe are structural and it may therefore be that children are increasingly distant from their parents in terms of income, education and geography not through choice and effort but by forces that are out of their control. Family ties could therefore be as relevant for those affected by these structural factors as for those who are not. These arguments suggest that parental income and offspring educational attainment would not differentiate parent-child relations.

In support of (H4), we saw a dramatic impact of a child's migration on parent-child relations. This is unsurprising given that many of the indicators of support require a degree of physical proximity. Compared to both urban and rural residents, urban migrants have less exchange and support and this is reflected in relationships with less emotional closeness. From descriptive statistics alone it is clear that urban migrants are less likely to be 'very close' to their parents emotionally than non-migrants (24% v 33%). There is a degree to which this is a selection effect, with children migrating due to a lack of emotional closeness and so interpretations must treat causal mechanisms with caution.

Surprisingly, we find little support for modernization theory's suggestion that urban residents give and receive less support as there is no difference in the likelihood of having supportive relationships between urban and rural residents. Where we do see a difference, however, is in the prevalence of supportive relationships with a lack of emotional closeness such as 'Upward Financial Support' and 'Care Dependent' which are far less common amongst urban children. This supports the hypothesis that those in urban areas are less likely to have parent-child relations marked by functional support alongside emotional distance (H5) in suggesting that those in urban areas with access to support services are able to avoid intergenerational relations that make the parent strongly dependent on the child and potentially erode the emotional closeness within the relationship.

Overall, the picture of parent-child relationships in China shares two distinct features that are also found in European and North American research. First, the relationships are not unidimensional and display complex patterns which deviate heavily from a 'strong versus weak' description of family ties. This finding supports the use of a latent class approach above using single individual behaviors as indicators of parent-child relationships. Indeed, we found 26% of the dyads to exhibit characteristics that are associated with relationships in which there is functional support but emotional closeness is below average. Second, the association between the type of parent-child relationship and key socio-economic variables is not one that reflects standard modernization hypotheses. Instead, it would appear that relationships are adaptive to context and parent-child relationships are structured in order to navigate a complex and dynamic social context. This is in line with findings from Europe where parent-child relationships adapt and reflect shifts in resources, rather than merely retreating when other forms of support are not necessary or possible (Igel et al. 2009; Kalmijn 2006).

Higher parental income, high school graduation for the child and residence in an urban area were all hypothesized to reduce interdependence and therefore reduce both the giving and receiving of intergenerational support. However, in both regards we observed more support based relationships characterized by greater emotional closeness in these groups of dyads. We also saw that high income parents, highly educated children and children with urban residency were less likely to have relationships that are associated with support alongside a lack of emotional closeness. We conclude that modernization theory only partially allows those elements of a relationship that strain emotional ties to be circumvented and greater independence to be established and yet also provides resources and capacities that facilitate support. Furthermore, the support that is facilitated is closely associated with greater emotional closeness. Research regarding modernization and intergenerational relations would therefore be well-minded to incorporate a multi-dimensional view of intergenerational relations within their theoretical frameworks and analytical approach.

### *Future research*

The analysis offered indicates that there is a complex association between intergenerational relations and modernization processes, with several findings pointing towards potentially interesting and fruitful avenues of research, especially given the rapid nature of developments in China's socio-economic context and social policy arrangements. Such future analysis of parent-child relationships will be better supported in the future by the continually improving data landscape within China. Future waves of the CFPS and surveys such as CHARLS (China Health and Retirement Longitudinal Study) will offer researchers opportunities to utilize more complex modelling techniques which can better isolate the causal processes at play and provide a more detailed description of developments.

Some of the questions raised by this analysis such as the observation of an apparent educational 'pay back' role and the positive association between increased economic opportunities and greater intergenerational support giving and receiving are puzzling in the context of existing research on parent-child relationships and deserve further attention. This is enabled by rapidly expanding data collection in China but is also made possible by a shared conceptual and theoretical framework with North American and European research. Comparative research which incorporates European, North American and Chinese contexts should therefore be high on the research agenda of those examining family relations in later life as such comparisons offer the possibility of extending and refining our understanding of family dynamics in later life.

We conclude by asserting that a narrow conceptualization of intergenerational support that identifies only functional support behaviors, presents an incomplete theoretical and analytical view of intergenerational relations in the context of modernization. The multi-dimensional approach to intergenerational relations adopted here is in line with many recent findings in the sociological literature which emphasize the complex interplay between intergenerational relations and their social context (Brandt/Deindl 2013; Emery 2016; Mudrazija 2016). This is essential if both social researchers and policy makers are

to meet with the challenges that are presented by social inequalities currently observed within China.

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# Titles, abstracts and key words in German

## Titel, Zusammenfassungen und Schlagwörter in deutscher Sprache

### S. 3-26:

*Fabrizio Bernardi & Chiara Ludovica Comolli*

#### **Parental separation and children's educational attainment: Heterogeneity and rare and common educational outcomes**

#### **Elterliche Trennung und Bildungsniveau der Kinder – Heterogenität sowie seltene und häufige Bildungsfolgen**

##### **Zusammenfassung:**

Während der Zusammenhang zwischen elterlicher Trennung und geringeren Bildungserfolgen der Kinder als belastbares Forschungsergebnis gilt, ist die Evidenz bezüglich ihrer Heterogenität über die sozialen Gruppen hinweg uneinheitlich. Einige Studien zeigen auf, dass sozioökonomisch bessergestellte Familien es schaffen, ihre Kinder im Schulalter vor den Folgen elterlicher Trennung abzusichern, während andere Studien dies verneinen. Wir tragen zu dieser Debatte bei, indem wir eine Strukturtheorie der Heterogenität der mit der elterlichen Trennung assoziierten Konsequenzen für den Bildungsergebnisse der Kinder skizzieren. Wir argumentieren, dass die Bildungseinbußen aufgrund der Trennung und deren Heterogenität über die sozialen Hintergründe hinweg in Abhängigkeit von der Selektivität des jeweiligen Bildungsergebnisses unterscheiden. Insbesondere gilt, dass die geringsten Einbußen für sehr seltene und für sehr verbreitete Ergebnisse beobachtet werden. Die Seltenheit eines Bildungsergebnisses hängt vom sozialen Hintergrund der Schüler ab, der wiederum die beobachtete Heterogenität hervorbringen könnte; dies selbst dann, wenn die Einbußen aufgrund der Trennung über den sozialen Hintergrund der Eltern hinweg gleich sind.

Wir untersuchen die Heterogenität der Trennungsfolgen anhand der elterlichen Bildung für zwei Ergebnisse für Kinder in Spanien: Eines dieser Ergebnisse – Besuch einer Einrichtung des tertiären Bildungssektors – tritt für Kinder in Familien mit niedriger Bildung selten auf, während das andere – Klassenwiederholung im Primär- und Sekundärschulsektor – für Kinder aus höher gebildeten Familien selten ist. Die Ergebnisse zeigen, dass die Bildungseinbußen, die mit der elterlichen Trennung in Verbindung gebracht werden – das Sitzenbleiben in der Elementar- und Sekundarschule – für die Kinder von Müttern mit niedriger Bildung größer sind. Für den Besuch des tertiären Bildungssektors wurde keine Heterogenität gefunden.

*Schlagwörter:* elterliche Trennung, diverging destinies, Heterogenität, selten und häufig auftretende Bildungsfolgen

**S. 27-39:***Ansgar Hudde & Carmen Friedrich***Having power, having babies? Fertility patterns among German elite politicians****Viel Macht, viele Kinder? Ein Einblick in die Fertilitätsmuster deutscher Spitzenpolitikerinnen und Spitzenpolitiker****Zusammenfassung:**

Mitglieder der politischen Elite üben erheblichen Einfluss auf das gesellschaftliche Zusammenleben aus. Aus zwei Gründen analysieren wir in diesem Artikel Fertilitätsmuster von deutschen Spitzenpolitikern: Erstens, um mehr über die Lebensumstände einer Gruppe zu erfahren, die wichtige Entscheidungen trifft und eine Vorbildfunktion für die Bevölkerung einnehmen kann, und zweitens, um ein besseres Verständnis über den Zusammenhang zwischen Sozialstatus und Fertilität am oberen Ende der Sozialstatus-Skala zu erhalten, indem wir exemplarisch eine Gruppe mit besonders hohem Sozialstatus analysieren. Wir sammeln biographische Daten von allen Personen, die in Jahr 2006 und/oder 2017 eine politische Elitenposition in Deutschland innehaben (184 Frauen und 353 Männer) und vergleichen die Kinderzahl der Politikerinnen und Politiker mit denen der Gesamtbevölkerung. Zusätzlich analysieren wir die Kinderzahl der Personen in politischen Ämtern nach Geschlecht, Region (Ost/West), Parteizugehörigkeit sowie weiteren Variablen. Die Ergebnisse zeigen, dass männliche Politiker im Durchschnitt relativ viele Kinder haben, 2,0 in West-, und 2,2 in Ostdeutschland. Politikerinnen in Westdeutschland haben im Durchschnitt sehr wenige Kinder (1,3); Politikerinnen in Ostdeutschland haben dagegen vergleichsweise viele Kinder (1,9). Die Ost-West-Unterschiede der durchschnittlichen Kinderzahl lassen sich komplett durch Unterschiede in den Übergangsraten zum ersten Kind erklären. Die vergleichsweise hohe Kinderzahl männlicher Spitzenpolitiker könnte ein Hinweis darauf sein, dass der Zusammenhang zwischen Sozialstatus und Fertilität für Männer im oberen Bereich der Statushierarchie positiv ist. Die großen Ost-West-Unterschiede bei Politikerinnen könnten darauf hindeuten, dass der Zusammenhang zwischen Sozialstatus und Fertilität in Abhängigkeit von Makro-Level Faktoren wie Geschlechternormen und die Vereinbarkeit von Beruf und Familie positiv oder negativ sein könnte.

*Schlagwörter:* Fertilität, Elite, Politikerinnen, Politiker, Kinderzahl, Familie, biographische Daten

**S. 40-57:***Daniel Baron & Ingmar Rapp***Does fixed-term employment delay important partnership events?****Comparing transitions into cohabitation, marriage, parenthood and home ownership among young adults in Germany****Verzögern befristete Beschäftigungsverhältnisse zentrale Partnerschaftereignisse?****Eine vergleichende Untersuchung der Übergänge in Kohabitation, Ehe, Elternschaft und Immobilieneigentum unter jungen Erwachsenen in Deutschland****Zusammenfassung:**

In diesem Beitrag wird untersucht, ob befristete Beschäftigungsverhältnisse die Realisierung zentraler Partnerschaftereignisse beeinflussen. Hierfür untersuchen wir vier Übergänge: Eintritt in die Kohabitation, Eheschließung, Elternschaft und Erwerb von Immobilieneigentum. Die Daten wurden aus einer Zufallsstichprobe mit 1.083 jungen deutschen Erwachsenen auf Basis des AGIPEB-Survey gewonnen. Wir wenden die Kaplan-Meyer-Methode und *piecewise-constant exponential models* an, um Überlebenskurven und Übergangsraten zu schätzen. Frauen und Männer, die in einem befristeten Beschäftigungsverhältnis arbeiten, neigen in ähnlicher Weise wie Personen mit einem unbefristeten Arbeitsvertrag dazu,

die Kohabitation zu beginnen, die Ehe zu schließen und Eltern zu werden. Im Gegensatz dazu verzögert das Arbeiten unter befristeten Verträgen – im Vergleich zum Arbeiten unter unbefristeten Verträgen – jedoch den Übergang zum Erwerb von Wohnungseigentum.

*Schlagwörter:* atypische Beschäftigung, Kohabitation, Familienökonomie, befristetes Beschäftigungsverhältnis, Immobilienerwerb, Stabilisierung der Partnerschaft

## **S. 58-82:**

*Tina Baier*

### **Does sibling and twin similarity in cognitive ability differ by parents' education?**

#### **Variiert die Ähnlichkeit von Geschwistern und Zwillingen in Bezug auf ihre kognitiven Fähigkeiten mit den Bildungshintergrund der Eltern?**

##### **Zusammenfassung:**

In der Stratifizierungsliteratur wird überwiegend zur Frage geforscht, wie sich Unterschiede zwischen Kindern aus unterschiedlichen Familien erklären lassen, wobei Unterschiede, die sich zwischen Kindern aus einer Familie ergeben, unberücksichtigt bleiben. Diese Studie untersucht die Ähnlichkeit von Geschwistern in Bezug auf ihre kognitiven Fähigkeiten und fragt, ob diese in Abhängigkeit des Bildungshintergrunds variiert. Die ökonomische Literatur und Erweiterungen davon vertreten die Ansicht, dass benachteiligte Eltern Unterschiede zwischen Geschwistern verstärken, wohingegen besser gestellte Eltern Unterschiede zwischen Geschwistern eher ausgleichen. Ich dagegen argumentiere, dass Eltern auch gleiche Investitionen in ihre Kinder machen können und Unterschiede zwischen ihren Kindern akzeptieren. Ausgangspunkt hierfür ist die Literatur zu stratifizierten elterlichen Verhaltensweisen und Erziehungspraktiken, die belegt, dass Eltern ihre Kinder unterschiedlich erziehen und unterschiedlich in die Entwicklungsprozesse der Kinder eingebunden sind. Weil besser gestellte Eltern die individuellen Talente ihrer Kinder stärker fördern als benachteiligte Eltern, wird angenommen, dass sich Geschwister aus besser gestellten Familien unähnlicher sind als Geschwister von sozial benachteiligten Eltern. Bisherige Forschungsarbeiten, die die Ähnlichkeit von Geschwistern untersuchen, liefern uneinheitliche Befunde. Um beobachtbare und nicht beobachtbare Unterschiede zwischen Geschwistern berücksichtigen zu können, erweitere ich den herkömmlichen Ansatz, in dem Geschwister verglichen werden, um ein- und zweieiige Zwillinge. Die empirischen Analysen basieren auf den Daten der TwinLife Studie, einer repräsentativen Studie von Zwillingen und ihren Familien. Meine Ergebnisse zeigen, dass sich Geschwister und Zwillinge im jungen Erwachsenenalter aus bildungsnahen Familien unähnlicher sind in Bezug auf ihre kognitiven Kompetenzen im Vergleich zu Geschwistern und Zwillingen aus bildungsfernen Familien. Meine Ergebnisse unterstützen damit die Hypothese bezüglich gleicher Investitionen und deuten darauf hin, dass stratifizierte Erziehungsweisen der Eltern einen langanhaltenden Einfluss auf die Realisierung von kognitiven Fähigkeiten der Kinder haben.

*Schlagwörter:* intergenerationale Transmission, Bildungsungleichheit, kognitive Fähigkeiten, Geschwisterähnlichkeit, Zwillinge, Deutschland

**S. 83-104***Kristin Hajek***Sex and housework: Does perceived fairness of the distribution of housework actually matter?****Sex und Hausarbeit: Wie wichtig ist die wahrgenommene Gerechtigkeit der Hausarbeitsteilung tatsächlich?****Zusammenfassung:**

Jüngste Befunde legen nahe, dass Paare, die ihre Hausarbeitsteilung als gerecht empfinden, häufiger Geschlechtsverkehr haben und zufriedener sind mit ihrem Sexualleben. Allerdings stützt sich die bisherige Forschung auf Vergleiche zwischen Personengruppen und könnte deshalb durch unbeobachtete Störfaktoren verzerrt sein. Durch die Verwendung von Fixed-Effects-Panel-Modellen strebt die vorliegende Studie an, jegliche zeitkonstante, gruppenspezifische Heterogenität zu eliminieren. Unter Verwendung der Daten von 1.315 zusammenlebenden und verheirateten Paare des deutschen Beziehungs- und Familienpanels (pairfam) habe ich untersucht, wie Veränderungen in der Hausarbeitsteilung und der Gerechtigkeitswahrnehmung die sexuelle Zufriedenheit und Koitushäufigkeit beeinflussen. Außerdem unterscheidete ich zwischen traditionell weiblichen und männlichen Haushaltsaufgaben, um die Hypothese zu überprüfen, dass eine geschlechtstypische Hausarbeitsaufteilung sexuelle Aktivität fördert. Es konnte kein Effekt der Hausarbeitsteilung oder der wahrgenommenen Gerechtigkeit dieser Aufteilung auf die sexuelle Zufriedenheit und Koitushäufigkeit festgestellt werden.

*Schlagworte:* Hausarbeitsteilung, fixed effects, pairfam, wahrgenommene Gerechtigkeit, Koitushäufigkeit, sexuelle Zufriedenheit

**S. 105-124:***Thomas Emery, Pearl Dykstra & Maja Djundeva***Chinese parent-child relationships in later life in the context of social inequalities****Die Beziehungen zwischen älteren chinesischen Eltern und ihren Kindern im Kontext sozialer Ungleichheiten****Zusammenfassung:**

In diesem Artikel wird untersucht, wie die Eltern-Kind-Beziehungen vor dem Hintergrund sozialökonomischer Ungleichheiten, die in China evident sind, variieren. China ist gleichermaßen ein zunehmend von Ungleichheiten geprägtes wie ein rasch alterndes Land. Es ist daher von überragender Bedeutung zu verstehen, inwieweit die Beziehungen älterer Chinesen zu ihren Kindern mit sozioökonomischen Ungleichheiten assoziiert sind. Wir widmen uns dieser Frage, indem wir den Effekt sozialökonomischer Indikatoren für Eltern und Kinder auf deren Beziehung in einem multinominalen logistischen Mehrebenenmodell unter Verwendung von Daten der Chinese Family Panel Study für Eltern-Kind-Dyaden untersuchen. Die von uns beobachteten Beziehungen sind jedoch nicht eindimensional, sondern weisen komplexe Muster auf, die stark von einer „stark versus schwach“-Beschreibung der Familienbeziehungen abweichen. Die Ergebnisse stützen die Perspektive der Ablösung von der Familie in den Eltern-Kind-Beziehungen nicht, sondern legen stattdessen nahe, dass vorhandene Bildungs- und finanzielle Ressourcen eine Unterstützung erleichtern, die mit größerer emotionaler Nähe assoziiert ist und die Notwendigkeit solcher Unterstützung negieren, die der Eltern-Kind-Beziehung eine emotionalen Belastung auferlegen.

*Schlagwörter:* intergenerationale Unterstützung, Ungleichheit, latent class analysis