DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 48, ARTICLE 23, PAGES 641–680
PUBLISHED 5 MAY 2023
https://www.demographic-research.org/Volumes/Vol48/23/
DOI: 10.4054/DemRes.2023.48.23

Replication

Adult children's union type and contact with mothers: A replication

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Demographic Research: Volume 48, Article 23
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Adult children's union type and contact with mothers: A replication

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Abstract

BACKGROUND
Several studies show that cohabiting adult children have less frequent contact with their mothers than married adult children. We argue that these findings might be spurious due to confounding.

OBJECTIVE
Our aim is to replicate earlier research using more robust statistical instruments from the family of multi-level models with fixed effects, which are known to offer better control of omitted-variable bias. We also want to show the extent to which union-type effects vary across countries and by parenthood status.

METHODS
We use data from the SHARE survey. Mothers are the primary respondents and report on contact with all their children as well as on their children's union type. We apply mother-level fixed effects (i.e., within-mother comparisons) to see if the frequency of contact depends on the child's union type (distinguishing marriage and unmarried cohabitation).

RESULTS
We find no overall association between the adult child's union status and the frequency of intergenerational contact with the mother. While there are some differences across countries in this effect, these are uncorrelated with the prevalence of unmarried cohabitation, any typology of family systems, or the prevailing type of unmarried cohabitation.

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CONCLUSIONS
We failed to replicate previously reported associations between children's union type and frequency of intergenerational contact. We conclude that the earlier findings are spurious and cannot be interpreted causally.

CONTRIBUTION
Unmarried cohabitations should not be seen as 'incomplete institutions.' Cohabitors are not excluded from family networks and intergenerational exchanges on the basis of their union status.

1. Introduction

1.1 The adult child's union status and contact with parents

The increasing rates of cohabitation raise many questions about the nature of this form of coresidential union regarding – among other things – intergenerational relations. For instance, in comparison to married children, cohabiting children seem to maintain less frequent contact with their parents. Various studies have come to this conclusion using data from a variety of advanced countries. Examples include the Netherlands (Hogerbrugge and Dykstra 2009) and Italy (especially for the average number of personal visits per year; Nazio and Saraceno 2013). Comparative studies also confirm this finding in many additional contexts. Yahirun and Hamplová's (2014) recent study identifies less frequent contact with mothers by cohabitors in Italy, Spain, Greece, Ireland, Poland, Switzerland, and the United States.

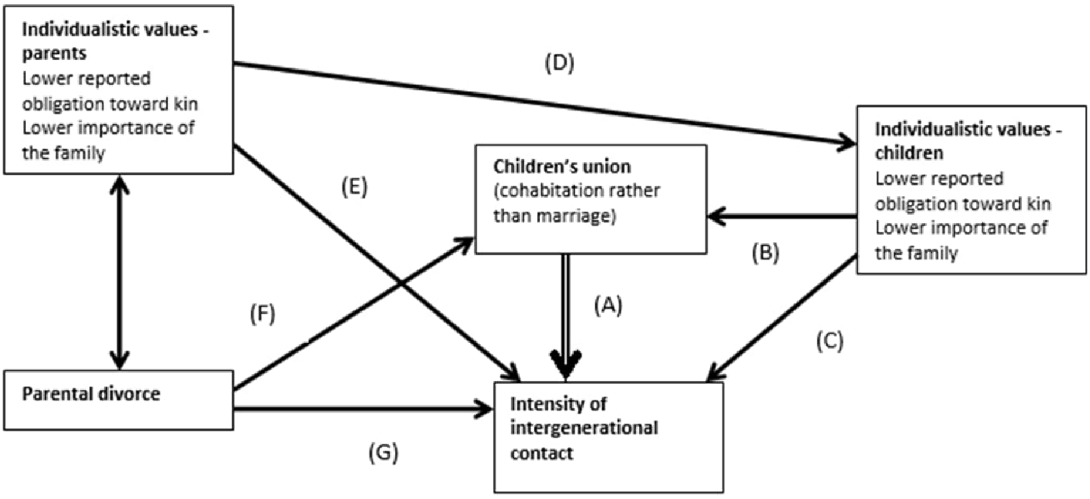
However, less frequent contact by cohabitors is far from universal. In a typically utilized multivariate statistical model with frequency of contact as the dependent variable, the difference between marriage and cohabitation is very weak or nonexistent in many Western and Northern European countries as well as in Czechia (Yahirun and Hamplová 2014: Figure 2). No effect of children's union status is also reported in the United Kingdom (Nazio and Saraceno 2013) and Norway (Daatland 2007). For some contexts the literature offers inconsistent conclusions. For instance, Hogerbrugge and Dykstra (2009) report an effect for the Netherlands, while Yahirun and Hamplová (2014) and Kalmijn et al. (2019) find no effect in the Dutch data. Similar inconsistency applies to US data – for instance, Musick and Bumpass (2012) report no effect, while Yahirun and Hamplová (2014) and Eggebeen (2005) show different levels of intergenerational contact depending on children's union status.

This inconsistency in findings is striking, given the significance of unmarried cohabitations in current debates about family change. Furthermore, it is also of paramount importance, academically as well as practically, to better understand intergenerational contact and exchange vis-à-vis the growing number of the years of 'shared lives' that members of various generations have (Bengtson 2001; Suitor et al. 2011) and the rising reliance on intergenerational support in response to increasingly fragile intra-generational family bonds (Bengtson, Biblarz, and Roberts 2002). These considerations motivate our effort to revisit the issue of children's union status and contact with mothers, and to replicate the most recent comparative study of this phenomenon, which was published in Demographic Research several years ago (Yahirun and Hamplová 2014). Our approach to replication combines – to use terms proposed by Freese and Peterson (2017: Figure 2) – elements of the 'robustness check' and the 'generalizability test;' i.e., we apply a different method to some old and some new data.

1.2 Union type and intergenerational ties – causal and noncausal theories

Why would adult children's union type be related to frequency of contact with parents? Scheme 1 summarizes the various, often contradictory, arguments that sociologists and demographers have invoked to interpret the data and explain why cohabitors (in some countries) are in less frequent contact with parents. The association between union type and intensity of intergenerational contact (arrow A in Scheme 1) could be attributed to the selection of cohabiting individuals or to the causal effect of the union type. However, most existing studies are unable to distinguish between these two arguments.

Scheme 1: Conceptual model linking children's union type to frequency of contact with parents



1.2.1 Self-selection and omitted-variable bias

Past studies typically refer to differences in patterns of self-selection into cohabitation and/or marriage to explain the varying levels of intergenerational contact (Hogerbrugge and Dykstra 2009; Nazio and Saraceno 2013; Yahirun and Hamplová 2014). These arguments are typically based on the idea of omitted-variable bias. This omitted variable then influences both the selection procedure and the outcome variable (e.g., frequency of contact). According to the simplest version of the self-selection argument, cohabitors differ from married individuals in various traits even before entering into a union. These traits then predispose cohabitors to maintain less frequent intergenerational contact. Thus, an empirical association between an adult child's union status and frequency of contact with his/her parents does not reflect a causal effect, but rather represents a spurious association. Moreover, when examining intergenerational contact, the selection might not only be related to the personal traits of individuals but also to the traits of their parents.

Cohabitors seem to self-select on a variety of their own characteristics, including low socioeconomic status (Bumpass and Lu 2000; Clarkberg 1999; Mikolai, Berrington, and Perelli-Harris 2018; Mooyart, Liefbroer, and Billari 2022; Musick and Michelmore 2018; Palumbo et al. 2022; Perelli-Harris et al. 2010), lower levels of commitment (Nock 1995; Brown, Manning, and Wu 2021), and relationship satisfaction (Aarskaug Wiik, Keizer, and Lappegård 2012). Cohabitors are also more likely to be less religious (Stanley, Whitton, and Markman 2004) and to adopt more individualized practices

(Hiekel and Wagner 2021). They are also, on average, more accepting of divorce, have less positive attitudes towards marriage and children, and score lower on various measures of familialistic attitudes (Axinn and Thornton 1992; Clarkberg, Stolzenberg, and Waite 1995; Kreidl and Žilinčíková 2021; Moors and Bernhardt 2009; Surkyn and Lesthaeghe 2004). All of these attributes can influence not only the choice of union type but also the intensity of intergenerational contact. Children's individualistic attitudes in particular seem to be – according to our reading of the literature – the most likely sources of the spuriousness of the observed association between children's union status and intergenerational contact (arrow B and arrow C in Scheme 1). In other words, the attitudes that motivate children to cohabit (rather than marry) can also explain less frequent intergenerational contact.

A more complex selectivity argument turns our attention to parental values, attitudes, and behaviors, which may also affect children's values, preferences, and partnership behavior. These chains of influence start in the top left corner of Scheme 1 and work with the idea that individuals adopt and change their attitudes throughout their life. The adoption of attitudes starts during primary socialization (Bengtson 1975). This means that attitudes tend to be passed from parents to their children, and values and attitudes are likely correlated across generations within the family (this is represented by arrow D in Scheme 1; see also Allendorf et al. 2021). Parental attitudes influence children's attitudes, and thus indirectly the choice between cohabitation and marriage on the one hand and the intensity of intergenerational contact on the other. The attitudes of the parents can also influence the intensity of intergenerational contact directly, as individualistic parental values could mean that parents attribute less importance to frequent intergenerational contact (arrow E in Scheme 1).

Finally, the experience of parental divorce, cohabitation, or step-family arrangements may translate into children's preference for cohabitation. Children of divorced parents, for example, are more likely to cohabit (Amato and Booth 1997; Cherlin, Kiernan, and Chase-Lansdale 1995; Dush, Cohen, and Amato 2003; Härkönen, Brons, and Dronkers 2021), and this association is represented by arrow F in Scheme 1. At the same time, parental divorce has been shown to lead to a disruption of family ties and support patterns between generations (Kalmijn 2007, 2008; King 2003; Trávníčková and Kreidl 2021; Žilinčíková and Kreidl 2018) (arrow G in Scheme 1). Since both the child's cohabitation and intergenerational contact are jointly determined by parental divorce (and other union transitions), this is yet another source of spuriousness.

1.2.2 Causal claims

Some scholars propose causal arguments to explain the differences in intergenerational contact and exchange between cohabitations and marriages. These causal notions tend to stress that cohabitation is, in some crucial ways, organized and perceived differently than marriage. For instance, cohabitation involves lower commitment and more individualized practices of the partners, which are mirrored – among other things – in higher dissolution rates (Brown, Manning, and Wu 2022; Hiekel and Wagner 2020; Liefbroer and Dourleijn 2006). Cohabitation is, some authors argue, a less institutionalized form of coresidential union and entails lower expectations of interaction with the partner's parents (Nock 1995). Institutionalization theory is the core of causal claims in this field. This lower degree of institutionalization consequently also leads to lower frequency of contact with one's own parents, since contact – in particular personal visits – frequently involves both partners. Cohabitors are also less likely to receive financial transfers and/or instrumental support from parents (Artis and Martinez 2016; Eggebeen 2005).

These interaction patterns may reflect unclear relationships with extended family and they may also echo parental disapproval of cohabitation, conscious withdrawal of support, and subsequent estrangement (Nazio and Saraceno 2008). In addition, cohabitations appear to change partners' attitudes toward the family; for instance, approval of union dissolution grows over time in cohabiting couples (Kreidl and Žilinčíková 2021). Cohabitation may, similarly, undermine the perceived overall importance of the family and thus also reduce the frequency of contact with kin.

Earlier formulations of the 'cohabitation as an incomplete institution' argument (Nock 1995) implicitly assumed that unmarried cohabitations played the same role in the family formation process in all contexts. Later investigations have emphasized that the meaning of unmarried unions can differ across societies (Heuveline and Timberlake 2004) and can also evolve over time within countries (Kiernan 2004). This developmental paradigm suggests that cohabitation is most different from marriage when it is uncommon, or – as Heuveline and Timberlake (2004) put it – "marginal" (c.f. Nazio 2008). In Heuveline and Timberlake's analysis, Italy, Poland, and Spain are representative of family systems with marginal cohabitations (Heuveline and Timberlake 2004). In general terms, these family systems are characterized by strong norms against unmarried unions, and high and institutionalized penalties for such behavior. In these systems, the authors argue, "cohabitation will attract only a small minority of couples. (…) the incidence and duration of adulthood cohabitation should be low, and children's exposure to and duration in cohabitation should be even lower" (Heuveline and Timberlake 2004: 1216). This characterization leads us to believe that the other countries in our sample may fall into this category due to the prevailing behaviors, values, and strong normative preferences that make marriage a strong institution (Cherlin 2020). In line with the developmental paradigm, we can expect that in countries where cohabitation is marginal, the differences in intergenerational contact between married and cohabiting children are most pronounced (cf. Nazio and Saraceno 2008).

2. Reasons for and nature of the replication

We decided to replicate Yahirun and Hamplová's (2014) study in order to see if their results hold even when a different statistical tool is applied to the same (and some new) data. We prefer to use a statistical instrument that is less prone to omitted-variable bias: While Yahirun and Hamplová utilized mother–child dyads nested within country contexts and applied random effect models to obtain estimates of the effect of child's union status on frequency of contact, we prefer mother-level fixed effect models that control for the additive effects of all (measured or unmeasured) mother-level variables. Applying this method, we adjust the analysis for the variation in variables at the mother level (such as norms, values, and attitudes that are passed on between generations within the family). We would like to emphasize that our method is just a variant (no matter how robust) of the multivariate model. It does not provide the same kind of evidence on causality that some other research designs – such as experiments and quasi-experiments – offer (Dunning 2012; Freedman 1991; Smith 2003).

We replicate this earlier study using the same data source (the SHARE survey). However, we use a more recent data release that offers a larger sample of countries and respondents. This allows us to enhance the statistical power of fixed effect models which rely on the variation within the observations (i.e., mothers). Whereas Yahirun and Hamplová (2014) analyzed 15 countries with 9,779 mothers and 20,795 adult children, most of our analysis is based on a sample of 21 countries, 17,893 mothers, and 45,228 adult children; we do, however, also run our replication model only on the SHARE countries/survey waves that were employed in the replicated article[3] to demonstrate that sample definition is not the source of differences in results.

We also offer an important theoretical and conceptual extension of Yahirun and Hamplová's (2014) study. We acknowledge the existing heterogeneity of unmarried cohabitations (see e.g., Heuveline and Timberlake 2004; Hiekel, Liefbroer, and Poortman 2014; Kiernan 2001, 2004; Parker 2021) and differentiate cohabitations with and without children (and contrast them with marriages with and without children). We argue that parenthood imparts the same degree of social recognition to unmarried couples as married couples enjoy. Hence, we expect to find a larger difference by union/parenthood status between childless cohabitations and childless marriages.

[3] We do not use US data in the replication due to issues related to the harmonization of the US HRS survey with SHARE.

3. Data and variables

3.1 Data

Our analysis is based on data from the Survey of Health and Retirement in Europe (SHARE). SHARE is an internationally harmonized survey studying populations aged 50+. We employ data for all SHARE countries available in release 7.0.0 (Börsch-Supan 2019); overall, we utilize data for 21 countries. We use the data cross-sectionally to maximize sample size and avoid potential bias due to attrition. For each country, we include all respondents interviewed in the first interview (in that country). We also add all respondents from refreshment samples. No weights are employed.

Data collection – for our specific sample of respondents – spanned the years 2004–2015. Only mothers with non-coresident[4] biological children over 25 years of age are included in our analysis in order to apply the same sample definitions as the study we aim to replicate. Step/adopted/foster children are excluded in order to reduce complexity related to the study of less traditional (and less common) families (Seltzer 2019). Focus on non-coresident biological offspring is common in similar investigations, including the one by Yahirun and Hamplová (2014) that we want to replicate. Emphasis on contact with mothers is also maintained for replication purposes. Mothers (primary respondents of the survey) reported the frequency of contact as well as children's characteristics. The database has a clustered (multi-level) structure with multiple children nested within mothers.

By the nature of our analytical strategy (within-mother fixed-effect models; see below), only mothers with at least two such children contribute to the analysis. If more than two children are available for a given mother, all children with available information are maintained for analysis (the maximum number of children per mother was 12). This restriction leaves us with a different sample from that in the original study by Yahirun and Hamplová (2014). It is likely that the patterns of intergenerational relations are different among families with single children and families with multiple children. For example, intergenerational contact tends to be less frequent if there are more siblings (e.g., Grundy and Shelton 2001). Yet, our samples are similar in terms of union status, parental status, gender, and employment. Overall, our analysis is based on 17,893 mothers and 45,228 children in 21 countries. The average sample size per country is 852 mothers and 2,154 adult children; the minimum is 131 mothers and 325 children (both in Croatia) and the maximum is 1,630 mothers (in Czechia) and 3,808 children (in France). Detailed information about sample sizes by country/wave is presented in Table A-1 in the Appendix.

[4] 'Non-coresident' refers to children living neither in the same household nor in the same building.

3.2 Dependent variable: frequency of contact

Our dependent variable is the frequency of contact between the respondent (mother) and each of her non-coresident children, as reported by mothers. Contact with each non-coresident child was measured using a single question in the CH ('children') module, which asked: "During the past twelve months, how often did you [or your] [husband/wife/partner] have contact with [{child name}], either personally, by phone or mail?" Interviewers were instructed to count any form of contact including email, SMS, or MMS. The response scale was: 1. Daily; 2. Several times a week; 3. About once a week; 4. About every two weeks; 5. About once a month; 6. Less than once a month; 7. Never. The distribution of responses to this question varies to a significant degree across countries (see Table A-2 in the Appendix), reflecting variation in family systems, prevailing patterns of intergenerational exchange, and trends in marital and divorce rates (Alderotti, Tomassini, and Vignoli 2022; Choi, Goldberg, and Denice 2022; Hogendoorn, Kalmijn, and Leopold 2022; Kailaheimo-Lönnqvist et al. 2021; Mönkediek 2020; Reher 1998).

Following a procedure advocated by Yahirun and Hamplová (2014), we transform this ordinal scale into the number of contacts per year. Some responses translate into a specific number straightforwardly (daily = 365 contacts per year, once per week = 52 contacts, once per month = 12 contacts). Responses that refer to an interval are distributed uniformly over that interval using a random number generator (several times per week is more than once a week and less than every day, i.e., 2–6 contacts per week, i.e., 104–312 contacts per year; less than once per month implies 1–11 contacts per year). Because the distribution of responses is rather skewed (60% of children fall into the 'daily' or 'several times per week' categories), the resulting scale is logged (zero contacts per year is replaced by 1 to make this operation possible).

3.3 Explanatory variables

Our key explanatory variable is the child's union type as reported by the SHARE respondent (i.e., the mother). This variable was created using information on the child's marital and partnership status at the time of the interview. The original coding was simplified to differentiate single, cohabiting, and married children. The overall and country-specific distribution of children across the categories of union status is shown in Table 1. In our analytical sample, 64% of all children are married, 18% are single, and 18% are cohabiting. The share of married children varies between 53% and 81% across countries, whereas the percentage of cohabiting children ranges between 6% and 28%. The share of married children is high in the traditional, conservative, and religious

Mediterranean countries (and in Poland). Cohabitation is found more commonly in Northern and Western European countries (e.g., Sweden, Denmark, France, Belgium, and Luxembourg) as well as in some Central and Eastern European countries (e.g., Slovenia and Estonia; see Table 1). The variation in union status in our analytical sample is in line with comparative findings on life-course organization across societies (Brons, Liefbroer, and Ganzeboom 2017; van den Berg and Verbakel 2022).

Table 1: Percentage distribution of children's union status by country, SHARE, 2004–2015. Number of cases (children) N = 45,228

Country	Single	Cohabiting	Married	TOTAL (N)
Austria	23%	17%	61%	2,939
Germany	23%	18%	58%	2,924
Sweden	13%	28%	59%	2,414
Netherlands	22%	17%	61%	3,111
Spain	13%	11%	76%	3,016
Italy	13%	8%	79%	2,184
France	20%	20%	61%	3,808
Denmark	24%	21%	55%	2,628
Greece	14%	7%	79%	1,466
Switzerland	26%	19%	55%	1,792
Belgium	19%	24%	57%	3,757
Israel	15%	6%	79%	1,647
Czechia	16%	19%	65%	3,807
Poland	13%	6%	81%	1,186
Ireland	28%	13%	59%	625
Luxembourg	18%	21%	60%	720
Hungary	16%	15%	69%	1,238
Portugal	15%	12%	73%	839
Slovenia	11%	23%	66%	1,645
Estonia	20%	27%	53%	3,157
Croatia	16%	6%	77%	325
TOTAL	18%	18%	64%	45,228

Other control variables include the child's gender (coded 1 – male, 0 – female), parenthood status[5] (1 – child has some children, 0 – no children), educational attainment (1 – lower secondary or less, 2 – higher/complete secondary, 3 – tertiary), employment status (1 – full-time employment, 2 – part-time employment, 3 – other), age (25–34 years,

[5] Children might be natural, fostered, adopted, or stepchildren. Unfortunately, the data do not contain further information about the relationship between children and children's children.

35–44 years, 45 and older).[6] Descriptive statistics for all explanatory variables are presented in Table 2.

Table 2: Descriptive statistics of explanatory variables (child-level data). SHARE, 2004–2015. Number of cases N = 45,228

Variable	Percentage distribution
Child's gender (1-male)	49%
Child's parenthood status (1-yes)	71%
Child's education	
Lower secondary or less	21%
Higher secondary	46%
Tertiary	33%
Child's employment status	
Full-time employment	74%
Part-time employment	8%
Other	19%
Child's age	
25-34 years	27%
35–44 years	36%
45 + years	37%

A subset of our analysis is based on the idea that cohabitations are heterogeneous within societies. Therefore, comparing marriages and all concurrent cohabitations may be suboptimal vis-à-vis our theoretical concern. Cohabitations that serve as an alternative to being single are much less likely to be embedded in the larger family and kinship networks than cohabitations that are a long-term alternative to marriage (Heuveline and Timberlake 2004); cohabitations initiated as a test of the relationship and/or prelude to marriage will probably lie in-between.

However, differentiating the various types of cohabitations existing within a particular society is complicated without direct measures of the couple's intentions, plans, and anticipations. Since SHARE has no such measurements for children, we cross-classify cohabitations by parenthood status, which may (to some extent) differentiate short-term, transitory unions from more permanent partnerships. The presence of a child, we believe, constitutes a significant factor for the couple and may also alter the perceptions of family and friends. A cross-classification of union status and parenthood status in the sample of children is shown in Table 3. We can see that the share of childless

[6] Yahirun and Hamplová (2014) do not include the child's education level as a control because of complications in the harmonization process between SHARE and HRS. Furthermore, they measure the child's age using a continuous variable (centered at 40). While we believe that the child's education level is an important control variable and that the child's age should allow for a non-linear effect, one part of our replication strictly follows their example and finds very little difference in the substantive results (see Table A-3 below for details).

cohabitations varies between 3% (Poland, Croatia) and 14% (Switzerland), whereas the share of cohabitations with children ranges between 2% (Greece) and 20% (Estonia). Between 5% (Denmark, Estonia) and 16% (Italy) of the sample constitute married couples without children (see Table 3).

Table 3: Percentage distribution of children's union/parenthood status by country, SHARE, 2004–2015. Number of cases (children) N = 45,228

Country	Single, no child	Single with a child	Cohabiting, no child	Cohabiting with a child	Married, no children	Married with a child	TOTAL (N)
Austria	14%	8%	8%	8%	10%	51%	2,939
Germany	15%	8%	11%	8%	11%	48%	2,924
Sweden	8%	5%	10%	18%	6%	53%	2,414
Netherlands	15%	6%	9%	8%	12%	50%	3,111
Spain	10%	4%	7%	4%	15%	60%	3,016
Italy	10%	3%	5%	4%	16%	63%	2,184
France	11%	8%	7%	12%	9%	52%	3,808
Denmark	13%	11%	9%	12%	5%	49%	2,628
Greece	10%	5%	5%	2%	11%	67%	1,466
Switzerland	21%	6%	14%	5%	9%	45%	1,792
Belgium	10%	9%	10%	14%	9%	48%	3,757
Israel	9%	6%	5%	2%	6%	73%	1,647
Czechia	8%	8%	7%	12%	8%	57%	3,807
Poland	8%	5%	3%	3%	11%	70%	1,186
Ireland	23%	5%	8%	5%	10%	50%	625
Luxembourg	12%	6%	13%	8%	11%	50%	720
Hungary	8%	8%	6%	9%	11%	57%	1,238
Portugal	9%	6%	4%	8%	11%	62%	839
Slovenia	6%	5%	7%	16%	10%	56%	1,645
Estonia	9%	11%	7%	20%	5%	48%	3,157
Croatia	9%	7%	3%	3%	10%	67%	325
TOTAL	11%	7%	8%	10%	10%	54%	45,228

We also present three sets of robustness checks. One attempts to mimic the earlier study by Yahirun and Hamplová (2014) as closely as possible in terms of the sample (it limits the analysis to the same sample of SHARE countries/waves) and control variables at the child level (the inclusion criteria and definition of the measures). The second check extends the child's parenthood status variable to also differentiate the age of the child's youngest child. The 'parenthood situation' variable, then, has four categories (no parent, parent with the youngest child between 0 and 5 years, parent with the youngest child between 6 and 14, and parent with the youngest child 15+). This categorization is chosen to reflect the well-documented gradient in grandparental childcare (Hank and Buber 2009; Lakomý and Kreidl 2015). The final robustness check includes mother–child geographical distance in the control variables. Geographical distance is a strong predictor of intergenerational contact (Nazio and Saraceno 2008), even when considering both physical and remote contact (Hank 2007). While some of the effect might be exogenous (i.e., unrelated to the value profiles of children but related to external factors such as educational, employment, and/or housing opportunities), a large part of the effect is expected to be endogenous; i.e., related the values of the children. That is, children and parents may live close to each other because they wish to maintain frequent contact, or alternatively children may move far away to minimize parental control.

4. Results

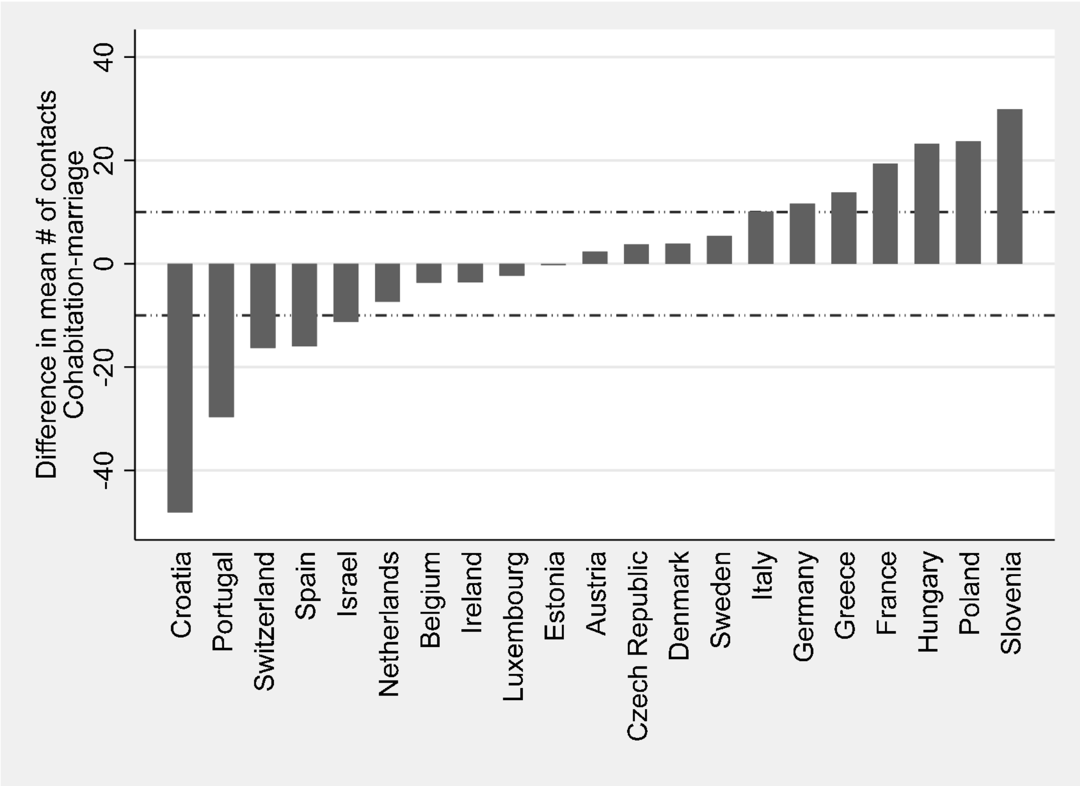
4.1 Comparing all marriages to all cohabitations

First, our descriptive analysis documents the average number of reported contacts by child's union type (Table 4). It shows that there indeed appears to be a difference in the frequency of contact by child's union status: more frequent contact with mothers is reported when the child is married. When we split this descriptive analysis by country we see a significant degree of variation (see Figure 1). In some countries (such as Croatia, Portugal, Switzerland, Spain, and Israel) more frequent contact is reported for married children than cohabiting children. In several other countries, however, cohabiting children exhibit significantly higher frequencies of contact (for instance Germany, Greece, France, Hungary, Poland, and Slovenia; see Figure 1). In most other countries the observed differences are negligible (i.e., the difference is less than 10 contacts per year, on average). Nevertheless, comparisons based on such rough numbers may be severely biased due to omitted variable(s) and a more advanced analysis is necessary to reduce such bias.

Table 4: Average reported number of contacts per year between adult children and their mothers by child's partnership status, SHARE, 2004–2015. Number of cases (children) N = 45,228

Child's partnership status	Mean # of contacts per year	s.d. of # of contacts per year	Number of cases
Single	176	145	8,275
Cohabiting	176	142	8,081
Married	185	145	28,872
Total	182	144	45,228

Figure 1: Difference between mean reported frequency of contact with mothers by adult child's union type across countries, SHARE, 2004–2015. Number of cases (children) N=45,228



Note: A positive number indicates higher frequency of intergenerational contact in cohabiting children, a negative number indicates more frequent contact in married children. The dot-dash lines and +– 10 points on the y-axis represent our subjective definition of substantively significant difference in annual contact.

Therefore, we opt for multivariate statistical models in the next step. We begin multivariate analyses with a simple mother-level fixed-effect model that contains only one child-level covariate, namely union type (see Model 1 in Table 5). Union type is a variable with three categories (single, cohabiting, married); our interpretation focuses only on the contrast between cohabiting and married children. The estimated parameters of Model 1 reveal that there is in fact no association between children's union status and frequency of contact with mothers in this model: the respective estimated parameter showing the contrast between cohabiting and married children is –0.002 (s.e. is 0.021). That is, once we control for the additive effect of all mother-level confounders (such as familialistic values and norms of family cohesion) as well as country-level confounders (such as the prevailing value climate and dominant family system in a given society), union type shows no association with frequency of contact. This statistical model is the first piece of evidence that earlier estimates of the effect of children's union type on intergenerational contact were probably biased due to unmeasured confounders.

Table 5: Estimated parameters of multi-level fixed-effect models of frequency of contact between adult children and their mothers (s.e. in parentheses). SHARE, 2004–2015. Number of cases (children) N = 45,228, number of cases (mothers) N = 17,893

	Model 1	Model 2
Child's union status (married is reference)		
Single	0.034	0.103
	(0.019)	(0.020)
Cohabiting	–0.002	0.047
	(0.021)	(0.021)
Child is a parent		0.197
		(0.018)
Child's educational attainment (lower secondary or less is reference)		
Complete secondary		0.075
		(0.023)
Tertiary		0.023
		(0.027)
Child's labor market position (employed full-time is reference)		
Part-time		0.122
		(0.027)
Not employed		0.021
		(0.019)
Child is male		–0.342
		(0.014)
Child's age (25–34 is reference)		
35–44		–0.237
		(0.023)
45+		–0.451
		(0.031)
Constant	4.630	4.833
	(0.008)	(0.031)
Intra-class correlation	0.461	0.466
AIC	114475	112664
BIC	114501	112760
Log likelihood	–57234.7	–56320.82
Deviance	114469.4	112641.64

Model 2 contains several child-level covariates that have been added to Model 1. These additional variables improve model fit significantly, as we can infer from both the deviance statistic and information criteria reported at the bottom of Table 5.[7] The estimated parameters of Model 2 (shown in Table 5) indicate that cohabiting children have more frequent contact with mothers than otherwise identical married children. This finding further diverges from existing research as well as from institutionalization theory. Therefore, we cannot confirm that unmarried cohabitations are any less recognized and socially institutionalized than marriages. Our data provides no evidence that cohabiting

[7] Model 2 has a lower (i.e., better) deviance than Model 1. Similarly, both information criteria (AIC and BIC) are also lower (i.e., better) in Model 2 than in Model 1; see the bottom of Table 5.

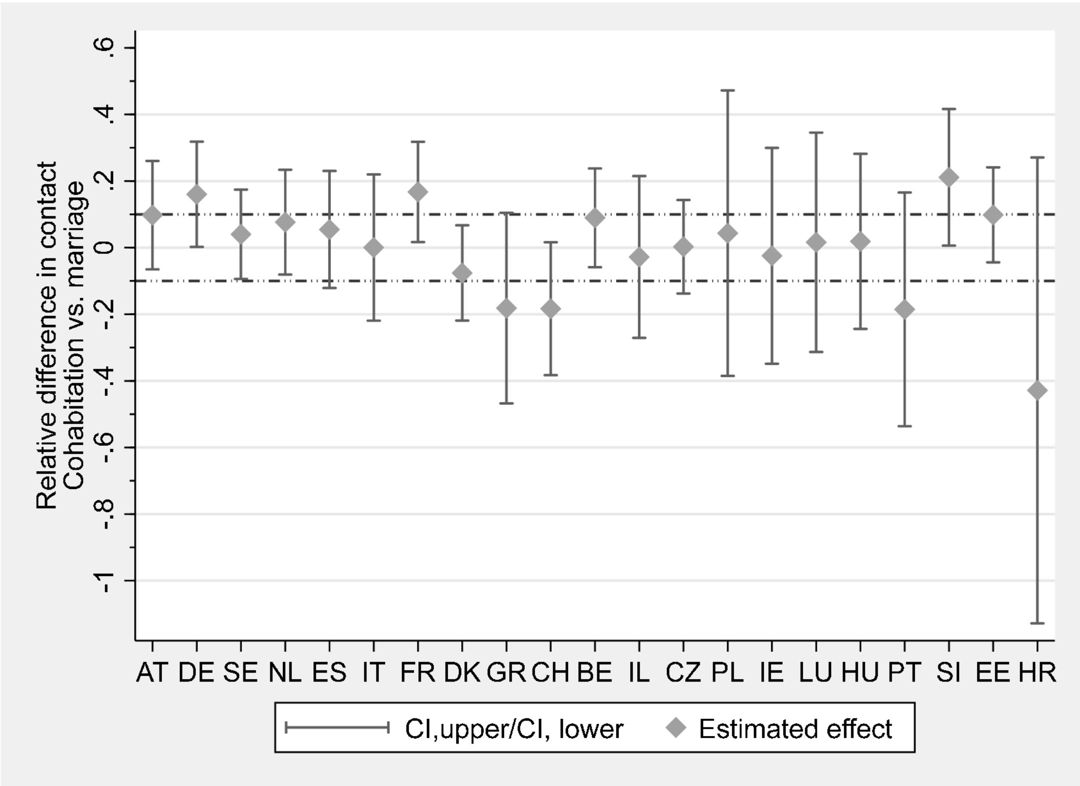
children are excluded from intergenerational interaction within the family, at least not on average, in a large sample of SHARE countries.

It is still possible, however, that the difference between married and cohabiting children varies across countries. To explore this option, we add to Model 2 an interaction between country and child's cohabitation (this addition creates Model 3). When we compare Model 3 and Model 2 using the Deviance statistic, we see that Model 2 should be preferred (the deviance statistic differs by 25.02, with 20 degrees of freedom). Both AIC and BIC also favor the simpler Model 2. To summarize, we find little indication that there is any difference in the effect of cohabitation (in contrast to marriage) on frequency of contact across countries.

To provide further evidence of cross-national variation in the effect of union type on frequency of contact, we also estimate the equivalent of Model 2 separately for each country and display the contrast between cohabiting and married children graphically in Figure 2. To aid in the interpretation of Figure 2, we decided to consider a 10% difference (positive or negative) in the average number of contacts as substantively significant. A first inspection of Figure 2 indicates that there are three countries where mothers report more frequent contact with cohabiting children than married children: Germany, France, and Slovenia. On the other hand, there are four countries where more frequent contact is reported with married children: Greece, Switzerland, Portugal, and Croatia. There is no apparent difference in the frequency of contact in the remaining 14 countries (Austria, Sweden, Netherlands, Spain, Italy, Denmark, Belgium, Israel, Czechia, Poland, Ireland, Luxemburg, Hungary, and Estonia).

We observe little systematic variation across countries. A positive cohabitation effect is found across Europe; a negative cohabitation effect is identified in southern, central, and northern European countries alike. No effect is found in a diverse set of countries in the south, west, center, and north of the continent (plus Israel). Neither group overlaps with commonly utilized typologies of family systems (Hajnal 1965; Reher 1998), the prevailing type of unmarried cohabitation (Kiernan 2001; Heuveline and Timberlake 2003), or the prevalence of unmarried cohabitation or out-of-wedlock fertility (Kiernan 2004). The notion of unmarried cohabitation as an incomplete institution is not supported by the data in Figure 2.

Figure 2: Estimated contrasts (and 95% confidence intervals) in frequency of contact with mothers between cohabiting and married children by country. Estimates from mother-level fixed-effect multilevel models. SHARE, 2004–2015. Number of cases (children) N = 45,228, number of cases (mothers) N = 17,893



Note: A positive number indicates higher frequency of intergenerational contact in cohabiting children, a negative number indicates more frequent contact in married children. The dot-dash lines and +– 10 points on the y-axis represent our subjective definition of substantively significant difference in annual contact.

4.2 All marriages vs. all cohabitations – robustness checks

Our replications (Models 1 and 2) offer results markedly different from those of Yahirun and Hamplová (2014). In order to rule out the possibility that these differences stem from variation in the samples and other analytical choices, we re-estimate Model 1 and Model 2, mimicking their models as closely as possible. This involves working with the same sample of SHARE countries/waves that Yahirun and Hamplová (2014) utilized, leaving out all countries (Luxemburg, Hungary, Portugal, Slovenia, Estonia, and Croatia) that joined the SHARE project after wave 2. This decision also omits all respondents from refreshment samples. Furthermore, similarly to Yahirun and Hamplová (2014), we also omit child's education level from the right-hand side of the regression equation. Finally, we measure child's age as a continuous variable (centered at 40 years). The estimated parameters of these models (Model 1A and Model 2A) are presented in Table A-3 in the Appendix. Overall, the model parameters are very similar to those shown in Table 5. If anything, we can conclude that the effect of cohabitation is closer to 0 in Model 2A than in Model 2, again confuting the 'cohabitation as an incomplete institution' argument.

As we can see in Table A-4 in the Appendix, controlling for mother–child geographical distance does not alter the association between the child's union status and contact with the mother. Model 2B shows an association of the same magnitude as we observed in Model 2 (0.056 in Model 2B vs. 0.047 in Model 2; see Table 5 and Table A-4, respectively). Note that this association is positive (rather than negative, as was inferred from the theory), indicating that cohabiting children are in more frequent contact with mothers than married children, which again goes against the 'cohabitation as an incomplete institution' argument.

Finally, we replace the simple binary parenthood indicator with a measure of parenthood situation that has four categories based on the age of the child's youngest child. Models with this variable are shown in Table A-5 in the Appendix. While intergenerational contact is strongly related to the age of the youngest child (being most frequent when the child is under 6 years old), this additional control variable does not modify the effects of the child's union status at all. Whereas the estimated effect of child's cohabitation was 0.047 in Model 2 (Table 5), it is 0.049 in Model 3A (Table A-5). Even if we add geographical distance to Model 3A, the results do not change significantly (see Model 3B in Table A-5). We are led to conclude that even these alternative model specifications do not provide any evidence that intergenerational contact with mothers is less frequent among cohabiting adult children than among married adult children.

We can also utilize Model 3B to explore possible cross-national variation in the size of the cohabitation effect. In order to do so we employ the same procedure as above in Section 4.1; that is, we estimate the equivalent of Model 3B separately for each country, save the estimated cohabitation effects from these models, and display them graphically. This procedure produces Figure A-1, which is shown in the Appendix. Again, we see little difference between the results in Figure 2 and in Figure A-1, confirming our earlier conclusion that there is little systematic, interpretable variation across countries.

4.3 Comparing cohabitations and marriages with and without children

As we noted previously, there is growing awareness that not all unmarried cohabitations are the same. Unmarried unions differ according to the aspirations, plans, and expectations of the partners as well as by the socioeconomic and other circumstances that lead people to choose unmarried partnership over singlehood and/or marriage (Hiekel, Liefbroer, and Poortman 2014). Therefore, this subset of analysis works with a modified explanatory variable based on both partnership and parenthood status. This variable has six categories as presented in Table 6.

Table 6: Average reported number of contacts per year between adult children and their mothers by child's partnership and parenthood status, SHARE, 2004–2015. Number of cases (children) N = 45,228

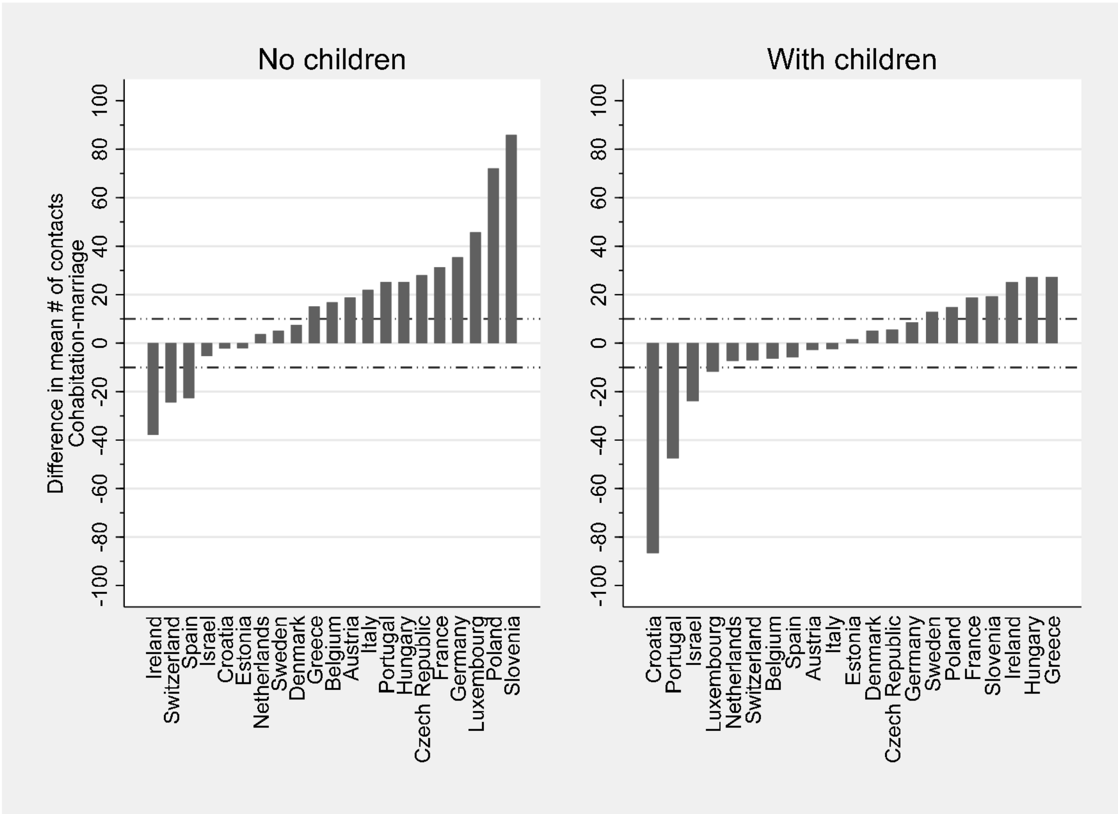
Child's partnership and parenthood status	Mean # of contacts per year	s.d. of # of contacts per year	Number of cases
Single without children	173	144	5,084
Single with children	182	147	3,191
Cohabiting without children	173	141	3,589
Cohabiting with children	178	142	4,492
Married without children	171	145	4,354
Married with children	188	144	24,518
Total	182	144	45,228

When we break cohabitation and marriages down by parenthood status, we have 4 classes of unions and potentially 6 comparisons that we may want to examine. There are 2 comparisons that are, we believe, of most theoretical significance:

a) Between childless cohabitations and childless marriages.
b) Between cohabitations with children and marriages with children.

The mean annual number of contacts between adult children and mothers across the categories defined by the children's union and parenthood status is presented in Table 6. We see that, on average, there is no difference between the categories of childless adult children: cohabiting and married adult children report, on average, 171 and 173 contacts per year, respectively. Childless singles report 173 contacts per year (see Table 6). When we turn to adult children with children, we see larger differences. Cohabiting children with children report 178 contacts, single children with children 182 contacts, and married children with children 188 contacts per year, on average.

Figure 3: Difference between mean reported frequency of contact with mothers by adult child's union type and parenthood status across countries, SHARE, 2004–2015. Number of cases (children) N = 45,228



Note: A positive number indicates higher frequency of intergenerational contact in cohabiting children, a negative number indicates more frequent contact in married children. The dot-dash lines and +– 10 points on the y-axis represent our subjective definition of substantively significant difference in annual contact.

If we compute these averages by country (Figure 3), we see much stronger effects and a much larger variation. Especially when we compare contact with cohabiting and married childless children, the variation is enormous. On the one hand, there are a few countries where married children report more frequent contact (Ireland, Switzerland, and Spain; see the left panel of Figure 3). On the other hand, there are many more countries where cohabiting childless children report more frequent contact, on average. At the very extreme lie Poland and Slovenia, with 72 and 86 more contacts per year, respectively, among childless cohabiting children than among childless married children (see the left panel of Figure 3).

Variation in the mean number of contacts is much lower when we compare cohabiting and married children with children. Yet, there are some notable extreme values in the right panel of Figure 3. Especially, Croatia, Portugal, and Israel appear to be outliers with 87, 48, and 24 fewer contacts per year, respectively, among cohabiting children with children than among married children with children. There are ten countries where we see no significant difference: Austria, Germany, Netherlands, Spain, Italy, Denmark, Switzerland, Belgium, Czechia, and Estonia. More frequent average contact with married children with children is found in Sweden, France, Greece, Poland, Ireland, Hungary, and Slovenia.

Table 7: Estimated parameters of multi-level fixed-effect models of frequency of contact between adult children and their mothers (s.e. in parentheses). SHARE, 2004–2015. Number of cases (children) N = 45,228, number of cases (mothers) N = 17,893

	Model 4	Model 5
Child's union status (married with children is reference)		
Single without children	–0.106	–0.098
	(0.024)	(0.024)
Single with children	0.140	0.107
	(0.028)	(0.027)
Cohabiting without children	–0.151	–0.142
	(0.029)	(0.029)
Cohabiting with children	0.053	0.040
	(0.025)	(0.025)
Married without children	–0.208	–0.202
	(0.026)	(0.026)
Child's educational attainment (lower secondary or less is reference)		
Complete secondary		0.075
		(0.023)
Tertiary		0.023
		(0.027)
Child's labor market position (employed full-time is reference)		
Part-time		0.122
		(0.027)
Not employed		0.021
		(0.019)
Child is male		–0.342
		(0.014)
Child's age (25–34 is reference)		
35–44		–0.236
		(0.023)
45+		–0.451
		(0.031)
Constant	4.665	5.031
	(0.009)	(0.030)
Intra-class correlation	0.465	0.466
AIC	114262	112667
BIC	114304	112780
Log likelihood	–57120.02	–56320.55
Deviance	114240.04	112641.1

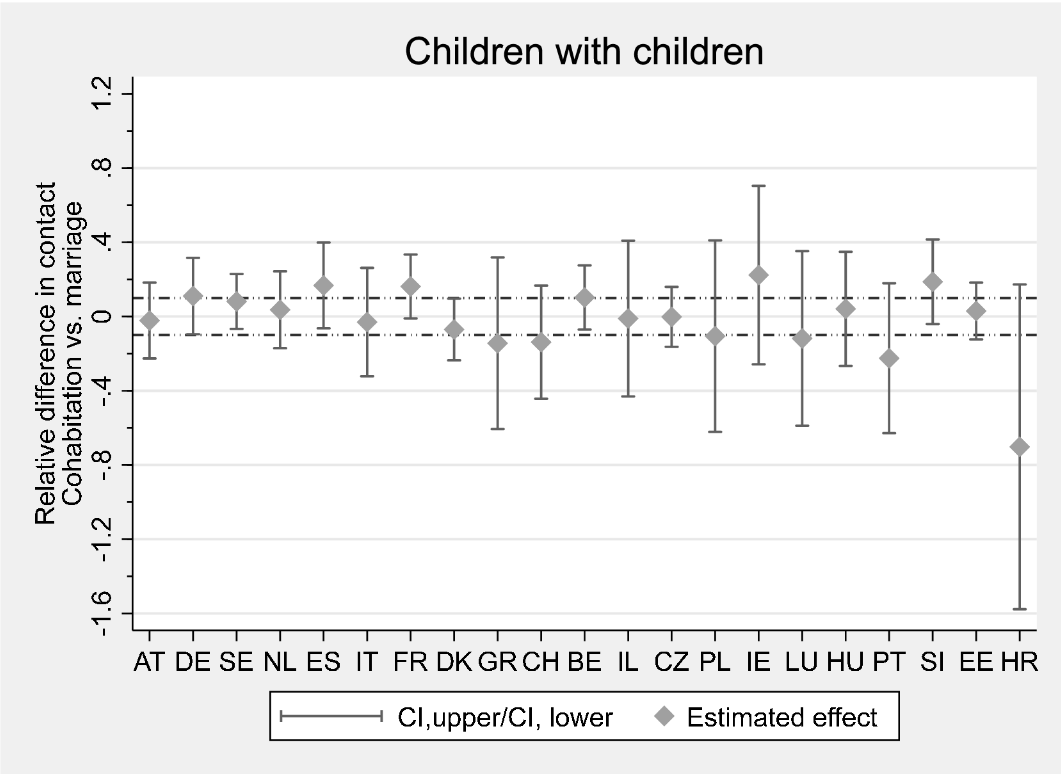
We will now proceed to present the results of the fixed-effect models of frequency of contact. The estimated parameters of these models are presented in Table 7. Model 4 contains only the union/parenthood status explanatory variable, and Model 5 contains additional child-level controls. Both models lead to the same substantive conclusion. We see no difference in the frequency of intergenerational contact between cohabiting children with children and married children with children. The estimated cohabitation effect is 0.040 in Model 5 (s.e. = 0.025; see Table 7). We can also use Model 5 to assess the contrast between childless cohabitations and childless marriages. In order to do so, we must reparametrize the model and set a different reference category in the child union/parenthood variable. If we do so (the full set of estimates is not presented due to space constraints) we obtain an effect of 0.060 (s.e. = 0.035). Both contrasts appear substantively insignificant as they suggest 4.0% and 6.0% increase in contacts per year, on average. Interestingly, both contrasts are positive, i.e., in the direction of more contacts between cohabiting adult children and mothers than between married adult children and mothers. Clearly, even Models 4 and 5 go against the conceptual notion of 'cohabitation as an incomplete institution,' which suggests that cohabitors are less integrated into family networks.

However, the average effect of union type on frequency of contact may obscure important variations between countries. We therefore want to see if there are any significant differences in the size of this effect across contexts. The crucial tests involve adding appropriate interactions to create Model 6, which takes the contrast between childless cohabiting and childless married children and interacts it with country. If we compare Models 5 and 6 using the Deviance statistic, we see that Model 5 is clearly preferred (Deviance statistic = 30.62, d.f. = 20). Similarly, when we create Model 7 (in which the contrast between cohabiting and married children with children is interacted with country), we also see that this interaction does not improve model fit (Deviance statistic = 12.78, d.f. = 20). Overall, Models 6 and 7 provide little evidence that the effects of union type differ across countries.

It is possible, however, that some countries deviate significantly from the overall tendency in the data and that these divergent cases will not be captured by the set of 20 global interaction terms in Model 6 or Model 7. Countries with marginal cohabitation (Heuveline and Timberlake 2004) are obvious candidates for such divergence and we can expect that in these countries intergenerational contact with cohabiting adult children will be less frequent than with married children.

We estimate the equivalent of Model 5 in each country's sample to visualize the contrasts between cohabitations and marriages graphically. Figure 4 focuses on children who themselves have children, whereas Figure 5 deals with childless children. In each graph the average gap in the frequency of contact is displayed for each country. Positive numbers imply more frequent contact of mothers with cohabiting adult children, and negative numbers indicate more frequent contact with married children. As before, we consider a 10% difference (positive or negative) in the average number of contacts as substantively significant. Figures 4 and 5 indicate that there are several countries where the estimated effect of union type exceeds this limit, even though the common criteria of statistical significance are not met in some of these cases.

Figure 4: Estimated contrasts (and 95% confidence intervals) in frequency of contact with mothers between cohabiting and married children (who themselves have children). Estimates from mother-level fixed-effect multilevel models. SHARE, 2004–2015



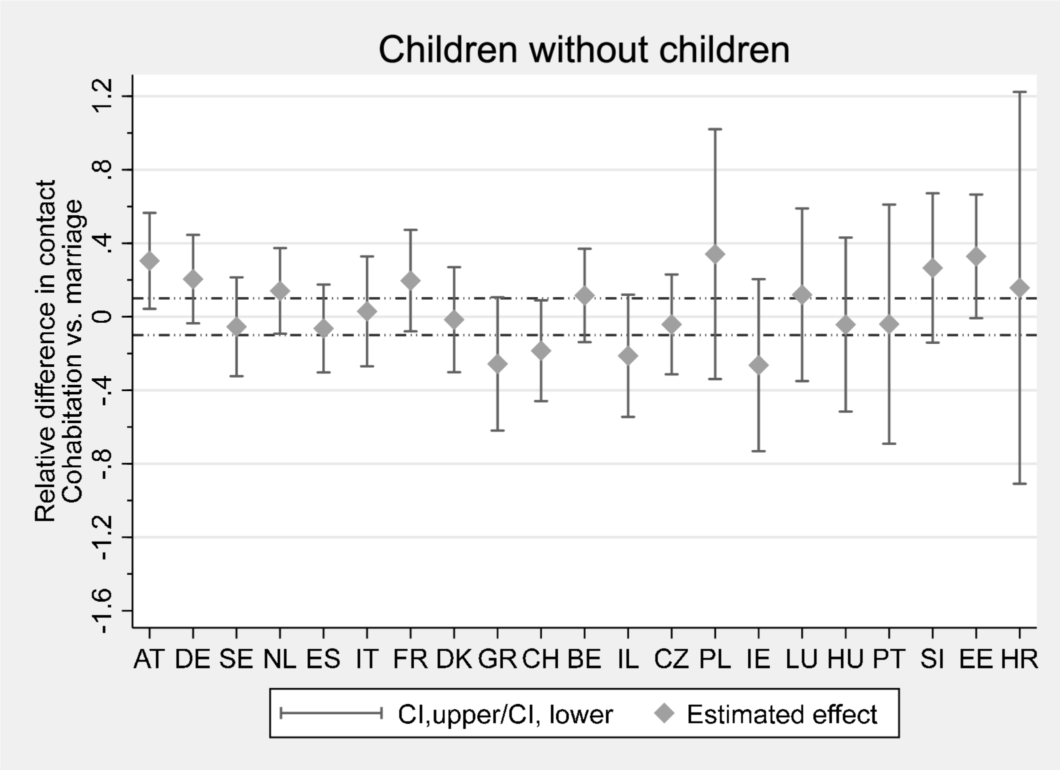
Note: A positive number indicates higher frequency of intergenerational contact in cohabiting children, a negative number indicates more frequent contact in married children. The dot-dash lines and +– 10 points on the y-axis represent our subjective definition of substantively significant difference in annual contact.

Figure 4 portrays the cohabitation–marriage contrast among parents (i.e., adult children with children). We can see that there are six countries in this group where intergenerational contact occurs more frequently between mothers and their cohabiting adult children. This is a rather diverse category, which includes Western European countries (Belgium, France, Germany, and Ireland), one Central/Eastern European country (Slovenia), and one Southern European country (Spain). On the other hand, we find six countries with significantly more frequent contact with married children (Greece, Switzerland, Poland, Luxemburg, Portugal, and Croatia).

Furthermore, focusing on adult childless children, we observe more frequent contact with cohabiting children in ten countries (see Figure 5); this group consists of a mix of countries from the west, center, east, and south of the European continent (Austria, Germany, Netherlands, France, Belgium, Poland, Luxemburg, Slovenia, Estonia, and

Croatia). Mothers report more frequent contact with married children in four countries (Greece, Switzerland, Israel, and Ireland).

Figure 5: Estimated contrasts (and 95% confidence intervals) in frequency of contact with mothers between cohabiting and married childless children. Estimates from mother-level fixed-effect multilevel models. SHARE, 2004–2015



Note: A positive number indicates higher frequency of intergenerational contact in cohabiting children, a negative number indicates more frequent contact in married children. The dot-dash lines and +– 10 points on the y-axis represent our subjective definition of substantively significant difference in annual contact.

5. Conclusions

This paper replicates an earlier study that explored the effect of adult children's union status on frequency of contact with mothers (Yahirun and Hamplová 2014) and reported significantly less frequent contact between cohabiting children and mothers in several countries. Such findings often lead to the conclusion that the marginal status of unmarried cohabitations combined with a strong cultural emphasis on the family result in this intergenerational interaction pattern. Are adult cohabiting children really excluded from intergenerational contact with mothers?

We hypothesized that the reported differences between married and cohabiting children were likely to be spurious, resulting from unmeasured country- and mother-level variables such as strength of familialistic attitudes and values, or religiosity. Some of these confounders are difficult to measure in cross-sectional or retrospective surveys. Yet, when omitted, they may introduce bias into the estimated parameters of multivariate statistical models.

We overcame this drawback of the earlier research by applying a different statistical tool to the same data (from the SHARE survey). While previous investigations utilized all mother–child dyads available in the data set, we constrained our sample and based our analyses on within-mother fixed-effect models. That is, our models explored the fact that many mothers have multiple children who differ in their union status. This statistical technique is more robust than random-effect models and controls for all mother-level (as well as country-level) confounders.

Our findings differed markedly from those Yahirun and Hamplová (2014) reported. We were not able to replicate their findings. Overall, we found little effect of cohabitation (compared to marriage) on the frequency of intergenerational contact. This suggests that the earlier results were probably biased due to confounders. There is a significant set of potential omitted variables that we inferred from theory (see Scheme 1). Our analysis does not permit us to determine which ones produce the strongest confounding effects.

Furthermore, we identified little systematic variation in the cohabitation effect across contexts. Depending on the precise model specifications and definitions of key explanatory variables, we found a small (and varying) subset of countries where contact between mothers and their cohabiting children was less frequent. This set included Greece, Switzerland, Portugal, and Croatia (Figure 2); Greece, Switzerland, Poland, Luxemburg, Portugal, and Croatia (Figure 4); and Switzerland, Ireland, Portugal, and Croatia (Figure 5). There is some overlap between these three groups. Most notably, Greece appears in all three groups, while Switzerland, Portugal, and Croatia appear twice on this list. It may be tempting to conclude that these are countries where cohabitation is relatively uncommon and that consequently this grouping confirms the expectation derived from institutionalization theory (Nock 1995) and the typology of cohabitation across countries (Heuveline and Timberlake 2004). However, we need to point out that there are other countries with strong familialism where cohabitors do not appear to be systematically excluded from intergenerational interaction – Spain, for instance. Some other traditional and religious countries (Ireland, Poland) appear in this group only once (when comparing marriages and cohabitations without children). We conclude that, overall, there is very limited and inconsistent evidence in favor the idea of 'cohabitation as an incomplete institution.'

We would like to emphasize that our conclusions are very robust vis-à-vis several alternative specifications of the sample (in terms of the included countries/waves/ refreshment samples) and/or of the model itself (we varied the set and definitions of the control variables to a significant degree). All of these alternative modifications had little or no effect on the substantive conclusions. These robustness checks significantly increased our trust in the results.

One finding in our replication is rather surprising and diverges completely from previous research. We observed that in several countries cohabiting children had more frequent contact with mothers than married children. This pattern applied to childless children as well as (to a lesser degree) to children with children. This result is very hard to explain, we believe, on the basis of existing theories of intergenerational exchange. This result persists even when we control for the age of the child's youngest child (along with other status and life-source variables). Therefore, this effect is unlikely to reflect an over-representation of a specific category of cohabiting couples (e.g., couples in a particular life-course stage). If it is not an artifact of the sample composition, researchers need to develop a novel theory to account for this unexpected pattern of intergenerational contact.

6. Acknowledgements

Martin Kreidl's work on this paper received financial support from the Czech Science Foundation (project num. 23-07378S). Zuzana Žilinčíková's work was supported by the German Research Foundation (DFG), grant nos. LE 3253/4-1 and YA 778/1-1.

This paper uses data from SHARE Waves 1, 2, 3, 4, 5, and 6 (DOIs: 10.6103/SHARE.w1.800, 10.6103/SHARE.w2.800, 10.6103/SHARE.w3.800, 10.6103/SHARE.w4.800, 10.6103/SHARE.w5.800, 10.6103/SHARE.w6.800) see Börsch-Supan et al. (2013) for methodological details. The SHARE data collection is funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°823782, SHARE-COVID19: GA N°101015924) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, and VS 2020/0313. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815,

R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C, RAG052527A), and from various national funding sources is gratefully acknowledged (see www.share-project.org).

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Appendix

Table A-1: Analytical sample sizes (mothers/children) by country and wave of data collection; Survey of Health and Retirement in Europe

	Wave 1	**Wave 2**	**Wave 4**	**Wave 5**	**Wave 6**	
Country	**2004–06**	**2006–07**	**2010–11**	**2013**	**2015**	**TOTAL**
Austria	259/641		860/2,298			1,119/2,939
Germany	415/1,017	130/316		639/1,591		1,184/2,924
Sweden	387/892	78/189		511/1,333		976/2,414
Netherlands	562/1,483	140/347	126/337	357/944		1,185/3,111
Spain	388/983	49/126	295/858	403/1,049		1,135/3,016
Italy	341/845	108/255	140/364	172/427	126/293	887/2,184
France	529/1,373	144/352	708/2,002		33/81	1,414/3,808
Denmark	337/855	258/650	34/78	388/1,000	20/45	1,037/2,628
Greece	358/842	73/174			185/450	616/1,466
Switzerland	146/375	140/357	410/1,060			696/1,792
Belgium	581/1,545		471/1,255	194/538	151/419	1,397/3,757
Israel	482/1,307	62/139		76/201		620/1,647
Czechia		514/1,179	811/1,898	305/730		1,630/3,807
Poland		432/1,045			60/141	492/1,186
Ireland		211/625				211/625
Luxembourg				245/607	48/113	293/720
Hungary			527/1,238			527/1,238
Portugal			314/839			314/839
Slovenia			395/900	124/294	189/451	708/1,645
Estonia			1,220/2,922		101/235	1,321/3,157
Croatia					131/325	131/325
TOTAL	**4,785/ 12,158**	**2,339/ 5,754**	**6,311/ 16,049**	**3,414/ 8,714**	**1,044/ 2,553**	**17,893/ 45,228**

Note: For details of data collection dates and refreshment samples in each country, consult SHARE Release Guide 1.0.0 of Wave 8 (SHARE 2021: 8) and the SHARE Wave 5 volume on Innovations & Methodology (Malter and Börsch-Supan 2015: 80).

Table A-2: Percentage distribution of frequency of contact between adult children and their mothers, SHARE, 2004–2015. Number of cases (mother/child dyad) N = 45,228

	Frequency of contact							
Country	Daily	Several times a week	About once a week	About every two weeks	About once a month	Less than once a month	Never	TOTAL (N)
Austria	18%	35%	23%	10%	7%	4%	2%	2,939
Germany	17%	34%	25%	10%	7%	5%	2%	2,924
Sweden	18%	40%	27%	7%	4%	3%	1%	2,414
Netherlands	20%	40%	22%	8%	4%	3%	2%	3,111
Spain	47%	29%	13%	4%	3%	3%	1%	3,016
Italy	50%	28%	13%	4%	2%	3%	1%	2,184
France	19%	31%	26%	9%	7%	6%	3%	3,808
Denmark	17%	39%	25%	10%	5%	2%	1%	2,628
Greece	46%	30%	13%	4%	3%	2%	1%	1,466
Switzerland	12%	31%	30%	13%	8%	4%	1%	1,792
Belgium	23%	35%	22%	8%	4%	4%	3%	3,757
Israel	56%	28%	10%	3%	2%	1%	0%	1,647
Czechia	23%	33%	21%	9%	8%	5%	2%	3,807
Poland	24%	26%	23%	9%	10%	8%	1%	1,186
Ireland	38%	31%	19%	5%	3%	3%	1%	625
Luxembourg	30%	34%	20%	5%	5%	4%	3%	720
Hungary	39%	29%	15%	5%	5%	5%	1%	1,238
Portugal	45%	25%	14%	6%	4%	5%	1%	839
Slovenia	36%	34%	16%	5%	4%	4%	1%	1,645
Estonia	22%	32%	23%	9%	8%	5%	1%	3,157
Croatia	43%	22%	15%	6%	6%	5%	2%	325
TOTAL	27%	33%	21%	8%	5%	4%	2%	45,228

Note: Original scale, before transformation. Only dyads involving a mother with at least two biological, non-coresident children are included.

Table A-3: Estimated parameters of multi-level fixed-effect models of frequency of contact between adult children and their mothers (s.e. in parentheses). SHARE, 2004–2006. Number of cases (children) N = 16,466, number of cases (mothers) N = 6,580

	Model 1A	Model 2A
Child's union status (married is reference)		
Single	0.058	0.109
	(0.032)	(0.033)
Cohabiting	–0.044	–0.011
	(0.035)	(0.036)
Child is a parent		0.153
		(0.030)
Child's labor market position (employed full-time is reference)		
Part-time		0.141
		(0.042)
Not employed		0.055
		(0.031)
Child is male		–0.357
		(0.023)
Child's age (centered at 40)		–0.030
		(0.003)
Constant	4.623	4.659
	(0.012)	(0.032)
Intra-class correlation	0.471	0.483
AIC	40697	39896
BIC	40720	39957
Log likelihood	–20345.37	–19939.76
Deviance	40690.74	39879.52

Note: Models 1A and 2A are equivalent to Models 1 and 2 in Table 5 except that in an attempt to mimic Yahirun and Hamplová's (2014) analytical choices as closely as possible they (a) use the same sample of countries/waves, (b) define age as a continuous variable (centered at 40), and (c) exclude education from the set of control variables.

Table A-4: Estimated parameters of a multi-level fixed-effect model of frequency of contact between adult children and their mothers (s.e. in parentheses). SHARE, 2004–2006. Number of cases (children) N = 45,228, number of cases (mothers) N = 17,893

	Model 2B
Child's union status (married is reference)	
Single	0.084
	(0.019)
Cohabiting	0.056
	(0.020)
Child is a parent	0.126
	(0.017)
Child's educational attainment (lower secondary or less is reference)	
Complete secondary	0.098
	(0.022)
Tertiary	0.124
	(0.025)
Child's labor market position (employed full-time is reference)	
Part-time	0.112
	(0.026)
Not employed	0.042
	(0.018)
Child is male	–0.342
	(0.013)
Child's age (25–34 is reference)	
35–44	–0.215
	(0.022)
45+	–0.432
	(0.029)
Mother-child distance (less than 1 km is reference)	
1km–25km	–0.563
	(0.021)
25+km	–1.247
	(0.022)
Constant	5.548
	(0.035)
Intra-class correlation	0.472
AIC	107140
BIC	107253
Log likelihood	–53556.97
Deviance	107113.94

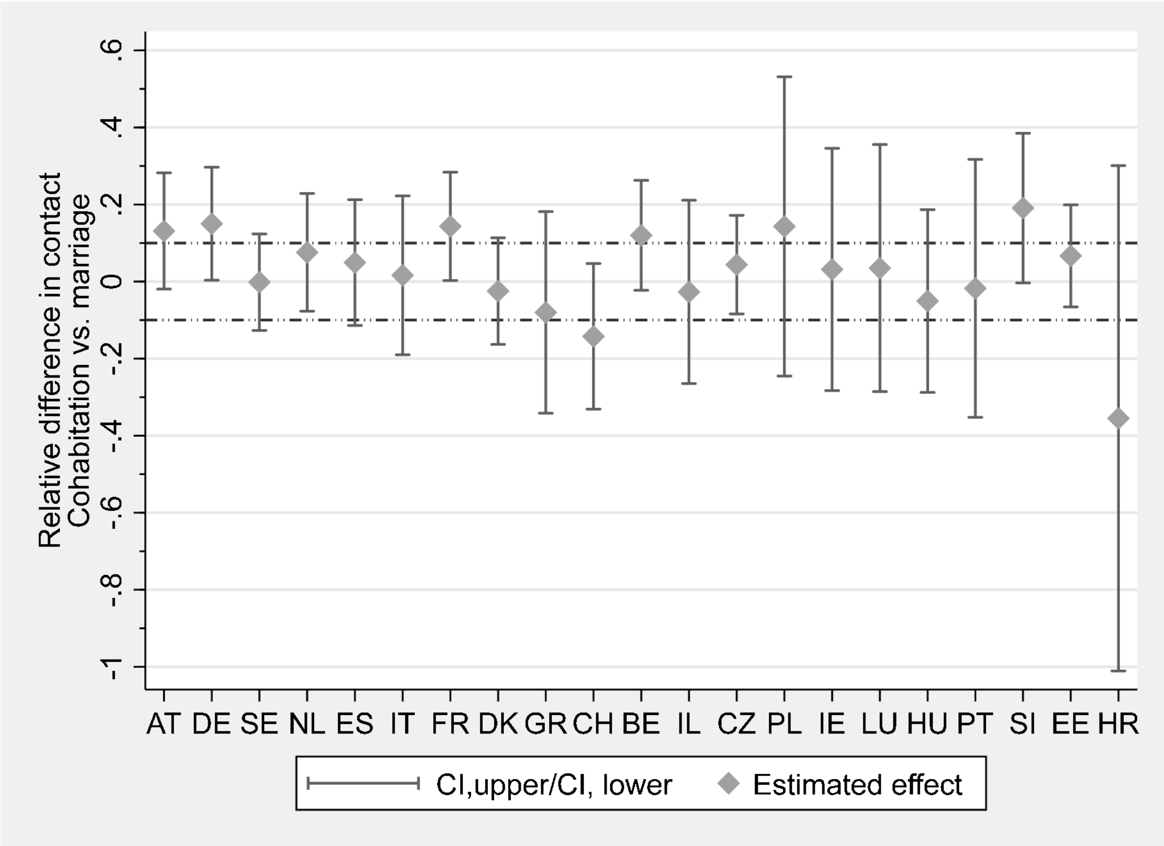
Note: Model 2B is equivalent to Model 2 in Table 5 except that it employs one additional control variable – geographic distance between the mother and the child.

Table A-5: Estimated parameters of a multi-level fixed-effect model of frequency of contact between adult children and their mothers (s.e. in parentheses). SHARE, 2004–2006. Number of cases (children) N = 45,228, number of cases (mothers) N = 17,892

	Model 3A	Model 3B
Child's union status (married is reference)		
Single	0.116	0.098
	(0.020)	(0.019)
Cohabiting	0.049	0.058
	(0.021)	(0.020)
Parenthood situation (no child is reference)		
Youngest child <6 years	0.278	0.219
	(0.022)	(0.021)
Youngest child 6–14 years	0.184	0.102
	(0.022)	(0.021)
Youngest child 15+ years	0.094	0.016
	(0.024)	(0.023)
Child's educational attainment (lower secondary or less is reference)		
Complete secondary	0.073	0.094
	(0.023)	(0.022)
Tertiary	0.015	0.115
	(0.027)	(0.025)
Child's labor market position (employed full-time is reference)		
Part-time	0.118	0.108
	(0.027)	(0.026)
Not employed	0.012	0.032
	(0.019)	(0.018)
Child is male	–0.351	–0.352
	(0.014)	(0.013)
Child's age (25–34 is reference)		
35–44	–0.220	–0.197
	(0.023)	(0.022)
45+	–0.387	–0.365
	(0.032)	(0.030)
Mother–child distance (less than 1 km is reference)		
1 km–25 km		–0.563
		(0.021)
25+ km		–1.249
		(0.022)
Constant	4.826	5.543
	(0.032)	(0.035)
Intra-class correlation	0.466	0.472
AIC	112665	107099
BIC	112778	107230
Log likelihood	–56319.65	–53534.33
Deviance	112639.3	107068.66

Note: Models 3A and 3B are extensions of Model 2 in Table 5. Model 3A adds a more nuanced classification of child's parenthood situation (including age of the youngest child). Model 3B adds geographical distance between mother and child to Model 3A.

Figure A-1: Estimated contrasts (and 95% confidence intervals) in frequency of contact with mothers between cohabiting and married children by country. Estimates from mother-level fixed-effect multilevel models. SHARE, 2004–2015. Number of cases (children) N = 45,228, number of cases (mothers) N = 17,893



Note: A positive number indicates higher frequency of intergenerational contact in cohabiting children, a negative number indicates more frequent contact in married children. The dot-dash lines and +– 10 points on the y-axis represent our subjective definition of substantively significant difference in annual contact.
Estimates based on Model 3B (Table A-5).