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Grandparental Child Care in Europe: Evidence for Preferential Investment in More Certain Kin

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Abstract: Theories of kin selection and parental investment predict stronger investment in children and grandchildren by women and maternal kin. Due to paternity uncertainty, parental and grandparental investments along paternal lineages are based on less certain genetic relatedness with the children and grandchildren. Additionally, the hypothesis of preferential investment (Laham, Gonsalkorale, and von Hippel, 2005) predicts investment to vary according to available investment options. Two previous studies have tested this hypothesis with small samples and conflicting results. Using the second wave of the large and multinational Survey of Health, Ageing and Retirement in Europe (SHARE), collected in 2006–07, we study the preferential investment hypothesis in contemporary Europe based on self-reported grandparental provision of child care. We predict that 1) maternal grandmothers provide most care for their grandchildren, followed by maternal grandfathers, paternal grandmothers and last by paternal grandfathers; 2) maternal grandfathers and paternal grandmothers provide equal amounts of care when the latter do not have grandchildren via a daughter; 3) women who have grandchildren via both a daughter and a son will look after the children of the daughter more; and 4) men who have grandchildren via both a daughter and a son will look after the children of the daughter more. Results support all four hypotheses and provide evidence for the continuing effects of paternity uncertainty in contemporary kin behavior.

Keywords: child care, grandparental investment, kin selection, paternity uncertainty, relationship certainty, matrilaterality, grandparents, grandchildren
Introduction

Grandparental attachment in humans is a universally found psychological disposition that promotes care and other investments in grandchildren (Hrdy, 2009). In contemporary industrialized societies, increasing life expectancy and wealth provide grandparents with many new opportunities to participate in their grandchildren’s life (Bengtson, 2001). While grandparenting is often characterised by altruism and mutual benefit to giver and recipient, it also includes intergenerational conflicts and preferential treatment of kin. Grandparental investment in grandchildren varies between maternal and paternal kin, typically (but not always) so that maternal kin provide more assistance. This study investigates the prevalence and reasons for biases in grandparental child care provision in contemporary Europe by testing the hypothesis of preferential investment in genetically more certain kin (Laham et al., 2005).

Grandmaternal care has increased child survival in many societies and may thus have been favored by natural selection (e.g., Lahdenperä, Lummaa, Helle, Tremblay, and Russell, 2004; see Coall and Hertwig, 2010 for discussion). The positive impact of especially maternal grandmothers on grandchild survival has been shown for many pre-modern (e.g., Jamison, Cornell, Jamison, and Nakazato, 2002; Voland and Beise, 2002) and developing societies (e.g., Gibson and Mace, 2005; Sear, Mace, and MacGregor, 2000; for reviews see Sear and Mace, 2008; Strassman and Kurapati, 2010). Grandparental investment may be defined as an extension of parental investment: It includes all actions and characteristics of grandparents that increases the fitness of the grandchild and detracts from resource spending in other areas of reproductive importance (Trivers, 1972) or related to survival, development and maintenance (Clutton-Brock, 1991). However, unlike parental investment, grandparental investment typically does not incur a cost to individual fitness since grandparents are often post-reproductive (Rice, Gavrilets, and Friberg, 2010).

Unlike parental investment, which is rarely refused by the recipient, grandparental investment may be partly or wholly rejected by the parents of the grandchildren or by the grandchildren themselves. The question of grandparental access to grandchildren should ideally be distinguished from grandparental willingness to invest, a fact which complicates measurements of investment (Barnett, Scaramella, Neppl, Onta, and Conger, 2010; Pashos and McBurney, 2008).

The proximate mechanisms eliciting grandparental investment are not clear but appear to include emotional closeness and psychological and physiological resemblance. Grandparental investment in developed countries is often measured as the types and amounts of physical, social, emotional, caring and financial resources offered to a grandchild, directly or via its parents. The social and economic importance of contemporary grandparenting is only beginning to be charted and its current evolutionary relevance is subject to debate (see Coall and Hertwig, 2010 and responses). Bias in contemporary investment, especially when not culturally prescribed, may serve as an important clue to the origins and functions of grandparenting in evolutionary history (Pashos and McBurney, 2008).

Other factors besides genetic certainty naturally affect patterns of grandparental child care in modern societies (see Euler and Michalski, 2008). Geographical distance
between grandparent and grandchild has a strong influence on the frequency of child care provided (Hank and Buber, 2009). The number of children and grandchildren is also related to the amount of care provided by grandparents (Smith, 1991). The grandparent’s age and health, position on the labour market, partnership status (Guzman, 2004; Hank and Buber, 2009) and educational level might also be influential factors. Younger grandchildren typically need child care more often than do older ones. Furthermore, national family policies shape the demand for kin assistance with child care (Leitner, 2003). Contemporary European family policy systems stretch – broadly speaking – from the most extensive Nordic welfare state system to Southern Europe, where day care services and family benefits are often limited and wage working parents need more informal assistance with child care (Haavio-Mannila and Rotkirch, 2009; Lewis, Campbell, and Huerta, 2008). The intensity of grandparental child care follows these welfare regimes. Grandparents in Northern Europe provide some kind of child care more frequently, while grandparents in Southern Europe provide regular care of a grandchild most often (Fokkema, ter Bekke, and Dykstra, 2008; Hank and Buber, 2009).

**Discriminative grandparental solicitude**

Paternity uncertainty was first proposed as the evolutionary explanation for differential grandparenting (Dawkins, 1989/1976). Males in several species are affected by evolutionary pressures to invest in offspring as a function of paternity certainty (Platek and Shackelford, 2006). Actual nonpaternity rates for humans vary between populations and have been estimated to between two to three percent in contemporary industrialized societies (Anderson, 2006; Bellis, Hughes, Hughes, and Ashton, 2005; Voracek, Haubner, and Fisher, 2008). Contemporary men preferentially invest resources in children to whom they are likely to be related genetically based on facial or odor resemblance (Alvergne, Faurie, and Raymond, 2009; Anderson, Kaplan, and Lancaster, 1999; Burch and Gallup, 2000; Daly and Wilson, 1982). The psychological dispositions of parents and grandparents may also reflect the conditions in our evolutionary past, when nonpaternity rates were probably higher (Gaulin, McBurney, and Brakeman-Wartell, 1997; Hoier, Euler, and Hänze, 2001).

Paternity certainty in grandparenting, where it is also called relationship certainty, means that grandparents would bias investment in grandchildren following the differences in genetic certainty. Only the maternal grandmother has no relationship uncertainty, since she is certain that her daughter and her daughter’s children are genetically related to her (by an average of 0.5 for the daughter and 0.25 for her grandchild). Maternal grandfathers and paternal grandmothers have one kinship link with paternity uncertainty, while the paternal grandfather has two. Therefore the hypothesis of *discriminative grandparental solicitude* predicts that maternal grandmothers invest in their grandchildren the most, followed by maternal grandfathers and paternal grandmothers who invest equally, while paternal grandfathers invest the least (Euler and Weitzel, 1996). This pattern has been confirmed in several studies and for a wide range of grandparent–grandchildren variables, including care provided during childhood, emotional closeness, relationship closeness, financial support, and contact frequencies (see Bishop, Meyer, Schmidt, and Gray, 2009; Chrastil, Getz, Euler, and Stark, 2006; Eisenberg, 1988; Euler, Hoier, and Rohde, 2001; Euler and
Grandparental child care in Europe

Michalski, 2008; Euler and Weitzel, 1996; Hoffman, 1980; Jamison et al., 2002; Kahana and Kahana, 1970; Laham et al., 2005; Scholl Perry, 1996; Smith, 1991; Uhlenberg and Hammill, 1998; for more exact models and genetic estimates depending on expected paternity uncertainty and also on the asymmetric impact of X- and Y-chromosome inheritance, see Chrastil et al., 2006, and Rice et al., 2010).

However, a study of 18th and 19th century Finns and Canadians found no difference in fitness benefits associated with maternal and paternal grandmothers (Lahdenperä et al., 2004), and Alexander Pashos (2000) showed urban and rural Greece paternal grandmothers to be more involved than maternal grandmothers under certain circumstances. Thus family structure, cultural traditions and ecological conditions may strengthen, moderate or override the influence of paternity certainty, depending on the sex and lineage of grandparent (see Sarmaja, 2003).

The preferential investment hypothesis

One problem with the hypothesis of discriminative grandparental solicitude is that maternal grandfathers are commonly found to invest more in their grandchildren than paternal grandmothers do, although they both have the same genetic certainty regarding offspring. This is often explained by incidental exposure, meaning that maternal grandfathers increase their reported involvement due to their spouse, the maternal grandmother, who invests the most (see Gaulin et al., 1997; McBurney, Simon, Gaulin, and Geliebter, 2002; Pollet, Nettle, and Nelissen, 2006). However, Laham et al. (2005) studied reported exposure rates and found greater differences by grandparental sex than within the grandparental couple. Grandchildren were more exposed to grandmothers than to grandfathers, and there was no evidence for a greater exposure of maternal grandfathers compared to paternal grandmothers. Instead, Laham et al. (2005) argue that the difference between maternal grandfathers and paternal grandmothers can be explained by preferential investment in more certain kin. This refined hypothesis of discriminative grandparental investment allows for ecological and situational adjustments. The preferential investment hypothesis predicts grandparental investment to change according to the degree of genetic relatedness, but also according to the availability of other investment alternatives as represented by the existence of grandchildren by sons or by daughters. If women and men have children and grandchildren of both sexes they are expected to invest more in their daughter’s children (uterine grandchildren) than their son’s children (agnatic grandchildren). In the absence of uterine grandchildren, both sexes are expected to invest more in their son’s children. Thus, in the case of a typical child, maternal grandfathers would invest more because paternal grandmothers have a more certain investment option through another, uterine grandchild. If more certain outlets are unavailable, similar investment levels are predicted by the maternal grandfather and the paternal grandmother.

The hypothesis of preferential investment in more certain kin was first tested with survey data from 787 psychology students. The students were asked to rate their emotional closeness to each of their biological grandparent on a “feeling thermometer” from 0 (cold or negative feelings) to 100 (warm or positive feelings) and to report how often they had seen each grandparent beginning from early childhood. On average, students felt somewhat closer to their maternal grandfather than to their paternal grandmother, although both rated...
around 75 “degrees” and the difference was not statistically significant for students who had all four grandparents alive. However, the presence of cousins on either side affected emotional proximity, which was explained by both the diffusion effect (a grandparent having more grandchildren to invest in, regardless of the impact of relationship certainty) and preferential investment in genetically more certain kin. The gap in emotional closeness was biggest when the maternal grandfather had no other uterine grandchildren (making his score almost 80 “degrees”) while the paternal grandmother had uterine grandchildren (making her score around 72) (Laham et al., 2005). In a recent study, Bishop et al. (2009) studied 193 college students who have all four grandparents alive. This study considered a wide range of different forms of investment. The results showed discriminative grandparental support according to kin lineage but did not find diminishing differences between maternal grandfathers and paternal grandmothers when the latter had no better investment outlets, as the preferential investment hypothesis predicts.

**Alternative explanations**

There are two other main explanations for biased grandparenting: women’s stronger disposition to care (the sex effect) and matrilineal kin ties (the matrilateral effect). These explanations partly overlap with and partly challenge the hypotheses of discriminative grandparental solicitude and preferential investment. First, due to many factors including pregnancy, lactation, paternity uncertainty and cultural traditions, humans typically exhibit sex-specific reproductive strategies where women invest more in children than do men. This appears to be reflected in several evolved psychological dispositions, for instance making women on average more empathetic and caring towards their kin and towards young children (Rotkirch and Janhunen, 2010). The gender difference is especially clear for the measure we use in this study, direct care for children, which women provide more than men do in all known societies. The sex effect predicts that kin, and especially female kin, invest more resources in their female than male relatives, irrespective of lineage, because women are more often in charge of the children and because women are (or are perceived to be) more reliable and efficient parents. For instance, Euler and Weitzel (1996) explained higher care by maternal grandfathers, as compared to paternal grandmothers, as a combination of paternity uncertainty and sex specific reproductive strategies.

Second, humans appear to have cultural or psychological predispositions that favor helping patterns through maternal kin. A matrilateral effect may have developed either as a proximate mechanism for paternity uncertainty, or as an alternative, ultimate reason for biased grandparental investment (Gaulin et al., 1997; Pashos and McBurney, 2008). Given higher maternal than paternal investment, parents often contribute most to their fitness by helping their daughter with child care, and the daughter in turn is likely to have the major responsibility for her children. Thus both the grandparental and parental generation may be inclined to favor matrilateral assistance. This pattern has received empirical support, especially in studies of aunts and uncles (McBurney et al., 2002). Regarding grandparents, the matrilateral effect predicts that maternal grandparents will invest more than paternal grandparents (see Euler and Weitzel, 1996).

Compared with theories stressing paternity certainty, the sex and matrilateral effects are more sensitive towards the motivations of the parental generation vis-à-vis their own
parents. For instance, they predict that mothers of young children, being typically responsible for child care arrangements, are most inclined to seek help from their own mothers (sex effect) or parents (matrilateral effect). Unfortunately empirical tests of paternity certainty, the sex effect and the matrilateral effect often tend to overlap and evidence for one can often also be interpreted as evidence for the other (Pashos, 2000). Below, we aim to compare these alternative explanations when possible.

Measure and hypotheses

Both previous studies of the preferential investment hypothesis (Bishop et al., 2009; Laham et al., 2005) have used small and unrepresentative data where grandparental investment is investigated from the grandchildren’s point of view. The present study uses a large multinational and representative survey where the respondents are the grandparents. We measure grandparental investment as child care provided when the child’s parents are absent.

We test four hypotheses which are linked to the paternity uncertainty and the preferential investment hypothesis. We measure grandparental investment as child care provided and reported by grandparents to their adult children. Child care is an investment of time and care into a grandchild. It can be seen as a more direct investment than simply spending time with a grandchild (Laham et al., 2005) and definitely as a more direct investment than mere contacts between a grandparent and a grandchild. Child care is also a form of investment that exists in both subsistence societies and modern welfare states (Dawkins, 1989/1976; Euler and Michalski, 2008; Hrdy, 2009).

As outlined above, the preferential investment hypothesis generates four testable predictions:

H1) Maternal grandmothers most often provide care for their grandchild, followed by the paternal grandfather and then by the paternal grandmother, while the paternal grandfather provides least care.
H2) Maternal grandfathers and paternal grandmothers provide child care with the same intensity, if the paternal grandmothers do not have a grandchild via a daughter.
H3) Women who have a grandchild via both a daughter and a son will look after more the child of the daughter.
H4) Men who have a grandchild via both a daughter and a son will look after more the child of the daughter.

Our hypotheses also partly test for sex effects and matrilateral effects. In contrast to the preferential investment hypothesis, the sex effect hypothesis predicts higher female care provision, so both types of grandmothers should invest more than grandfathers do (H1) and paternal grandmothers should provide more child care than maternal grandfathers do in all circumstances (H2). The sex effect hypothesis coincides with the preferential investment hypothesis for H3 and H4, where both predict that grandparents prefer caring for the daughter’s children (or alternatively, that the daughter will solicit more help from her own parents). The matrilateral hypothesis predicts that maternal grandparents will look after the
grandchild more than will paternal grandparents, consistent with H1, H3 and H4 but contrary to H2, where it instead predicts higher investment by the maternal grandfather in all cases.

**Table 1.** Summary of theoretical explanations and hypotheses for differential grandparental investment

<table>
<thead>
<tr>
<th>Preferential investment</th>
<th>Sex effect</th>
<th>Matrilateral effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main claim</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paternity uncertainty biases grandparental investment towards the genetically most certain available grandchildren</td>
<td>Sex-specific reproductive strategies and cultural traditions make women more likely to provide child care and to interact with female kin</td>
<td>Due to paternity uncertainty and/or sex-specific reproductive strategies, kin help follows the maternal line more than the paternal line</td>
</tr>
<tr>
<td><strong>H1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child care varies by degree of probable genetic relatedness: MGM &gt; MGF &gt; PGM &gt; PGF</td>
<td>+</td>
<td>- (grandmothers are always expected to invest more than grandfathers do)</td>
</tr>
<tr>
<td><strong>H2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MGF and PGM invest equally, if PGM lack uterine grandchildren</td>
<td>+</td>
<td>- (grandmothers are always expected to invest more than grandfathers do)</td>
</tr>
<tr>
<td><strong>H3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having a choice between uterine and agnatic grandchildren, women invest more in the former</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>H4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having a choice between uterine and agnatic grandchildren, men invest more in the former</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

*Note:* MGM = Maternal grandmother, MGF = Maternal grandfather, PGM = Paternal grandmother, PGF = paternal grandfather
Materials and Methods

The data we used in our study is the second wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) which was collected in 2006–2007. The target population consists of all people born in 1956 or earlier who are speaking the official language of the country and do not live abroad or in an institution, such as a prison, during the entire fieldwork period, plus their spouses/partners independent of age.

The SHARE data collection is based on a computer-assisted personal interview. The aim of the SHARE survey project is to collect longitudinal data of Europeans’ ageing process. The data includes variables measuring the respondents’ physical health, mental well being, financial situation and social support. The second wave of SHARE was carried out in thirteen European countries (Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, The Czech Republic, and Poland).

The total number of participants in the SHARE second wave dataset is 33,281, of whom 44.3% are men and 55.7% are women. For the present study, we included only respondents who have a biological child/children, at least one grandchild who is not over 14 years old, and who have responded to the question about child care (n = 8,667, grandmothers n = 4,899, grandfathers n = 3,768). The present dataset was constructed so that observations are the original respondent’s (the grandparent’s) children, resulting in a total of 22,264 observations (on average 2.6 children per respondent). The grandparental variable by lineage (maternal grandmother, maternal grandfather, paternal grandmother, paternal grandfather) vis-à-vis each child was then determined for every grandparent-parent dyad.

Four additional variables were generated for hypotheses 2, 3 and 4. The first variable contrasts maternal grandfathers who have only uterine grandchildren with paternal grandmothers who have only agnatic grandchildren (H2). The second variable contrasts those maternal grandfathers who have only uterine grandchildren with paternal grandmothers who have both agnatic and uterine grandchildren (H2). The third variable includes only those grandmothers who have both agnatic and uterine grandchildren (H3), and the fourth variable includes grandfathers who have both uterine and agnatic grandchildren (H4).

All grandparents were first asked whether they had looked after their grandchildren during the time since the last interview (longitudinal respondents) or during the last twelve months (new respondents) without the presence of the parents. The grandparents were then asked how often they looked after their grandchildren (since the last interview/during the last twelve months). The alternatives were almost daily, almost every week, almost every month and less often. Grandparents were asked separately about providing child care to the children of each of their adult children. We categorized our dependent variable, the frequencies of looking after a particular grandchild, into two categories: 0 = less often than almost every week, 1 = almost daily or every week. This is because we are interested especially in frequently provided grandparental childcare, which we interpret to indicate a stronger investment in a grandchild than only occasionally provided child care (see also Hank and Buber, 2009).

Logistic regression was used to predict the dichotomously coded childcare provided...
by the grandparent. We first fitted models with only the grandparental indicator and age of the grandparent included as independent variables. To assess the role of grandparent’s background characteristics, we then further adjusted for grandparent’s self reported health, education, partnership status, job situation, number of children and grandchildren, geographical distance to child, children’s year of birth and country (see Table 2). To examine potential cultural differences, we grouped the countries according to type of family policy regimes (Southern Europe: Spain, Italy and Greece; Eastern Europe: the Czech Republic and Poland; Central Europe: Switzerland, France, Germany, Austria and Belgium; Northern Europe: Netherlands, Sweden and Denmark) and fitted the models separately in these groups. The results were illustrated by calculating the predicted probabilities of childcare by kin lineage from the logistic regression models. Grandparental indicator variables were treated as categorical variables in all models.

Table 2. Descriptive statistics

<table>
<thead>
<tr>
<th>Grandparent (%)</th>
<th>% / mean</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal grandmother</td>
<td>28.4</td>
<td>6199</td>
</tr>
<tr>
<td>Maternal grandfather</td>
<td>21.4</td>
<td>4663</td>
</tr>
<tr>
<td>Paternal grandmother</td>
<td>28.3</td>
<td>6188</td>
</tr>
<tr>
<td>Paternal grandfather</td>
<td>21.9</td>
<td>4786</td>
</tr>
<tr>
<td>Grandparent's year of birth (mean)</td>
<td>1941</td>
<td>8666</td>
</tr>
<tr>
<td>Grandparent's years of education (mean)</td>
<td>10</td>
<td>8381</td>
</tr>
<tr>
<td>Grandparent's self reported health (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>8.5</td>
<td>733</td>
</tr>
<tr>
<td>Very Good</td>
<td>16.9</td>
<td>1465</td>
</tr>
<tr>
<td>Good</td>
<td>37.8</td>
<td>3274</td>
</tr>
<tr>
<td>Fair</td>
<td>26.8</td>
<td>2324</td>
</tr>
<tr>
<td>Poor</td>
<td>10.0</td>
<td>869</td>
</tr>
<tr>
<td>Grandparent's partnership status (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living with a spouse/partner</td>
<td>71.5</td>
<td>6194</td>
</tr>
<tr>
<td>Living as a single</td>
<td>28.5</td>
<td>2472</td>
</tr>
<tr>
<td>Grandparent's job situation (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>20.1</td>
<td>1730</td>
</tr>
<tr>
<td>Other</td>
<td>79.9</td>
<td>6898</td>
</tr>
<tr>
<td>Grandparent's number of children (mean)</td>
<td>2.6</td>
<td>8667</td>
</tr>
<tr>
<td>Grandparent's number of grandchildren (mean)</td>
<td>3.7</td>
<td>8667</td>
</tr>
<tr>
<td>Grandparent's distance to child (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living in the same household</td>
<td>10.0</td>
<td>2178</td>
</tr>
<tr>
<td>In the same building</td>
<td>4.8</td>
<td>1041</td>
</tr>
<tr>
<td>Less than 1 kilometer away</td>
<td>13.3</td>
<td>2893</td>
</tr>
<tr>
<td>Between 1 and 5 kilometers away</td>
<td>18.3</td>
<td>4002</td>
</tr>
<tr>
<td>Between 5 and 25 kilometers away</td>
<td>23.0</td>
<td>5009</td>
</tr>
<tr>
<td>Between 25 and 100 kilometers away</td>
<td>13.7</td>
<td>2979</td>
</tr>
</tbody>
</table>
Grandparental child care in Europe

<table>
<thead>
<tr>
<th>Distance from Grandparents</th>
<th>Probability</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 to 500 kilometers</td>
<td>10.8</td>
<td>2349</td>
</tr>
<tr>
<td>More than 500 kilometers</td>
<td>2.9</td>
<td>635</td>
</tr>
<tr>
<td>Abroad</td>
<td>3.4</td>
<td>735</td>
</tr>
<tr>
<td>Children's year of birth</td>
<td>1969</td>
<td>21836</td>
</tr>
</tbody>
</table>

Country

Southern Europe:
Spain 6.4 555
Italy 9.2 797
Greece 6.6 573

Eastern Europe:
Czechia 8.5 734
Poland 10.1 879

Central Europe:
Switzerland 3.8 331
France 9.1 795
Germany 6.6 574
Austria 4.2 363
Belgium 9.7 842

Northern Europe:
Netherlands 9.3 806
Sweden 8.6 744
Denmark 7.8 674

Results

Hypothesis 1

We first investigate the general hypothesis of discriminative grandparental investment. The predicted probabilities of grandparental child care in Europe follow the expected pattern (Table 3, Figure 1). Maternal grandmothers (MGM) have the highest probability to look after their grandchildren, followed by maternal grandfathers (MGF), then by paternal grandmothers (PGM) and finally paternal grandfathers (PGF).
Table 3. Logistic regression models (odds ratios and standard errors) predicting grandparental care by lineage

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Southern Europe</th>
<th>Eastern Europe</th>
<th>Central Europe</th>
<th>Northern Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGF</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
</tr>
<tr>
<td>MGF</td>
<td>1.61‡ (0.10)</td>
<td>1.43‡ (0.17)</td>
<td>1.54‡ (0.23)</td>
<td>1.92‡ (0.20)</td>
<td>1.47‡ (0.21)</td>
</tr>
<tr>
<td>PGM</td>
<td>1.22‡ (0.07)</td>
<td>1.08 (0.13)</td>
<td>1.44‡ (0.20)</td>
<td>1.21 (0.13)</td>
<td>1.26 (0.17)</td>
</tr>
<tr>
<td>MGM</td>
<td>1.89‡ (0.11)</td>
<td>1.93‡ (0.22)</td>
<td>2.08‡ (0.28)</td>
<td>1.91‡ (0.19)</td>
<td>1.68‡ (0.23)</td>
</tr>
</tbody>
</table>

Adjusted

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Southern Europe</th>
<th>Eastern Europe</th>
<th>Central Europe</th>
<th>Northern Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGF</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
<td>1.00 (ref)</td>
</tr>
<tr>
<td>MGF</td>
<td>1.79‡ (0.12)</td>
<td>1.66‡ (0.20)</td>
<td>1.73‡ (0.27)</td>
<td>2.09‡ (0.23)</td>
<td>1.53‡ (0.23)</td>
</tr>
<tr>
<td>PGM</td>
<td>1.38‡ (0.08)</td>
<td>1.01 (0.13)</td>
<td>1.33* (0.20)</td>
<td>1.37† (0.15)</td>
<td>1.23 (0.18)</td>
</tr>
<tr>
<td>MGM</td>
<td>2.26‡ (0.14)</td>
<td>1.89‡ (0.24)</td>
<td>2.34‡ (0.33)</td>
<td>2.52‡ (0.27)</td>
<td>2.02‡ (0.29)</td>
</tr>
</tbody>
</table>

Note: MGM = Maternal grandmother, MGF = Maternal grandfather, PGM = Paternal grandmother, PGF = paternal grandfather, * p < 0.05, † p < 0.01, ‡ p < 0.001

Figure 1. Grandparental care (predicted probabilities and 95% confidence intervals) by lineage.

Table 3 and Figure 2 show the predicted probabilities of the differences in grandparental investment in child care in four different European family policy regimes (Southern Europe: Spain, Italy and Greece; Eastern Europe: the Czech Republic and Poland; Central Europe: Switzerland, France, Germany, Austria and Belgium; Northern Europe: Netherlands, Sweden and Denmark). Grandparental child care varies from the
most extensive care provision found in Southern Europe to Eastern Europe, then to Central Europe and finally to Northern Europe, where grandparents have the smallest probabilities to look after their grandchildren. However, despite this variation, in all four European regimes grandparental investment varies by maternal and paternal lineage.

**Figure 2.** Grandparental care (predicted probabilities and 95% confidence intervals) by lineage and country group

![Unadjusted and Adjusted Graphs]

*Note:* MGM = Maternal grandmother, MGF = Maternal grandfather, PGM = Paternal grandmother, PGF = Paternal grandfather

**Hypothesis 2**

Next, we examine the preferential investment hypothesis by studying how alternative investment options affect care provision. We compare grandparents with
predicted equal amounts of investment, i.e., maternal grandfathers who have only uterine grandchild(ren) (via a daughter) and those paternal grandmothers who have only agnatic grandchild(ren) (via a son). The results are presented in Figure 3 and show that the predicted probabilities support the preferential investment hypothesis. The difference in predicted probability to provide child care is small and not statistically significant (unadjusted OR = 0.98, SE = 0.09, \( p = .852 \); adjusted OR = 1.04, SE = 0.11, \( p = .689 \)) between maternal grandfathers and paternal grandmothers when the latter do not have a preferential kin (grandchild via daughter) to invest in.

**Figure 3.** Grandparental care (predicted probabilities and 95% confidence intervals) by lineage

![Graph showing predicted probabilities of grandparental care](image)

*Note:* MGF (only uterine) = Maternal grandfather with only uterine grandchild(ren), PGM (only agnatic) = Paternal grandmother with only agnatic grandchild(ren).

Second, we investigate the opposite possibility, that is, care provision when preferential kin does exist. Figure 4 shows child care provision by those maternal grandfathers who have grandchild(ren) only via a daughter versus those paternal grandmothers who have grandchild(ren) via both daughter and son. The predicted probabilities support our hypothesis: men who have only uterine grandchildren look after the child more than do women who have both agnatic and uterine grandchildren (unadjusted OR = 0.50, SE = 0.04, \( p < 0.001 \); adjusted OR = 0.60, SE = 0.06, \( p < 0.001 \)).
Figure 4. Grandparental care (predicted probabilities and 95% confidence intervals) by lineage

![Graph showing predicted probabilities and 95% confidence intervals for grandparental care by lineage.](image)

Note: MGF (only uterine) = Maternal grandfather with only uterine grandchild(ren), PGM (uterine and agnatic) = Paternal grandmother with both uterine and agnatic grandchildren.

**Hypothesis 3**

According to our third hypothesis women who have both uterine and agnatic grandchildren will provide more care to the child of the daughter. Figure 5 presents women who have a grandchild via both a daughter (maternal grandmothers) and a son (paternal grandmothers). The predicted probabilities follow our third hypothesis, as women with both uterine and agnatic grandchildren are more likely to look after the former compared to the latter (unadjusted OR = 1.76, SE = 0.11, p < 0.001); adjusted OR = 2.08, SE = 0.14, p < 0.001).
Figure 5. Grandparental care (predicted probabilities and 95% confidence intervals) by lineage

![Bar chart showing predicted probabilities and 95% confidence intervals for grandparental care by lineage.](chart)

Note: MGM (uterine and agnatic) = Maternal grandmother with both uterine and agnatic grandchildren, PGM (uterine and agnatic) = Paternal grandmother with both uterine and agnatic grandchildren.

**Hypothesis 4**

Finally, we tested the effects of the preferential investment hypothesis on grandfathers. Figure 6 shows men who have a grandchild via both a daughter (maternal grandfathers) and a son (paternal grandfathers). The predicted probabilities are in line with our fourth hypothesis, predicting that maternal grandfathers look after the grandchild more than do paternal grandfathers (unadjusted OR = 1.76, SE = 0.13, \( p < 0.001 \); adjusted OR = 1.99, SE = 0.17, \( p < 0.001 \)).
Figure 6. Grandparental care (predicted probabilities and 95% confidence intervals) by lineage

Note: MGF (uterine and agnatic) = Maternal grandfather with both uterine and agnatic grandchildren, PGF (uterine and agnatic) = Paternal grandfather with both uterine and agnatic grandchildren.

Discussion

We have examined grandparental child care provision in 13 contemporary European countries. Our aim was to test the hypothesis of discriminative grandparental solicitude and its refined version, the hypothesis of preferential investment in more certain kin. When possible, we also tested two alternative explanations for discriminative grandparental care, namely, the sex effect of women being more inclined to child care provision than men and the matrilateral effect of kin assistance following the mother’s lineage rather than the father’s. In all our analyses we controlled for several variables (grandparent’s year of birth, self-reported health, years of education, partnership status, job situation, number of children and grandchildren, geographical distance to child, children’s year of birth and country) which did not substantially change the outcome.

In agreement with most other studies of contemporary grandparenting (see Coall and Hertwig, 2010), we found that maternal grandmothers are most likely to look after the grandchild (20.1% probability of looking after the child at least about once a week), followed by maternal grandfathers (17.6%), paternal grandmothers (13.9%), and paternal grandfathers (11.7%). We conclude that grandparental investment conceptualized as child care in the absence of the child’s parents follows the general pattern of discriminative grandparental solicitude (Euler and Weitzel, 1996). This is in line with the matrilateral effect but contradicts the sex effect, which predicts grandmothers to provide care more than grandfathers in each category of grandparents.
Second, we tested whether maternal grandfathers and paternal grandmothers provide childcare with the same intensity if the latter do not have a grandchild via daughter. Our analysis clearly supports this preferential investment hypothesis (Laham et al., 2005). When women do not have more genetically certain investment outlets, the difference between investment by paternal grandmothers and maternal grandfathers disappears and they “match” each other to a surprisingly high degree (M(GF): 20.9%, P(GM): 20.6%). This finding contradicts the results predicted by both the sex effect and the matrilateral effect. It provides the most unequivocal support for the preferential investment hypothesis compared with other explanations.

Finally, we further tested the preferential investment hypotheses by studying whether women and men who have both agnatic and uterine grandchildren will provide care for the child of the daughter more. Our results support also these two hypotheses, with maternal grandmothers being more likely than paternal grandmothers (18.1% vs. 11.1%) and maternal grandfathers more likely than paternal grandfathers to (15.7% vs. 9.6%) to look after the children at least once a week. Both results can also be interpreted as support for the sex effect hypothesis and the matrilateral effect hypothesis, since they measure preferential investment in daughters compared to sons.

The present study has several advantages. The large, multinational and population-based sample provides a strong setting to examine grandparental care in different parts of Europe. Data of grandparental care was reported by the grandparents themselves, not by grandchildren (as Bishop et al., 2009) or by grandchildren retrospectively (as Laham et al., 2005). It has been argued that grandparents are not the ideal source of information, as they may wish to present themselves as equal investors in all children (see Euler and Weitzel, 1996; Euler et al., 2001; Laham et al., 2005). Our findings do not support this assumption, as we observed clear and consistent variance of grandparental assistance provided to different children of the grandparent.

Hank and Buber (2009) have analysed grandparental child care in Europe with data from the first wave of SHARE. Their findings are consistent with our results, which are based on the second wave of SHARE, although they focus on the differences between countries, not between grandparents. These authors emphasize that the differences between European countries can be explained by women’s (in this case, grandmother’s) participation in the labour market and the availability of institutional child care, which both are more common in Northern than in Southern Europe. They also suggest that cross-national differences may be explained by different household co-residence traditions (Hank and Buber, 2009). In Southern Europe three-generational co-residence is more common than in Northern or Central Europe, and consequently, grandparental child care is more intense in the South. We adjusted for country, grandparent’s job situation, geographical distance to the adult child (which includes those living in the same household), among other factors. However, these adjustments did not change the discriminative logic of grandparental child care, which prevails despite the varying intensity of provided child care across European family policy regimes.

Unfortunately, our data does not include information on the sex of the grandchild. Therefore we could not test for the variation in grandparental solicitude between grandsons and granddaughters. Some recent studies (see Chrastil et al., 2006; Fox, Sear, Beise,
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Ragsdale, Voland, and Knapp, 2010; Rice et al. 2010; see also Euler, in press) suggest that asymmetric sex chromosome inheritance, and especially the different degrees of X-relatedness between a grandparent and a grandchild, can explain why women of paternal kin sometimes invest more in children than maternal kin.

Future studies should test whether contemporary grandparents increase their inclusive fitness by looking after grandchildren (see Coall and Hertwig, 2010 for review; see also Kaptijn, Thomese, van Tilburg, and Liefbroer, 2010). As SHARE is panel data, it is also possible to test the effect of the incidental exposure more reliably than with snapshot data (see Laham et al., 2005). In addition, other measures of grandparental investment besides child care, such as economic transfers, emotional support, and assistance during crisis situations such as divorce and illness merit investigation. Finally, the role of parents as solicitors and gatekeepers of grandparental care need to be better assessed (see Michalski, 2010). Paternal grandparents may wish to provide more child care and other investment than what the child’s parents grant them access to do. In that case, the relations between parents and daughter-in-law in particular would regulate grandparental investment, regardless of relationship certainty. Only by measuring also parental attitudes could the relative impact of grandparental willingness to invest and parental willingness to receive help be ascertained.

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