POPULATION, SPACE AND PLACE
Popul. Space Place (2015)
Published online in Wiley Online Library
(wileyonlinelibrary.com) **DOI**: 10.1002/psp.2003

Regional Differences in the Intergenerational Transmission of Family Size in Europe

Bastian Mönkediek*, Paul Rotering and Hilde Bras
Department of Social Sciences, Wageningen University, Wageningen, The Netherlands

ABSTRACT

Many studies report positive correlations between family sizes of successive generations, but the degree of correlation varies between countries. However, the majority of these studies are limited in geographical scope and do not consider the role of regional family organisation principles, that is, family systems. In this paper, we investigate to what extent regional family systems explain geographical differences in intergenerational transmission of family size among European regions. Using the large-scale European Survey of Health, Ageing and Retirement in Europe, we derive indicators of regional family systems based on average frequency of contact and geographical distance between kin. We use a multilevel random coefficients model to test for differences in the transmission between European regions, as well as between sons and daughters. We find a complex regional pattern of family influences on childbearing continuities, with considerable within-country variation. We observe a direct effect of parental fertility on offspring fertility, although sons show more variance than daughters. This transmission of fertility can be attributed to regional family systems for sons, but not for daughters. Our results demonstrate the importance of using a regional approach –rather than the country-level approach –to study intergenerational continuities in childbearing. Copyright © 2015 John Wiley & Sons, Ltd.

Accepted 19 October 2015

*Correspondence to: Bastian Mönkediek, Department of Social Sciences, Wageningen University, Hollandseweg 1, De Leeuwenborch (Building 201), Wageningen, NL 6706 KN, The Netherlands.
E-mail: bastian.monkediek@wur.nl

Keywords: fertility; intergenerational transmission; regional variation; family systems; Europe

INTRODUCTION

Many studies report positive correlations between family sizes of successive generations (for a systematic overview, see Murphy, 1999, 2013). In addition, independent effects of family background factors, such as socioeconomic status, and the influence of availability of kin on fertility have been observed (Fernández & Fogli, 2006; Reher *et al.*, 2008: 24; Booth & Kee, 2009; Kotte & Ludwig, 2011; Kolk, 2013: 3–4). However, the majority of these studies are limited in geographical scope and do not differentiate between regional family organisation principles, that is, 'family systems' (Skinner, 1997). A family system is defined as 'a set of beliefs and norms, common practices, and associated sanctions through which kinship and the rights and obligations of particular kin relationships are defined' (Oppenheim Mason, 2001: 160). In a recent paper, Murphy (2013) demonstrates that there are indications of regional differences in childbearing continuities between countries with strong family ties and those with weak family ties. Countries with strong family ties, such as Italy, Spain, and Hungary, demonstrate the largest correlations of family size over generations (Reher, 1998), while countries with weaker family ties, such as the Nordic countries, show lower correlation coefficients (Murphy, 2013: 111,118). Although Murphy (2013) does not assess the effects of family systems on childbearing continuities, his results suggest that the degree of intergenerational transmission of family size is mediated by the nature and strength of relationships between kin. In previous research, family systems have been shown to differ markedly among European regions (Reher, 1998; Bras & Van Tilburg, 2007; Jappens & Van Bavel, 2012: 86,

Copyright © 2015 John Wiley & Sons, Ltd.

Mönkediek & Bras, 2014) and to be correlated with demographic outcomes such as extramarital fertility (Kok, 2009), frequency of contact with kin (Bras & Van Tilburg, 2007), and indicators of social and economic development (Duranton *et al.*, 2009; Alesina & Giuliano, 2010). However, to properly assess geographical variation in childbearing continuities as demonstrated by Murphy (2013), a regional perspective needs to be considered in which attention is given to the role of family systems.

In this paper, we investigate whether family systems can explain regional disparities in the intergenerational transmission of family size in Europe. Using three waves of the large-scale European Survey of Health, Ageing and Retirement in Europe (SHARE) (Klevmarker *et al.*, 2005), we derive measures of regional family systems based on the average frequency of contact between family members and the geographical distance between them. Both frequency of contact and geographical distance form the basic opportunity structure for interaction between parents and children (Bongaarts & Watkins, 1996: 660–661; Hank, 2007: 158). Given the data's hierarchical nature, we use a multilevel model including random coefficients. This type of model allows us to test whether the effects of parental family size on children's family size varies between regions with different family systems.

In the following section, we briefly describe the mechanisms through which family size is transmitted from parents to children. We then develop our hypotheses concerning the effect of family systems on the degree of intergenerational transmission. After discussing our sample, measurements, and methods, we present the results of our multilevel analysis on the intergenerational transmission of family size. In the final section, we discuss our findings in light of the recent literature, our hypotheses, and the data and methods used.

FAMILY SYSTEMS AND FERTILITY BEHAVIOUR

Genes, Shared Environments, and Fertility

The literature on intergenerational associations in completed family size distinguishes between sociological and genetic factors. Sociological explanations pertain to the transmission of social status and transmitted norms and values related to childbearing preferences (Anderton *et al.*, 1987: 468/469; Murphy & Wang, 2001; Reher *et al.*, 2008: 25; Booth & Kee, 2009). Considering this, a part of the intergenerationally transmitted fertility is explained by the chances of children entering the same social strata as their parents (Kravdal & Rindfuss, 2008). Other explanations for transmission focus on norms and values concerning reproduction and the experiences of family life that are passed on from parent to child (Kantner & Potter, 1954; Axinn *et al.*, 1994: 68; Montgomery & Casterline, 1996; De Vries *et al.*, 2009). In this context, a growing body of literature recognises the role of kin in explaining fertility behaviour (Rijken & Liefbroer, 2009; Lyngstad & Prskawetz, 2010; Sear & Coall, 2011; Balbo, 2012; Bernardi & Klärner, 2014; Rotering & Bras, 2015) and in shaping intergenerational childbearing continuities (Kotte & Ludwig, 2011: 210–211; Kolk, 2013: 3). However, these studies are often limited to a few geographical areas.

Genetic explanations of intergenerational childbearing continuities concentrate either on reproductive fitness (Hamilton, 1964a, 1964b; Pluzhnikov *et al.*, 2007) or on the motivation and the desire to have children (Kohler *et al.*, 2005). However, by studying the influence of both sociological and genetic factors on fertility over birth cohorts, Kohler *et al.* (1999: 268) demonstrate that 'the genetic influence seems to be socially mediated'. Childbearing continuities between generations seem weaker in societies with strong mechanisms to enforce compliance with group norms (Van Bavel & Kok, 2009: 357) than in societies where the social control of group norms is weak. Where social control is weak, the effects of the shared family environment are reduced, and more variation in fertility becomes visible as the genetic effects are less constrained (Kohler *et al.*, 1999: 268; Bras *et al.*, 2013: 126, 130–131). Testing the importance of gene–environment interactions, Tropf *et al.* (2015: 9–10) demonstrate important changes in the levels of heritability among cohorts that experienced different historical events, such as the Second World War or the sexual revolution.

Regional Variation in Family Systems and the Transmission of Fertility

Previous research suggests that the effects of sociological and genetic factors on fertility

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

transmission are mediated by kin relationships and societal control over fertility behaviour (Bras *et al.*, 2013; Kotte & Ludwig, 2011: 210–211; Kolk, 2013: 3). However, geographical differences in the organisation of family life, in particular how these differences affect childbearing continuities, have received little attention. Regional clusters of norms and values towards kin are described as family systems. Family systems differ in the way they configure social relationships and obligations between kin and have been shown to vary markedly among European regions (Skinner, 1997: 57–58; Reher, 1998; Bras & Van Tilburg, 2007; Jappens & Van Bavel, 2012: 86; Micheli, 2012, 27, 30–31; Mönkediek & Bras, 2014). Family systems have been associated with regional disparities in socio-economic outcomes and labour force participation (Duranton *et al.*, 2009: 36–37), gender roles and gender disparities (Alesina & Giuliano, 2010: 99; Bertocchi & Bozzano, 2015), and inheritance rules (Skinner, 1997: 58–60). By setting norms and values concerning, for example communication between kin and non-kin (Freedman *et al.*, 1964: 27; Salamon, 1977: 815/816), sexual activity (Kok, 2009: 15), or cohabitation (Skinner, 1997: 63–64), family systems constrain opportunities for social relationships within and outside the family. Therefore, family systems determine the social framework in which people act, behave, and decide (Bernardi & Klärner, 2014: 644; DiMaggio & Garip, 2012).

Family systems can be classified by the configuration of social relationships between kin and non-kin. Non-kin constitute a significant element of social networks in weak family regions, where relationships with kin are fragmented and individualism is emphasised (Reher, 1998). Socially, non-kin may function as alternative providers of norms, values, and behavioural examples (Mathews & Sear, 2013: 318; Newson *et al.*, 2005: 369) and even adopt positions as 'voluntary kin' (Braithwaite *et al.*, 2010: 390/391). Because weak family regions display less-stringent social norms that could restrain children's reproductive choices, the effects of parental socialisation and genetic influences in weak family regions are likely to be higher than those in strong family regions (Van Bavel & Kok, 2009: 357; Udry, 1996: 335).

In contrast, in strong family regions, such as Sicily in Italy, social bonds between kin members are close (Reher, 1998: 203; Mönkediek & Bras, 2014), and parental monitoring of children's behaviour appears more authoritarian (Romero & Ruiz, 2007). Children often depend more and longer on familial support, and the production of welfare is generally regarded as a family obligation (Caldwell, 1978: 557–558; Livi-Bacci, 2001: 145–152; Aassve *et al.*, 2005: 284–285; Kohler *et al.*, 2006: 64–65). Young adults are also exposed longer to the social norms and values of their kinship group (Livi-Bacci, 2001: 145–152, Billari, 2008: 10), and the social norms that influence people's fertility behaviour are more likely to be shared within society and more easily enforced by children's parents (Granovetter, 2005: 34). Consequently, children's choices on fertility behaviour are more constrained in strong family regions than in weak family regions and are less related to socialisation and genetic influences (Udry, 1996: 335; Kohler *et al.*, 1999: 268; Van Bavel & Kok, 2009: 357). *Hence, the correlation between parent's and children's completed family size is expected to be weaker in strong family regions than in weak family regions* (**H1**).

Apart from the differences between family systems, previous research also suggests that the degree of intergenerational transmission significantly differs between men and women (Reher *et al.*, 2008: 25–26; Dahlberg, 2013; Murphy, 1999; Kolk, 2013: 4). Gender differences have been attributed to several factors, including closer ties between daughters and their mothers (Kolk, 2013: 4; Barber, 2000), more influential parental authority over daughters' fertility behaviour (Dahlberg, 2013: 241), and stronger genetic heritability effects for women (Kohler *et al.*, 1999: 268; Bras *et al.*, 2013: 127–128). Based on these insights, we expect that strong family environments leave women less space to freely choose their fertility behaviour compared with men. In weak family regions, the stronger genetic heritability effects for women may lead to stronger correlations between parental and daughter's family size than between parental and son's family size. Therefore, we expect that the regional family system is specifically important to determine the family size of daughters (Kolk, 2013: 4), while we expect little or no interaction effects for sons. *Therefore, we expect that the correlation between parent's (parents') and children's completed family size differs between regional family systems only for female children* (**H2**).

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

DATA, MEASURES, AND METHODS

Data

This study uses the first, second, and fourth wave of the SHARE (Börsch-Supan *et al.*, 2013). The survey is well suited for our analysis because it includes information on several European regions that have been identified with the European Nomenclature of Units for Territorial Statistics (NUTS) nomenclature. The NUTS nomenclature is a hierarchical system that divides the European Union into areas of comparable population size and is based on the administrative division laid down by the European Union member states.[1] In this paper, region or regions refer to the NUTS regions.

In addition, the SHARE provides us with information on the family structure and fertility of respondents (G1), and the completed fertility of their children (G2). Although the fertility of children (G2) was reported by the respondents (G1), the SHARE provides us with sufficient information on the completed fertility of multiple generations.

The first wave of SHARE was conducted in 2004/2005 in 11 European countries and in Israel. The second (2006/2007) and the fourth wave (2010/2012) added more countries to the survey.[2] The survey's target population was men and women older than 50 years and their spouses, who were interviewed separately (Börsch-Supan *et al.*, 2013: 993). Together, all three waves contain 57,242 respondents (G1), excluding spouses. Because the set of included countries varied between waves, the possibility of studying continuities in childbearing over birth cohorts is limited. From all respondents (G1), 19,907 individuals belong to the panel segment, meaning that these respondents have been interviewed in at least two of the included waves. For these respondents, we included the last observation of their children (G2), because this increases the chance that their offspring (G2) had also completed their fertility career.

We restricted the sample to European respondents (G1) who were born between 1925 and 1961, who were between 40 and 80 years old, and who had information on their fertility careers.[3] We excluded Ireland and Estonia because the SHARE does not provide statistical weights for Ireland and provides information only on the country level for Estonia. We derived the cohort-average family size (based on birth cohorts) for each region based on all remaining respondents ($N = 41{,}428$) (G1). In a second step, childless respondents with missing information on NUTS region were excluded from the sample. In total, we were able to calculate the cohort-relative family size for 35,706 parents (G1).

To make reliable statements about the magnitude of the transmission process, information is required about the completed fertility of the children's generation (G2). Both parent's and children's fertility were reported during the parental interview, asking respondents about their number of children that are still alive, and about the number of grandchildren of each specific child. However, not all children had finished their reproductive careers at that time. To approximate children's cohort-relative family size, we constrained the analysis to children who were 40 years old and older because they were likely to have completed their fertility career (32,799 children in G2). We selected only children (G2) born after 1950, because of relative low case numbers in the earlier birth cohorts, and excluded children with missing information. Because of variable non-response, our final sample for analysis contained 28,560 children[4] (G2) (14,300 men and 14,260 women).

Measures

Dependent variable

In this paper, we examine the regional variation in childbearing continuities between respondents (G1) and their children (G2). To control for demographic developments over time, we examine the fertility of parents and their children relative to their birth cohorts. This cohort-relative family size allows for a good identification of high and low fertility performers and to control for European-wide changes in completed fertility over time (Anderton *et al.*, 1987: 469). The dependent variable, the cohort-relative family size of the children's generation (G2), was generated by dividing each child's family size by the mean family size of their birth cohort (Table 1). The cohort-relative parental fertility (G1) was similarly calculated. As Table 1 shows, the mean family size for the children's generation declined over time in all European countries.

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

Table 1. Average fertility per country and birth cohort for the parental and the children's generation (based on individual data).

Parental fertility (parent's generation, G1)[a]

Country	Mean fertility (children per parent)	1925–1929	1930–1934	1935–1939	1940–1944	1945–1949	1950–1961
Austria (AT)	1.967	1.891	2.185	2.262	2.031	1.889	1.853
Germany (DE)	1.930	1.944	2.386	2.139	1.827	1.822	1.838
Sweden (SE)	2.332	1.924	2.183	2.298	2.272	2.303	2.412
The Netherlands (NL)	2.169	2.435	2.649	2.403	2.270	2.133	2.023
Spain (ES)	2.094	2.283	2.351	2.393	2.169	2.184	1.884
Italy (IT)	1.728	2.121	1.904	1.914	1.657	1.793	1.607
France (FR)	2.235	2.230	2.137	2.352	2.281	2.189	2.230
Denmark (DK)	2.221	2.107	2.502	2.406	2.235	2.084	2.177
Greece (GE)	1.849	2.035	2.023	1.884	1.659	1.808	1.823
Switzerland (CH)	1.931	1.997	2.264	2.043	1.959	1.841	1.871
Belgium (BE)	2.022	2.440	2.408	2.193	2.074	1.886	1.933
Czech Republic (CZ)	2.027	1.896	1.889	2.079	1.992	2.085	2.025
Poland (PL)	2.452	2.744	2.993	2.718	2.459	2.564	2.302
Hungary (HU)	1.882	—	1.790	1.809	1.857	1.895	1.918
Portugal (PT)	2.113	—	2.438	2.428	1.971	2.158	2.012
Slovenia (SI)	1.853	—	1.962	1.879	1.965	1.838	1.801
Total	2.045	2.108	2.256	2.216	2.011	2.041	1.965

Children's fertility (children's generation, G2)

Country	Mean fertility (children per parent)	1950–1956	1957–1960	1961–1964	1965–1968	1969–1972
Austria (AT)	1.484	1.673	1.610	1.572	1.398	1.337
Germany (DE)	1.407	1.658	1.575	1.399	1.250	1.134
Sweden (SE)	1.798	1.967	2.104	1.823	1.749	1.447
The Netherlands (NL)	1.637	1.988	1.874	1.647	1.569	1.397
Spain (ES)	1.411	1.688	1.802	1.483	1.324	1.109
Italy (IT)	1.369	1.690	1.612	1.383	1.288	1.165
France (FR)	1.749	2.011	1.887	1.798	1.677	1.527
Denmark (DK)	1.796	1.892	1.829	1.904	1.790	1.535
Greece (GE)	1.682	1.969	1.769	1.589	1.436	—
Switzerland (CH)	1.538	1.717	1.881	1.505	1.483	1.385
Belgium (BE)	1.709	1.772	1.858	1.751	1.653	1.558
Czech Republic (CZ)	1.865	1.918	2.042	1.923	1.848	1.648
Poland (PL)	1.915	2.199	2.178	2.086	1.807	1.458
Hungary (HU)	1.821	1.789	2.006	1.771	1.872	1.725
Portugal (PT)	1.509	1.484	1.593	1.578	1.612	1.336
Slovenia (SI)	1.737	1.589	1.968	1.779	1.693	1.679
Total	1.652	1.852	1.851	1.684	1.587	1.440

[a]Includes childless respondents in the parental generation, weighted output.

Explanatory variables
In our analysis, we include two indicators that reflect regional family systems as main explanatory variables. These indicators use the available information in the SHARE on contact frequency and spatial proximity between respondents and their

Copyright © 2015 John Wiley & Sons, Ltd.

kin. Average contact frequency, adjusted for all relationships, and average spatial proximity to kin, adjusted for kin relationships, were derived for all respondents (for a detailed description, see Mönkediek & Bras, 2014). These indicators constitute the basic opportunity structure for intergenerational interaction, and their combination can be assumed to reflect obligations and emotional associations between kin (Hank, 2007: 158; Viazzo, 2010: 282–283). By aggregating the individual scores to the NUTS 2 level, we can learn about the family system in which each respondent lives[5] (Mönkediek & Bras, 2014). Strong family regions are, for example, identified by a higher than average score on contact or distance between kin. The values range from 1 ('no contact') to 8 ('frequent contact') for average frequency of contact to kin, and 1 ('very distant') to 9 (or 'very close proximity') for average spatial proximity between kin. The European average for frequency of contact is 6.551 (between 'several times a week' and 'daily' contact), and for spatial proximity, the European average is 6.765 (between 'between 1 and 5 km' and 'less than 1 km away').

As Figure 1 (right-hand side) demonstrates, countries categorised by their family system indicators follow the observed distinction between weak and strong family systems in Europe (Reher, 1998). As expected, the northern countries (Denmark and Sweden) score low on frequency of contact and spatial proximity between kin, while the Mediterranean countries score relatively high on these indicators. The scores of the Central European countries fall between those of the Northern and Mediterranean countries, and the scores of the Eastern European countries are more similar to the Mediterranean countries. In contrast, the family system indicators demonstrate large within-country variation (Fig. 1, left-hand side). These regional disparities are especially large within the strong family Mediterranean countries and in some Central European countries (e.g. Germany).

Control variables

The regression models include control variables for individual-level and regional-level characteristics (Table 2).

Gender. Previous research suggests significant differences in the intergenerational transmission of fertility behaviour between men and women (Dahlberg, 2013; Murphy, 1999; Kolk, 2013: 4). To examine these differences, we estimate separate models for each sex.

Education. Parental and children's education are included in the analysis as an approximate control for socio-economic similarities. The educational information in the SHARE is coded following the International Standard Classification of Education

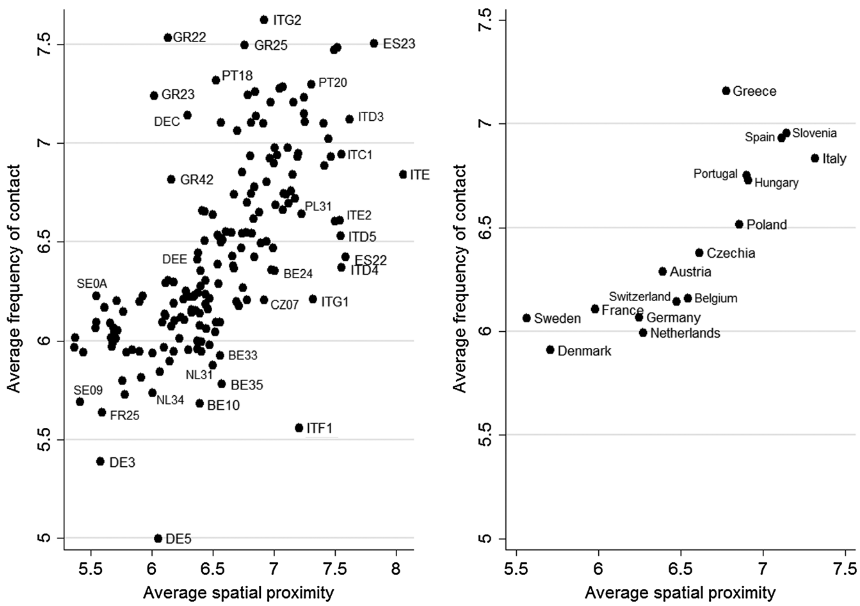

Figure 1. Regional (left) and country (right) averages of the family systems indicators (based on Survey of Health, Ageing and Retirement in Europe 2004–2012).

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

Table 2. Descriptive statistics based on children's generation.

Country (NUTS)	N	N parents	Female children (%)	Children's mean education (ISCED – 97)[a]	Parental mean education (ISCED – 97)[a]	Urban (%)	GDP measured in PPS (Purchasing Power Standard)	Average frequency of contact[a]	Average spatial proximity[a]
Austria (AT)	3233	1637	66.9	3.696 (0.024)	2.790 (0.028)	51.9	25,100	6.288 (0.031)	6.391 (0.031)
Germany (DE)	1823	985	58.3	3.727 (0.035)	3.227 (0.036)	65.3	22,400	6.068 (0.038)	6.249 (0.038)
Sweden (SE)	1903	1008	61.1	3.518 (0.034)	2.618 (0.045)	83.5	24,300	6.063 (0.035)	5.565 (0.038)
The Netherlands (NL)	1953	975	61.8	3.442 (0.040)	2.568 (0.038)	81.3	25,500	5.992 (0.078)	6.270 (0.088)
Spain (ES)	1894	920	67.2	2.629 (0.051)	1.403 (0.029)	93.7	18,500	6.930 (0.051)	7.115 (0.050)
Italy (IT)	2171	1165	64.5	2.879 (0.044)	1.474 (0.031)	55.5	22,300	6.833 (0.086)	7.318 (0.071)
France (FR)	3107	1542	62.2	3.441 (0.047)	2.232 (0.040)	58.5	21,900	6.104 (0.030)	5.977 (0.033)
Denmark (DK)	1448	735	61.3	3.799 (0.039)	3.205 (0.047)	80.4	25,000	5.908 (0.038)	5.708 (0.034)
Greece (GE)	939	538	67.6	3.055 (0.049)	1.376 (0.034)	79.1	16,000	7.159 (0.029)	6.775 (0.041)
Switzerland (CH)	1703	844	56.8	3.459 (0.025)	2.810 (0.029)	41.8	28,100	6.143 (0.037)	6.475 (0.039)
Belgium (BE)	2833	1407	60.3	3.743 (0.037)	2.664 (0.038)	74.1	24,000	6.156 (0.047)	6.544 (0.045)
Czech Republic (CZ)	3395	1993	69.5	3.031 (0.032)	2.440 (0.035)	69.5	13,500	6.378 (0.037)	6.614 (0.037)
Poland (PL)	1455	717	69.1	3.159 (0.033)	1.856 (0.041)	42.3	9,200	6.516 (0.041)	6.856 (0.041)
Hungary (HU)	1256	772	70.7	3.350 (0.045)	2.703 (0.052)	59.8	10,300	6.725 (0.081)	6.908 (0.070)
Portugal (PT)	723	406	57.8	2.939 (0.137)	2.052 (0.133)	70.5	15,400	6.751 (0.100)	6.900 (0.117)
Slovenia (SI)	1272	758	63.8	3.473 (0.032)	2.504 (0.034)	37.2	15,200	6.956 (0.037)	7.144 (0.037)
Total N/%	31,108	16,402	63.9	30,552	30,476	65.1	19,794	6.551 (0.026)	6.765 (0.024)

ISCED-97, International Standard Classification of Education 97.
[a]Weighted output with standard errors in brackets.

Copyright © 2015 John Wiley & Sons, Ltd.

97 classification.[6] The two categories 'first' and 'second stage tertiary' were pooled because of a low number of cases.

Birth cohort. We control for children's birth cohort to account for possible additional changes in the effects of the explanatory and the control variables over time.

Urbanisation. Previous research has demonstrated substantive differences in family networks between urban and rural areas (Buchowski, 2010; Heady *et al.*, 2010). In rural areas, family networks are more family centred (Höllinger & Haller, 1990: 112, 119), and the shared-environment effects on people's fertility, such as socio-economic conditions and normative climates, seem stronger (Bras *et al.*, 2013: 118, 128). Unfortunately, we have no information on the place of residence of children (G2). Because most children in the studied countries live within visiting distance of their parents, we approximated children's place of residence by using that of their parents (Hank, 2007; Tomassini *et al.*, 2004: 57; Santarelli & Cottone, 2009: 12, 16).

Finally, average fertility levels of European regions may also depend on the socio-economic characteristics of these regions. To accurately assess the impact of regional family systems on intergenerational childbearing continuities, regional values (NUTS 2) of gross domestic product (GDP) for the year 2000 were obtained from Eurostat.[7] Although GDP does not precisely measure regional socio-economic characteristics during the reproductive period of respondents, it is still a valuable approximation of often persistent socio-economic regional disparities. In the regression models, we use the natural logarithm of GDP because this variable is unevenly distributed.

Methods

Because we start from a sample of the parental generation (G1) and include all children (G2) who fulfil our selection criteria, our study encompasses a prospective analysis (Song & Mare, 2014). By doing so, we overcome two problems faced by retrospective studies, namely that the parents (G1) of the sampled children (G2) are not representative of the parental generation and that the parents with more children are over-represented (Song & Mare, 2014: 3).

We fit a multilevel mixed effects model to estimate variations in the effects parental family size (G1) on children's family size (G2) among NUTS regions by using individual-level data. The model accounts for the hierarchical structure of the data: children are nested in families, nested in 170 European regions, and nested in 15 countries. Because our study fulfils the limit on how many clusters are sufficient for consistent estimates in multilevel models (Stegmueller, 2013: 758), the chance of an over-rejection of the null hypothesis due to a small sample bias is reduced (Stegmueller, 2013: 749, 758). Nonetheless, our models contain country-fixed effects and differentiate between three levels of analysis (child, family, and NUTS regions) to account for unobserved heterogeneity at the country level. Additionally, we incorporate cluster robust estimators at the NUTS levels, where the largest variation in our independent variables is observed.

To estimate variations in the effects of parental completed fertility (G1) on children's family size (G2) among NUTS regions, our models include a random constant and a random slope. The coefficient of the random slope, measured in standard deviations, is reported under 'SD Parental Fertility'. Because our model differentiates between separate hierarchical levels of analysis, a random constant is provided for each level, namely 'SD (Region)' and 'SD (Family)'. These two random constant parameters control for unobserved effects at the specified levels. The correlation between the random intercept at the regional level, SD (Region), and the regional random slope for parental fertility, 'SD Parental Fertility', is reported under 'correlation' in the model's random part.

Because of non-response and different sampling methods in the target countries, our model results are weighted with the statistical weights provided by SHARE (Klevmarker *et al.*, 2005: 32–33, 39–40). We rescaled the individual weights so that they reflect the conditional selection probabilities within the multilevel framework.[8] To examine regional variation in fertility transmission, a random intercept and slope for the effects of parental fertility are introduced at the regional level. These regional differences are later mapped by applying the empirical Bayes prediction (Rabe-Hesketh & Skrondal, 2012: 201–203).

It is important to highlight that the relationships on which these indicators are based were

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

measured after respondents (G1) had completed their reproductive careers. Additionally, the relationships between parents and children may be contingent on the number of children that parents have. Nevertheless, previous research has demonstrated significant differences in parent–child relationships between regional family systems using the same data (Hank, 2007). Therefore, these relationships can be used to differentiate between strong and weak family system regions. Moreover, the two indicators were aggregated on the NUTS 2 level to reflect regional family systems instead of individual characteristics. This ensures that we avoid problems concerning endogeneity because regional family systems are no longer directly related to respondent's (G1) fertility. Furthermore, these regional characteristics are used to explain the fertility behaviour in the children's generation (G2) and not the completed family size of the respondents (G1). The regional family system indicators have been mean centred to reduce multicollinearity.

RESULTS

Table 3 provides the results of the different multilevel random coefficient models. These models describe the general influence of parental fertility (G1) and regional family systems on children's cohort-relative family size (G2). Because of size constraints, country-specific fixed effects are not reported in the table.[9]

Models 3.1 and 3.2 include only the explanatory variable 'parental fertility' (G1) and control variables. The results demonstrate a small but significant transmission effect: children's family sizes are larger when their parents had larger families as well. When parents had one child more than the average number of children in their birth cohort, their son's cohort-relative family size would be around 7% larger, on average. This effect, controlled for parent's education, offspring's education, and parent's current place of residence, is significant for male and female offspring. Although the effect of parental family size seems small, it is stronger than the effect of children's education level. Children's education level positively affects family size for male but negatively affects it for female offspring. With rising educational levels, son's fertility is increased, but daughter's fertility (G2) is lowered. For 'urbanity', we find a consistently negative effect for both sexes. Living in an urban area or in a region with a higher GDP is associated with a smaller family size for children (G2).

Models 3.1 and 3.3 are used to estimate and to visualise regional variations in the effects of intergenerational childbearing continuities (Figs. 2 and 3). The interpretation of the model's random part is complex (Rabe-Hesketh & Skrondal, 2012: 188–194). To simplify this interpretation, the strength of the association between parental and children's fertility is predicted and mapped by employing an empirical Bayes prediction for each NUTS 2 region for sons and daughters separately (Figs. 2 and 3). These separate figures give us a clear overview of the regional differences in childbearing continuities.

When we examine the regional variation in the effects of parental family size on children's family size, no pattern emerges that follows any cultural divide between strong and weak family regions (compare with Reher, 1998; Mönkediek & Bras, 2014). Instead, in nearly all countries, significant within-country variations can be observed in transmission strength. Interestingly, Figures 2 and 3 also display disparities in intergenerational transmission of fertility between male and female children. Their strength varies between regions, and in some regions, such as the Austrian region of Vienna (men: −0.030, women: 0.108), the Swedish regions of Sydsverige (men: −0.083, women: 0.047) and Norra Mellansverige (men: −0.081, women: 0.081), and in eastern Switzerland (men: −0.019, women: 0.101), negative transmission effects for men and positive transmission effects for women can be observed. A comparison of two nested models (not reported) verifies that the differences between men and women are indeed significant.

However, to what extent are the observed spatial variations in the effect of parental fertility on children's fertility related to regional family systems? To explain these differences, we include in our models two interaction terms combining regional family systems with parental fertility (Table 3, models 3.2 and 3.4). With the introduction of these interaction terms, the effects of the control variables stay nearly the same, although GDP is no longer significant for women. Our empirical analysis only partially supports our first hypothesis, concerning the strength of the transmission between weak and strong family regions. We do not observe a clear difference in the effects

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

Table 3. Results of the multilevel regression analysis explaining offspring's cohort-relative fertility – all children, weighted output.

	Base model men (3.1)	Full model men (3.2)	Base model women (3.3)	Full model women (3.4)	Combined model (3.5)
Fixed part					
Individual variables					
Parental fertility (G1)	0.070***	0.079***	0.062***	0.058***	0.075***
Parental fertility (G1) * male (G2)					−0.019
Male (G2)					0.013
Education					
Parental gen. (G1)	−0.007	−0.007	−0.012^	−0.012^	−0.010^
Children gen. (G2)	0.033***	0.032***	−0.031***	−0.031***	−0.001
Urban (0–1) (G1)	−0.050*	−0.051*	−0.057**	−0.056**	−0.053***
Children's cohort (G2) (reference: 1950–1956)					
1957–1960	−0.023	−0.023	−0.003	−0.002	−0.011
1961–1964	−0.006	−0.006	0.007	0.007	0.003
1965–1968	−0.024	−0.025	0.023	0.024	0.003
1969–1972	−0.030	−0.029	0.046	0.047	0.011
Regional variables (NUTS 2) and interaction terms					
Log(GDP)	−0.135*	−0.143**	−0.083*	−0.063	−0.101**
Family system					
Average contact		−0.023		0.055	0.018
Average proximity		−0.047		−0.066	−0.073
Family sys. * parental fertility (G1)					
Av. contact		−0.114*		−0.002	0.028
Av. proximity		0.107**		−0.012	−0.014
Fam. sys. * male (G2)					
Av. contact					−0.001
Av. proximity					0.034
Fam. sys. * parental fertility (G1) * male (G2)					
Av. contact					−0.183**
Av. proximity					0.110*
Constant term	1.142*	1.203*	0.865*	0.655^	0.912**
Random part					
Parental fertility (G1)					
SD parental fertility (slope)	0.137	0.131	0.062	0.063	0.081
Correlation (parent. fert. * cons)	−0.491	−0.538	−0.643	−0.599	−0.284
SD (Regions)	0.067 (0.018)	0.068 (0.019)	0.060 (0.011)	0.056 (0.012)	0.053 (0.013)
SD (Family)	0.265 (0.030)	0.264 (0.030)	0.289 (0.035)	0.289 (0.034)	0.267 (0.027)
SD (Residual)	0.716 (0.018)	0.716 (0.019)	0.600 (0.017)	0.600 (0.017)	0.668 (0.011)
Wald chi^2 (df)	382.75 (24)	422.27 (28)	358.62 (24)	403.62 (28)	574.49 (34)
BIC	30001.59 (30)	30031.21 (34)	26190.23 (30)	26223.81 (34)	56311.95 (40)
N regions	170	170	170	170	170
N children (G2)	14,300	14,300	14,260	14,260	28,560

BIC, Bayesian information criterion.
Standard errors in bracket.
$^{\wedge}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

of weak and strong family regions on transmission effects. Instead, our results indicate a more complex pattern in which the dimensions constituting family systems exert varying effects on continuities in childbearing. The interaction terms in model 3.2 indicate a remarkable difference between sons and daughters in the effects of parental family size (G1) on their children's family size (G2) between regions characterised by different family systems. In contrast to our second hypothesis, frequency of social contact and spatial proximity between kin on fertility are significant for men but not for women. These results are confirmed in a combined model where

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

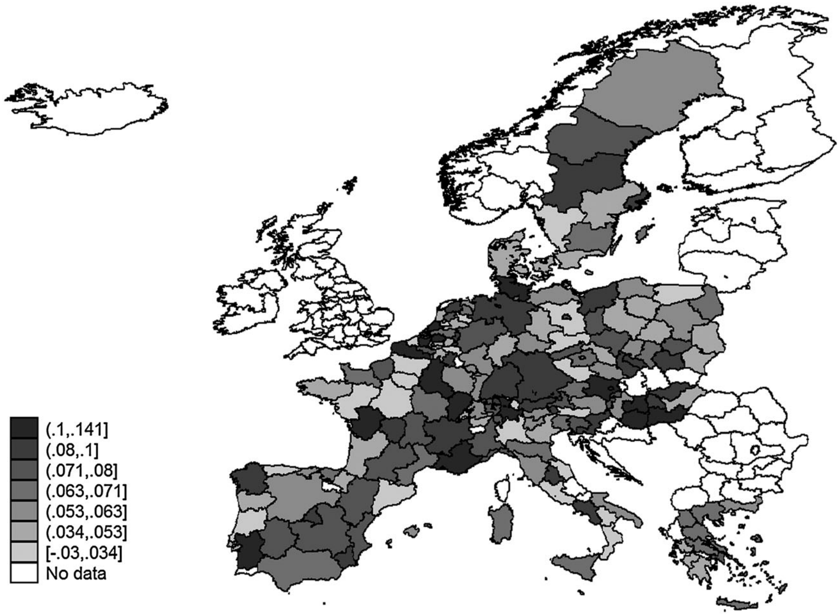

Figure 2. Regional variation of the intergenerational transmission effect, per NUTS region (for women, based on Survey of Health, Ageing and Retirement in Europe 2004–2012).

we test whether the differences between male and female offspring are significant using third-level interaction effects (Table 3, model 3.5). While previous research suggested stronger transmission effects for women than for men (Murphy, 1999; Kolk, 2013: 4; Dahlberg, 2013: 239, 241), our results indicate that gender differences are contingent on the family context. Given our results, stronger transmission effects for men compared with women occur in regions where the frequency of kin contact is below or the spatial proximity is above the European average.

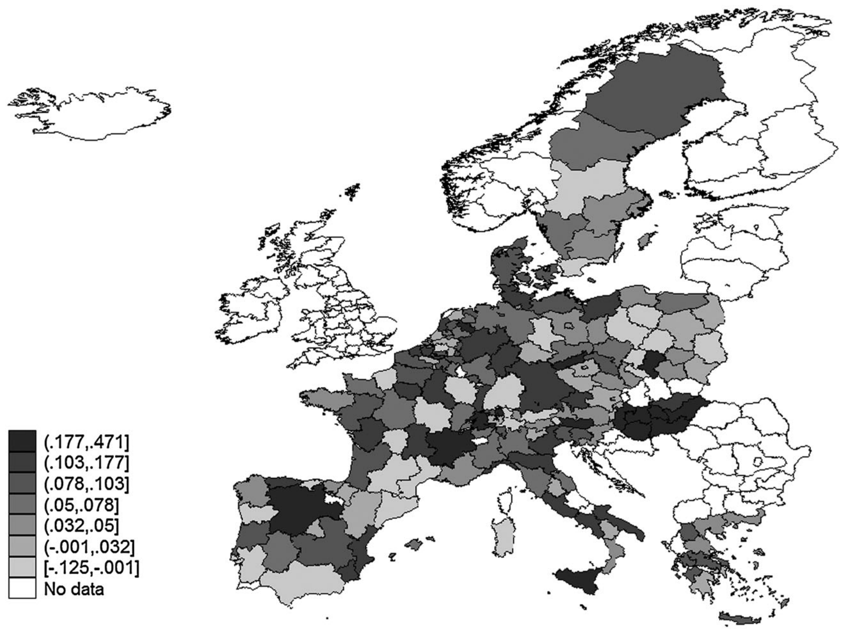

Figure 3. Regional variation of the intergenerational transmission effect, per NUTS region (for men, based on Survey of Health, Ageing and Retirement in Europe 2004–2012).

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

DISCUSSION AND CONCLUSION

In our study, we investigated the spatial variation in the intergenerational transmission of fertility between European regions using the large-scale SHARE. In addition, we examined to what extent regional family systems explain these differences in childbearing continuities. These issues are highly relevant because the influence of family systems on childbearing continuities in Europe is not well understood, even though family systems frame the context in which decisions on childbearing are made (Skinner, 1997).

By extending the geographic scope of previous studies and bringing the analysis to a lower regional level, this paper contributes important insights by showing to what extent the weak associations between parental and children's fertility – which are often observed at the country level – can be explained by regional effects. First, regional variations in the intergenerational transmission process were observed, which expand Murphy's (2013) earlier research, and show important within-country differences. Second, we investigated these variations separately for male and female children. Our analysis demonstrates that the often generalised weak association between the family sizes of successive generations is partly explained by differences in the transmission effects between men and women. Taking France as an example, the overall influence of parents on their children's family size appears to be minimal (as observed by Murphy, 2013). Yet, childbearing continuities differ markedly between French regions, especially once we consider gender differences (Figs. 2 and 3). In addition, we find that the intergenerational associations in family size are not always positive, and for some regions, they are even negative (compare with Murphy, 2013).

Given the variation in childbearing continuities that we observe between European regions, our results suggest that socialisation and the social context continue to play an important role in shaping children's fertility. The significant negative association between frequency of contact between kin and male children's fertility supports this view. Furthermore, the significant influence of family systems on intergenerational childbearing continuities for sons supports the idea that genetic effects are mediated by the social environment (Kohler *et al.*, 1999: 268, 275–276; Kohler *et al.*, 2005; Udry, 1996: 329–330, 335). In regions with, on average, higher contact frequency between kin, offspring's fertility is likely to be more controlled through social interactions, thereby leaving sons less space to determine their fertility behaviour. Apart from that, resource competition and overcrowding in strong family systems may convey negative family experiences, which could explain the adverse effect of frequency of contact between kin on the fertility of sons (compare with Wellman & Wortley, 1989: 300; Evans *et al.*, 1998; Voorpostel & Van der Lippe, 2007: 1279–1282).

In our study, we do not observe in general stronger transmission effects for women than for men. In fact, our results even suggest a stronger effect of parental fertility on the family size of sons in regions with family systems that are characterised by, on average, lower frequency of contact and higher spatial proximity between kin, such as the Italian region of Abruzzo (ITF1) (Fig. 1). This result is surprising because earlier research has demonstrated stronger effects of family-of-origin characteristics on female fertility (Murphy, 1999; Kolk, 2013: 4). This effect was attributed to the role of women as kin-keepers as well as to a higher susceptibility to parental influence during their reproductive career (Dahlberg, 2013: 241; Barber, 2000; Gerstel & Gallagher, 1994). On the other hand, recent research on the effects of social control on the transition to early parenthood shows that men are more affected than women by social control (Hofferth & Goldscheider, 2010: 418). Surprisingly, less social control often resulted in a later entry into parenthood for men. In contrast, women were more affected through social learning, suggesting differences in the underlying transmission process (Hofferth & Goldscheider, 2010: 434).

Future research is needed to address the findings in this paper in more detail, for example by differentiating between regional gender systems as previous research suggested a non-linear relationship between the orientation towards certain gender roles and fertility (Oppenheim Mason, 2001: 161; Miller Torr & Short, 2004: 123; Puur *et al.*, 2008: 1887). In addition, the role of parents-in-law deserves further attention. Future analysis may also consider possible differences in transmission effects between urban and rural locations over time and even the organisation of welfare.

Copyright © 2015 John Wiley & Sons, Ltd.

DOI: 10.1002/psp

ACKNOWLEDGEMENTS

The study was supported by a VIDI Innovational Research Grant from the Netherlands Organization for Scientific Research (NWO) to Prof. Dr H. Bras for the research project entitled 'The Power of the Family: Family Influences on Long-Term Fertility Decline in Europe, 1850-2010' (contract grant number 452-10-013).

This paper has been presented at the Posthumous Conference 2014 in Leeuwarden (the Netherlands).

We would like to thank the two anonymous reviewers for their valuable remarks and suggestions. Additionally, we would like to thank Hester Moerbeek and Jornt Mandemakers for their comments and ideas, which helped to improve this paper.

This paper uses data from SHARE Wave 5 release 1.0.0, as of 31 March 2015 (DOI: 10.6103/SHARE.w5.100), or SHARE Wave 4 release 1.1.1, as of 28 March 2013 (DOI: 10.6103/SHARE.w4.111), or SHARE Waves 1 and 2 release 2.6.0, as of 29 November 2013 (DOI: 10.6103/SHARE.w1.260 and 10.6103/SHARE.w2.260), or SHARELIFE release 1.0.0, as of 24 November 2010 (DOI: 10.6103/SHARE.w3.100). The SHARE data collection has been primarily funded by the European Commission through the 5th Framework Programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life), through the 6th Framework Programme (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5-CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812), and through the 7th Framework Programme (SHARE-PREP, N° 211909, SHARE-LEAP, N° 227822, and SHARE M4, N° 261982). Additional funding from 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, and OGHA 04-064) and the German Ministry of Education and Research as well as from various national sources is gratefully acknowledged (see www.share-project.org for a full list of funding institutions).

NOTES

(1) Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction; http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/local_administrative_units; (14.11.14)

(2) First wave: Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, and Switzerland; second wave: Ireland, Poland, and the Czech Republic; fourth wave: Hungary, Portugal, Slovenia, and Estonia. Because the structure of the third wave differs from that of the other waves, the third wave is excluded from this analysis.

(3) The lower bound of 40 years old was selected to increase the number of cases. Fecundity of both men and women strongly decreases after the age of 40 years (ESHRE 2005; Kidd *et al.*, 2001). In our data set, only 3.57% of the 83,858 children were born after their parent was 40 years old.

(4) An overview on the number of cases per NUTS region and the correspondence between European regions, NUTS codes, and countries is given in Table S1 (available online).

(5) For Germany, where the information was provided only on NUTS 1 levels, we used the respective NUTS level. For Denmark, we combined the information on NUTS 3 regions into higher level clusters (East, South, and North-West Denmark) approximating the NUTS 2 partition.

(6) For more information on International Standard Classification of Education 97, see http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm (17.07.13).

(7) GDP measured in Purchasing Power Standard (PPS), per capita. Source: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_r_e2gdp&lang=en (19.03.15).

(8) The results of the unweighted models can be found in Table S2 (available online). This table also shows the model results when we use completed family size instead of the cohort-relative measures to estimate the effects of parental fertility (G1) on offspring's family size (G2). The results stay the same.

(9) The full table is provided as Table S3 (available online). The table demonstrates country-specific effects on children's fertility. Compared with Austria (reference category), we find cohort-relative fertility to be higher in the Netherlands, France, and in the traditional weak family countries (Sweden and Denmark). Moreover, in Eastern European countries, as well as in Belgium and Portugal, higher fertility levels can be observed.

REFERENCES

Aassve A, Mazzuco S, Mencarini L. 2005. Childbearing and well-being: a comparative analysis of European

Copyright © 2015 John Wiley & Sons, Ltd.

welfare regimes. *Journal of European Social Policy* **15**: 283–299.

Alesina A, Giuliano P. 2010. The power of the family. *Journal of Economic Growth* **15**: 93–125.

Anderton DL, Tsuya NO, Bean LL, Mineau GP. 1987. Intergenerational transmission of relative fertility and life course patterns. *Demography* **24**(4): 467–480.

Axinn WG, Clarkberg ME, Thornton A. 1994. Family influence on family size preferences. *Demography* **31**(1): 65–79.

Balbo N. 2012. Family, friends and fertility. Dissertation. Ridderprint: Ridderkerk.

Barber JS. 2000. Intergenerational influences on the entry into parenthood: mother's preferences for family and nonfamily behavior. *Social Forces* **79**(1): 319–348.

Bernardi L, Klärner A. 2014. Social networks and fertility. *Demographic Research* **30**(22): 641–670.

Bertocchi G, Bozzano M. 2015. Family structure and the education gender gap: evidence from Italian provinces. CESifo Economic Studies, Special Issue on the Determinants of Gender Gaps, **61**: 263–300.

Billari FC. 2008. Lowest-low fertility in Europe: exploring the causes and finding some surprises. *The Japanese Journal of Population* **6**(1): 2–18.

Bongaarts J, Watkins SC. 1996. Social interactions and contemporary fertility transitions. *Population and Development Review* **22**: 639–682.

Booth AL, Kee HJ. 2009. Intergenerational transmission of fertility patterns. *Oxford Bulletin of Economics and Statistics* **71**(2): 0305–9049.

Börsch-Supan A, Brandt M, Hunkler C, Kneip T, Korbmacher J, Malter F, Schaan B, Stuck S, Zuber S. 2013. Data resource profile: the Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology* **42**: 992–1001.

Braithwaite DO, Wackernagel Bach B, Baxter LA, DiVerniero R, Hammonds JR, Hosek AM, Willer EK, Wolf BM. 2010. Constructing family: a typology of voluntary kin. *Journal of Social and Personal Relationships* **27**: 388–407.

Bras H, Van Tilburg T. 2007. Kinship and social networks: a regional analysis of sibling relations in twentieth-century Netherlands. *Journal of Family History* **32**(3): 296–322.

Bras H, Van Bavel J, Mandemakers K. 2013. Unraveling the intergenerational transmission of fertility: genetic and shared-environment effects during the demographic transition in the Netherlands, 1810–1910. *The History of the Family*. DOI:10.1080/1081602X.2013.803491.

Buchowski M. 2010. Family in Europe: urban and rural contexts compared. In *Family, Kinship and State in Contemporary Europe*, Vol. **3**, Perspectives on Theory and Policy, Heady P, Kohli M (eds). Campus: Frankfurt; 295–314.

Caldwell JC. 1978. A theory of fertility: from high plateau to destabilization. *Population and Development Review* **4**(4): 553–577.

Dahlberg J. 2013. Family influence in fertility: a longitudinal analysis of sibling correlations in first birth risk and completed fertility among Swedish men and women. *Demographic Research* **29**(9): 233–246.

De Vries J, Kalmijn M, Liefbroer AC. 2009. Intergenerational transmission of kinship norms? Evidence from siblings in a multi-actor survey. *Social Science Research* **38**: 188–200.

DiMaggio P, Garip F. 2012. Network effects and social inequality. *Annual Review of Sociology* **38**: 93–118.

Duranton GA, Rodriguez-Pose A, Sandall R. 2009. Family types and the persistence of regional disparities in Europe. *Journal of Economic Geography* **85**(1): 23–47.

ESHRE Capri Workshop Group. 2005. Fertility and ageing. *Human Reproduction Update* **11**(3): 261–276.

Evans GW, Lepore SJ, Shejwal BR, Palsane MN. 1998. Chronic residential crowding and children's well-being: an ecological perspective. *Child Development* **69**(6): 1514–1523.

Fernández R, Fogli A. 2006. Fertility: the role of culture and family experience. *Journal of the European Economic Association* **4**(2–3): 552–561.

Freedman R, Takeshita JY, Sun TH. 1964. Fertility and family planning in Taiwan: a case study of the demographic transition. *American Journal of Sociology* **70**(1): 16–27.

Gerstel N, Gallagher S. 1994. Caring for kith and kin: gender, employment, and the privatization of care. *Social Problems* **41**(4): 519–539.

Granovetter M. 2005. The impact of social structure on economic outcomes. *Journal of Economic Perspectives* **19**(1): 33–50.

Hank K. 2007. Proximity and contacts between older parents and their children: a European comparison. *Journal of Marriage and Family* **69**: 157–173.

Hamilton WD. 1964a. The genetical evolution of social behaviour. I. *Journal of Theoretical Biology* **7**(1): 1–16.

Hamilton WD. 1964b. The genetical evolution of social behaviour. II. *Journal of Theoretical Biology* **7**(1): 17–52.

Heady P, Gruber S, Ou Z. 2010. Family, kindred and marriage. In *Family, Kinship and State in Contemporary Europe*, Vol. **3**, Perspectives on Theory and Policy, Heady P, Kohli M (eds). Campus: Frankfurt; 31–70.

Hofferth SL, Goldscheider F. 2010. Family structure and transition to early parenthood. *Demography* **47**(2): 415–437.

Höllinger F, Haller M. 1990. Kinship and social networks in modern societies: a cross-cultural comparison among seven nations. *European Sociological Review* **6**(2): 103–124.

Jappens M, Van Bavel J. 2012. Regional family norms and child care by grandparents in Europe. *Demographic Research* **27**(4): 85–120.

Copyright © 2015 John Wiley & Sons, Ltd.

Kantner JF, Potter RG. 1954. Social and psychological factors affecting fertility. XXIV. The relationship of family size in two successive generations. *The Milbank Memorial Fund Quarterly* **32**: 294–311.

Kidd SA, Eskenazi B, Wyrobek AJ. 2001. Effects of male age on semen quality and fertility: a review of the literature. *Fertility and Sterility* **74**(2): 237–248.

Klevmarker A, Swensson B, Hesselius P. 2005. The SHARE sampling procedures and calibrated design weights. In *The Survey of Health, Aging and Retirement in Europe – Methodology*, Boersch-Supan A, Juerges H (eds). Research Institute for the Economics of Aging: Mannheim; 32–33.

Kohler HP, Rodgers JL, Christensen K. 1999. Is fertility behavior in our genes? Findings from a Danish twin study. *Population and Development Review* **25**(2): 253–288.

Kohler HP, Rodgers JL, Miller WB, Skytthe A, Christensen K. 2005. Bio-social determinants of fertility. *International Journal of Andrology* **29**: 46–53.

Kohler HP, Billari FC, Ortega JA. 2006. Low fertility in Europe: causes, implications and policy options. In *The Baby Bust: Who Will Do the Work? Who Will Pay the Taxes?*, Harris FR (ed). Rowman & Littlefield Publishers: Lanham, MD; 48–109.

Kok J. 2009. Family systems as frameworks for understanding variation in extra marital births, Europe 1900-2000. *Romanian Journal of Population Studies* Supplement **2009**: 13–38.

Kolk M. 2013. Multigenerational transmission of family size in contemporary Sweden. *Population Studies: A Journal of Demography.* DOI:10.1080/00324728.2013.819112.

Kotte M, Ludwig V. 2011. Intergenerational transmission of fertility intentions and behaviour in Germany: the role of contagion. *Vienna Yearbook of Population Research* **9**: 207–226.

Kravdal O, Rindfuss RR. 2008. Changing relationships between education and fertility: a study of women and men born 1940 to 1964. *American Sociological Review* **73**(5): 854–873.

Livi-Bacci M. 2001. Too Few Children and Too Much Family. *Daedalus*: **130**(3): 139–155.

Lyngstad TH, Prskawetz A. 2010. Do siblings' fertility decisions influence each other? *Demography* **47**(4): 923–934.

Mathews P, Sear R. 2013. Does the kin orientation of a British woman's social network influence her entry into motherhood? *Demographic Research* **28**(11): 313–340.

Micheli GA. 2012. Two strong families in southern Europe? Re-examining the geography of kinship regimes stemming from the reciprocity mechanisms between generations. *European Journal of Population* **28**: 17–38.

Miller Torr B, Short SE. 2004. Second birth and the second shift: a research note on gender equity and fertility. *Population and Development Review* **30**(1): 109–130.

Montgomery MR, Casterline JB. 1996. Social influence, social learning and new models of fertility. *Population and Development Review* **22**(Supplement: Fertility in the United States: New Patterns, New Theories): 151–175.

Mönkediek B, Bras H. 2014. Strong and weak family ties revisited: reconsidering European family structures from a network perspective. *The History of the Family* **19**(2): 235–259.

Murphy M. 1999. Is the relationship between fertility of parents and children really weak? *Social Biology* **46**: 122–145.

Murphy M. 2013. Cross-national patterns of intergenerational continuities in childbearing in developed countries. *Biodemography and Social Biology* **59**(2): 101–126.

Murphy M, Wang D. 2001. Family-level continuities in childbearing in low-fertility societies. *European Journal of Population* **17**: 75–96.

Newson L, Postmes T, Lea SE, Webley P. 2005. Why are modern families small? Toward an evolutionary and cultural explanation for the demographic transition. *Personality and Social Psychology Review* **9**(4): 360–375.

Oppenheim Mason K. 2001. Gender and family systems in the fertility transition. *Population and Development Review* **27**: 160–176.

Pluzhnikov A, Nolan DK, Tan Z, McPeek MS, Ober C. 2007. Correlation of intergenerational family sizes suggests a genetic component of reproductive fitness. *The American Journal of Human Genetics* **81**(1): 165–169.

Puur A, Oláh LS, Tazi-Preve MI, Dorbritz J. 2008. Men's childbearing desires and views of the male role in Europe at the dawn of the 21st century. *Demographic Research* **19**(56): 1883–1912.

Rabe-Hesketh S, Skrondal A. 2012. *Multilevel and Longitudinal Modeling Using Stata*, 3rd ed., Vol. **1**. Stata Press: College Station, Texas.

Reher DS. 1998. Family ties in Western Europe: persistent contrasts. *Population and Development Review* **24**(2): 203–234.

Reher DS, Ortega JA, Sanz-Gimeno A. 2008. Intergenerational transmission of reproductive traits in Spain during the demographic transition. *Human Nature* **19**: 23–43.

Rijken AJ, Liefbroer AC. 2009. Influences of the family of origin on the timing and quantum of fertility in the Netherlands. *Population Studies* **63**(1): 71–85.

Romero AJ, Ruiz M. 2007. Does familism lead to increased parental monitoring? Protective factors for coping with risky behaviors. *Journal of Child and Family Studies* **16**(2): 143–154.

Copyright © 2015 John Wiley & Sons, Ltd.

Rotering P, Bras H. 2015. With the help of kin? Household composition and reproduction in the Netherlands, 1842–1920. *Human Nature* **26**(1): 102–121.

Salamon S. 1977. Family bounds and friendship bonds: Japan and West Germany. *Journal of Marriage and Family* **39**(4): 807–820.

Santarelli E, Cottone F. 2009. Leaving home, family support and intergenerational ties in Italy: some regional differences. *Demographic Research* **21**(1): 1–22.

Sear R, Coall D. 2011. How much does family matter? Cooperative breeding and the demographic transition. *Population and Development Review* **37**: 81–112.

Skinner GW. 1997. Family systems and demographic processes. In *Anthropological Demography: Toward a New Synthesis*, Kertzer D, Fricke TE (eds). University of Chicago Press: Chicago; 53–95.

Song X, Mare R. 2014. Prospective versus retrospective approaches to the study of intergenerational social mobility. *Sociological Methods & Research*. DOI:10.1177/0049124114554460.

Stegmueller D. 2013. How many countries for multilevel modeling? A comparison of frequentist and Bayesian approaches. *American Journal of Political Science* **57**(3): 748–761.

Tomassini C, Kalogirou A, Grundy E, Fokkema T, Martikainen P, Van Groenou MB, Karisto A. 2004. Contacts between elderly parents and their children in four European countries: current patterns and future prospects. *European Journal of Aging* **1**: 54–63.

Tropf FC, Barban N, Mill MC, Snieder H, Mandemakers JJ. 2015. Genetic influence on age at first birth of female twins born in the UK, 1919-68. *Population Studies*. DOI:10.1080/00324728.2015.1056823.

Udry JR. 1996. Biosocial models of low-fertility societies. *Population and Development Review* **22**(Supplement: Fertility in the United States: New Patterns, New Theories): 325–336.

Van Bavel J, Kok J. 2009. Social control and the intergenerational transmission of age at marriage in rural Holland, 1850-1940. *Population* **64**(2): 343–360.

Viazzo PP. 2010. Macro-regional differences in European kinship culture. In *Family, Kinship and State in Contemporary Europe*, Vol. **3**, Perspectives on Theory and Policy, Heady P, Kohli M (eds). Campus: Frankfurt; 271–294.

Voorpostel M, Van der Lippe T. 2007. Support between siblings and between friends: two worlds apart? *Journal of Marriage and Family* **69**(5): 1271–1282.

Wellman B, Wortley S. 1989. Brothers' keepers: situating kinship relations in broader networks of social support. *Sociological Perspectives* **32**(3): 273–306.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web-site.

Copyright © 2015 John Wiley & Sons, Ltd.