Matrilineal Advantage in Grandchild–Grandparent Relations

Christopher G. Chan, Glen H. Elder, Jr.
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The bilateral nature of American kinship patterns allows both sides of a family to have equal access to grandchildren (Cherlin & Furstenberg, 1991). Yet, research consistently shows a matrilineal advantage in the quality of grandchild–grandparent bonds. Ties involving grandchildren and maternal grandparents are closer, more meaningful, and more satisfying than those relating to the paternal side (Kahana & Kahana, 1970; Kivett, 1991; Matthews & Sprey, 1985; Somary & Stricker, 1998). These close relationships are likely to persist after grandchildren have left their primary families to set up independent households and even after family disruptions resulting from marital separation or dissolution (Cherlin & Furstenberg, 1991; Clingempeel, Colyar, Brand, & Hetherington, 1992; Eisenberg, 1988; Hodgson, 1992).

Why are grandchildren closer to their maternal grandparents? Remarkably, this question has not been fully addressed in the literature on grandchild–grandparent relations. Researchers often argue that matrilineal advantage is the result of the “kinkeeping” activities of women (Hagestad, 1985, 1986; Rossi & Rossi, 1990). However, they have yet to specify and empirically evaluate the family mechanisms that link gender differences in family roles to better relations between grandchildren and maternal grandparents (e.g., Eisenberg, 1988; Hodgson, 1992; Matthews & Sprey, 1985). Are grandchildren closer to the maternal side solely because of mothers’ kinkeeping, or is it more a result of differences in how this activity is performed for parents and parents-in-law? What role do fathers play in shaping relations between grandchildren and their paternal and maternal grandparents?

Identifying the sources of matrilineal advantage in grandchild–grandparent relations for grandchildren in intact families helps us understand why some, but not all, grandparents emerge as significant resources for grandchildren during times of crisis or need. Maternal grandparents are more likely than their paternal counterparts to assume a significant role in the lives of grandchildren in single-parent families (Cherlin & Furstenberg, 1991; Kivett, 1991). Most explanations for the greater role of the maternal side during these situations have focused on the options and constraints created by the transition to single parenthood, such as maternal custody of children or parental coresidence after an out-of-wedlock birth (Aldous, 1995; Hagestad, 1986). However, it may also be the case that the significant role of maternal grandparents after the transition is a result of family inequalities that produced matrilineal advantage before crises erupted. In other words, the factors that generate matrilineal advantage in grandchild–grandparent ties in two-parent families may turn maternal grandparents into “latent resources” who then emerge as significant figures in grandchildren’s lives after the transition to single parenthood (Clingempeel et al., 1992). Thus, understanding the causes of the matrilineal bias of grandchildren in intact families brings a broader perspective on the emergence of significant relations between grandchildren and grandparents.

In light of these issues, in the present study we examine the sources of matrilineal advantage in grandchild–grandparent relations. Focusing on grandchildren who are still living in two-parent families, we argue that the observed advantage of the maternal side in relations with grandchildren (G3, the third generation) arises from variations in the quality of ties between the middle generation (G2, the second gen-


eration) and grandparents (G1, the first generation). Specifically, better relations between mothers and the maternal side of the family—as measured by a higher likelihood of social support and more consen-
sial ties between grandchildren and maternal grandpar-
ents. For some grandchildren, variations in fathers’ rela-
tions favoring the paternal side also create an ad-
vantage in ties to paternal grandparents. However, the
greater likelihood of maternal bias in parent-
grandparent relations leads to an overall matrilineal ad-
antage in grandchild–grandparent relations.

We examine these hypotheses empirically by us-
ing data from the Iowa Youth and Families Project, a
study of two-parent families in rural Iowa. We first
examine lineage differences in the support and affect-
tive relations of fathers and mothers with the grand-
parent generation. Then, using fixed-effect models, we
consider whether these lineage differentials in
G2–G1 ties can account for the matrilineal advan-
tage in grandchild–grandparent relations. The theo-
retical and practical implications of the results are
discussed in the Discussion and Conclusion.

Explaining Matrilineal Advantage: The Role of
Parents in the Middle

The sources of matrilineal advantage in grandchild–
grandparent relations have yet to be comprehensively
examined in the research literature. Most articles have
been theoretically oriented, discussing possible ex-
planations for closer ties between grandchildren and
maternal grandparents without providing an empiri-
cal assessment of the hypothesized relationships
Empirical studies, on the other hand, have simply
documented the existence of matrilineal advantage
without attempting to link lineage differences to other
correlates of grandchild–grandparent relations, such
as proximity, health, and social support (Hodgson,
1992; Matthews & Sprey, 1985; Uhlenberg & Ham-
mill 1998).

In this section, we address these limitations by out-
lining specific mechanisms that create matrilineal ad-
vantage in grandchild–grandparent relations. Our
conceptual framework departs from previous studies
by focusing attention on both parents in a two-parent
family and on lineage differentials in their relations
with grandparents. Researchers in the past have drawn
on Hagestad’s (1985, 1986) theoretical work on grand-
child–grandparent relations to argue that women’s
kinkeeping—the facilitation of contact among kin—
explains close ties between grandchildren and mater-
nal grandparents. However, they have yet to specify
the mechanisms that link the provision of support,
the organization of family gatherings, and other kin-
keeping activities to closer ties between grandchil-
dren and maternal rather than paternal grandparents.
We argue that kinkeeping, in and of itself, cannot ac-
count for matrilineal advantage in grandchild–grand-
parent relations. What matters instead are differentials
in kinkeeping (as measured by social support) and
closer relations between the mother and the maternal
side. We also emphasize that it is important to con-
sider mothers as well as fathers when explaining
matrilineal advantage because either parent can cre-
ate advantages and disadvantages favoring maternal
and paternal grandparents. We begin by discussing
the central role of the middle generation for the qual-
ity of the grandchild–grandparent connection. Then,
we specify how variations in the quality of parent-
grandparent ties are linked to matrilineal advantage.
Finally, we draw a number of hypotheses that we ex-
amine in the empirical analyses.

Any effort to explain matrilineal advantage must
begin by considering the role of the middle genera-
tion—the parents of grandchildren—for the grand-
child-grandparent connection. In a two-parent fam-
ily, fathers and mothers influence the amount of time
and attention that grandchildren can devote to each
grandparent because of their central position in the
sequence of parent–child bonds (i.e., G3–G2 and
G2–G1) that connect grandchildren to grandparents
and because of their consanguineal and affinal ties to
grandparents from both sides of the family (Hagestad,
1986; King & Elder 1995; Kivett, 1991; Rossi & Rossi,
1990). Thus, G2 parents serve as generational bridges
whose actions can determine the quality of the grand-

This does not preclude grandparents from initiat-
ing and cultivating close intergenerational relations
on their own, especially with adult grandchildren
but, in the case of young grandchildren who still live
at home, we believe that the quality of relations with
a grandchild is likely be contingent on the actions
and interests of parents in the middle. Most of the
joint activities that involve grandparents and young
grandchildren, such as babysitting or going out, re-
quire the cooperation, assistance or, at the very least,
the consent of parents (Matthews & Sprey, 1985;
Robertson, 1976). Moreover, the “norm of noninter-
fERENCE,” which proscribes grandparents from inter-
ferring in the parent–child relationship and which
grandparents seldom violate, provides parents with
great control over the actions of grandchildren, in-
cluding their ability to establish close ties with the
grandparent generation (Aldous, 1995; Cherlin &
Furstenberg, 1991; Johnson, 1985; Kivett, 1991; see
Appendix, Note 1).

This vital role of the middle generation is ex-
pressed in the empirical link between the quality of
G1–G2 relations and the quality of grandchild-grand-
parent bonds. Studies have consistently found that
grandparents who are emotionally close to or receive
support from those in the middle have closer ties
with grandchildren (Kivett, 1991; Pruchno, 1995).
Close affective relations between grandparents and
their adult children set an example that grandchil-
dren may emulate by establishing warm ties with
grandparents (King & Elder, 1995; Whitbeck, Hoyt, &
Huck, 1993). Social support, on the other hand, may
affect grandchild–grandparent relations by creating
opportunities for close ties to develop or by involving
parents and grandparents in a system of exchange,
with grandparents establishing close ties with a grandchild in return for help received from parents (Hogan, Eggebeen, & Clogg, 1993).

These links suggest a connection between lineage differentials in parent-grandparent relations and lineage differentials in the grandchild-grandparent connection. If parents are equally likely to provide support and are equally close to all surviving grandparents, then, in principle, the quality of a grandchild’s relationship with each grandparent will be the same, all else being equal. However, if parents favor one side of the family in their relations with the grandparent generation, then grandchildren will have better relations with grandparents from that side of the family.

Thus, matrilineal advantage in grandchild-grandparent relations is likely to emerge in a family system when at least one parent—usually the mother—has closer relations with the maternal rather than the paternal side. Mothers are more likely to provide support and have closer relations with maternal grandparents for a number of reasons. First, several studies have found that obligations to blood relations have greater relevance than obligations to affinal kin (Powers & Kivett, 1992; Rossi & Rossi, 1990). Thus, given constraints on their time and energy, mothers might be predisposed to provide more aid and have closer relations with their side of the family than their husband’s side. Second, mothers are more likely to have a longer history of close relations with their own parents, especially their mother—the maternal grandmother (Hagestad, 1986). Such a history is likely to be reflected in the present as a warmer relationship between mothers and the maternal side and may well facilitate exchanges of support between these generations (Rossi & Rossi, 1990; Whitbeck et al., 1993). Finally, mothers may have a greater likelihood of supporting their own side of the family simply because they expect parents-in-law to rely on their own daughters (if available) for support and assistance. The presence of such an expectation is possible given that daughters have primary responsibility for caregiving and other support activities in the United States (Lye, 1996; Spitze & Logan, 1990).

These alternative perspectives suggest different underlying causes for the differential treatment of paternal and maternal grandparents by mothers but their consequences are likely to be the same. Closer relations between mothers and the maternal side create the potential for closer relations between grandchildren and the maternal grandparents. If a matrilineal advantage in grandchild-grandparent relations does emerge, it is likely to be an unintentional rather than an intentional consequence of lineage variations in mothers’ actions and feelings. This follows from the bilateral nature of kinship ties in Western societies, which give both sides of the family equal rights to a grandchild (Cherlin & Furstenberg, 1991).

Mothers, of course, are not the sole influence on grandchild-grandparent relations. In a two-parent family, variations in the support and affective relations of fathers with the grandparent generation can also create lineage differences in grandchild-grandparent ties. Fathers can contribute to a matrilineal advantage just like mothers if they favor the maternal side, or they can have a neutral role if they have equinanimous ties with all grandparents. However, we expect that a more likely scenario would involve fathers having closer ties to their own side of the family because of the same pressures that lead mothers to favor their own parents. Thus, variations in the social relations of fathers with grandparents are likely to induce a patrilineal advantage in grandchild-grandparent relations.

Lineage variations in fathers’ and mothers’ relations with grandparents could develop separately, such as when norms of obligation to blood kin lead each parent to independently develop closer ties to their own side of the family. However, spousal differentials could also be connected. The linkage could be causal, with closer relations between mothers and one side of the family facilitating closer relations between fathers and that side of the family. Such a situation could emerge as a result of the kinkeeping role of women, which gives them an influential role in determining the quality of relations of other family members (Hagestad, 1986; Rosenthal, 1985). Alternatively, lineage differentials in father and mother relations with the grandparent generation could be the product of a single underlying process, with both parents jointly deciding to direct their attention to the same or different sides of the family to maximize the gains that may accrue from intergenerational relationships (Becker, 1981; Berk & Berk, 1983). These connections indicate that each parent is influential for grandchild-grandparent relations, and variations in the relations of fathers and mothers with the grandparent generation have to be considered for us to fully explain lineage differentials in grandchild-grandparent ties.

In summary, we argue that matrilineal advantage in grandchild-grandparent relations results from differences in the way mothers and fathers in the middle relate to the members of the grandparent generation, and we expect to find confirmation for a number of hypotheses. The importance of blood relations over affinal ties, the strength of the parent-child bond, and other factors suggest the following:

**Hypothesis 1:** Fathers and mothers in the middle have unequal relations with the grandparent generation, with mothers having closer ties and a greater likelihood of providing support to the maternal side and fathers favoring paternal grandparents.

These lineage differentials in G2–G1 relations are important because previous studies have found the following:

**Hypothesis 2:** Relations between grandparents and the middle generation are linked to the quality of grandchild-grandparent relations. Grandparents who receive support and maintain better relations with the middle generation have closer relationships with grandchildren.

Taken together, Hypotheses 1 and 2 suggest a link between the unequal relations that mothers and fathers
maintain with maternal and paternal grandparents and lineage differentials in the quality of grandchild-grandparent relations. We expect to find evidence favoring the following hypotheses:

**Hypothesis 3**: Closer relations between fathers and the paternal side is linked to closer relations between paternal grandparents and grandchildren. Thus, controlling for fathers' social support and affective relations with grandparents will increase the effect of maternal lineage on grandchild-grandparent relations.

**Hypothesis 4**: The matrilineal advantage in grandchild-grandparent relations is linked to variations in the support and affective relations of mothers with the grandparent generation. Controlling for relations between mothers and grandparents explains away or accounts for the effects of maternal lineage on grandchild-grandparent relations.

In other words, fathers' support and affective relations function as suppressor variables in that the patrilineal biases that they induce suppress the magnitude of overall matrilineal bias in grandchild-grandparent ties. Thus, controlling for these variables would increase the size of the matrilineal bias in grandchild-grandparent relations. Mothers' support and affective relations, on the other hand, are explanatory variables in that they are the source of matrilineal advantage in grandchild-grandparent relations. Thus, controlling for these variables will explain away the effect of lineage in multivariate models.

**Alternative Perspectives on Matrilineal Advantage**

In summary, there is a range of alternative explanations for matrilineal advantage that also deserve consideration if we are to fully understand why grandchild-grandparent relations are unequal. Other researchers studying grandchild-grandparent relations in single-parent families have focused on the consequences of events surrounding the transition to single parenthood. In the case of divorced families, closer relations to maternal grandparents may be conceptualized as the result of custody arrangements formed after marital dissolution (Aldous, 1995; Hagestad, 1986). The G2 mother often retains custody of children after divorce, preserving avenues for contact with maternal grandparents. Help from the maternal grandparents to their daughter increases contact and further enhances relations with the grandchildren. By contrast, relations between grandchildren and the paternal side diminish because fathers tend to drop out of children's lives, making visits from paternal grandparents especially awkward (Cherlin & Furstenberg, 1991).

In the case of single parenthood resulting from a mother giving birth outside of marriage, close ties between the grandchild and maternal grandparents may simply be the result of intergenerational coresidence between the mother and the grandparents. Never-married mothers, especially those who are teen-aged, often lack the resources necessary to establish an independent household and may have to live with their parents for an extended period of time (McLanahan & Garfinkel, 1986). Coreidence between grandchild and maternal grandparents provides constant opportunities for interaction and may well explain why maternal grandparents develop a more parentlike role than paternal grandparents (Oyserman, Radin, & Benn, 1993).

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**Method**

**Sample**

Data for this study are drawn from the Iowa Youth and Families Project (IYFP), a panel study of intact fami-
families in rural Iowa (Conger & Elder, 1994). To our knowledge, no other data set provides complete information on all of the surviving grandparents of each grandchild, a necessary condition for executing a within-family analysis of grandchild–grandparent bonds (see Appendix, Note 2). The IYFP began in 1989 with a representative sample of 451 two-parent households residing in eight contiguous farm-dependent counties in north-central Iowa. Data were collected from the father, mother, a focal child (who was in the 7th grade in 1989), and a near-aged sibling. Mean family income in 1990 was at $39,729 with over 93% having enough money to cover basic household needs.

During the 1991 follow-up, 407 focal children were asked about relationships with up to 4 living grandparents—a paternal grandfather, paternal grandmother, maternal grandfather, and maternal grandmother. Because our main goal was to examine lineage differences in grandchild–grandparent relations, we only analyzed grandchildren who still had at least one surviving grandparent on each side. In the resulting sample (n = 343), almost 43% of the grandchildren still had 4 surviving grandparents, whereas another 41% had 3 grandparents—2 on one side and 1 on the other. The remaining 16% had one grandparent from each lineage. The typical sample grandchild was about 14 years of age, in the 9th grade, and with aspirations to go to college. They had grandparents (N = 1,122) who were typically in their late 60s, retired, and with about 11 years of schooling on average. There were an equal number of boys and girls, with 44% of the grandchildren belonging to families that were currently or were previously involved in farming. There were slightly more female than male grandparents (55% vs. 45%) and more maternal than paternal grandparents (52% vs. 48%).

The Iowa sample is probably less diverse than the national population of grandchildren and grandparents (see Appendix, Note 3). We had a sample of White, rural adolescent grandchildren and their relatively young grandparents. Although these restrictions preclude us from making any national generalizations, the empirical analyses that follow are still highly relevant. They allow us to conduct a first test of a basic within-family model of maternal advantage, one that future researchers can replicate for other ecologies and subpopulations.

Variables

Variables for the empirical analyses are listed in the table in the Appendix. The dependent variable is relationship quality, a measure of the affective dimension of grandchild–grandparent bonds (Rossi & Rossi, 1990). Grandchildren were asked to rate their current relationship with each surviving grandparent by using a 5-point scale. A score of 5 indicates an excellent relationship, whereas 1 signifies a very poor rating.

The key independent variables are maternal lineage (1 = maternal, 0 = paternal) and two measures of the quality of relations between grandparents and the middle generation (as perceived by the latter group). The first measure is social support, a binary variable that is equal to 1 if a grandparent received emotional or material assistance from a parent (see Appendix, Note 4). The second measure is a scale that tracks the perceived condition of the parent-grandparent connection. It is the mean score on two items from the 1990 wave of the survey: parents’ ratings of their happiness with each grandparent relationship, and a measure of the degree of tension and conflict in the relationship. We consider this scale a measure of the congeniality of G2–G1 ties because a high score indicates cordial ties (i.e., a happy relation that also lacks tension), whereas lower scores indicate the presence of negativity. In analyzing these variables, we used separate measures for G2 fathers and mothers to capture their independent effects on the grandchild-grandparent connection. All of the multivariate analyses included controls for grandparents’ proximity, health, age, gender, education, work status, and farm background, variables that may vary by lineage and simultaneously have an influence on the grandchild-grandparent connection.

Models

The availability of complete information on the quality of relations between a grandchild and each surviving grandparent in the IYFP allowed us to analyze within-family differences in grandchild-grandparent relations. We took the perspective of the grandchild (i.e., grandchild as ego) and examined how social differences between grandparents created the matrilineal advantage in generational ties (see Appendix, Note 5).

We implemented this approach by using fixed-effect models, a statistical framework that allowed us to focus on within-family differentials in cross-generational relations (Greene, 1993; Sayrs, 1989; see Appendix, Note 6). For the purpose of estimating this model, we constructed a repeated-observations file that has one observation for each grandparent-grandchild dyad. In other words, a grandchild with 2 grandparents contributes 2 observations (i.e., dyads) to this file, whereas a grandchild with 3 grandparents contributes 3, and so on. Pooling together these dyads creates a file that is equal in size to the number of surviving grandparents in the sample (N = 1,122). We then use this file to estimate the following fixed-effect model:

$$RQ_{ij} = \alpha_i + \beta x_{ij} + e_{ij}$$  \hspace{1cm} (1)$$

The model specifies relationship quality (RQ) between grandchild i and grandparent j as a function of a set of intercepts (i.e., there are 343 \(\alpha\)'s, one for each grandchild i) and predictors (\(x\)'s) that include relations between grandparents and the middle generation as well as other control variables (see Appendix, Note 7).

The 343 grandchild-specific intercepts automatically account for any and all measured and unmeasured grandchild-specific characteristics; that is, the model automatically controls for characteristics that
vary between grandchildren but not among the grandchildren’s grandparents. Thus, indicators such as the grandchildren’s family background, competence, or age need not be included in the model. It also follows that the fixed-effect model only estimates the effects of variables that vary within a family (i.e., variables that differ in value among grandparents in the same family), such as grandparents’ age, the social support received, and so on. Therefore, an important property of this model is that only within-family (i.e., within-grandchild) variations in the data are reflected in the parameters, thereby allowing us to focus on within-family relationships (see Appendix, Note 8). For example, the effect of a variable such as proximity in a fixed-effect model would capture how between-grandparents variation (in a family) in distance is linked to between-grandparents differences in grandparent-grandchild relations.

In the multivariate analyses that follow, our general strategy is to begin with a baseline model that estimates the magnitude of the overall maternal bias in grandparent-grandchild relations, net of the control variables. Then, we add successive sets of explanatory variables to the model to identify key sources of inequality by lineage. If variations in mothers’ and fathers’ support and affective relations with the grandchild are linked to between-grandparents variation (in a family) in distance is linked to between-grandparents differences in grandparent-grandchild relations.

Results

Lineage is an important factor for grandchild-grandparent relations in our sample of rural Iowa grandchildren. As Table 1 shows, grandchildren perceive better relations with maternal grandparents, rating them .22 points higher on the measure of relationship quality. This is remarkable given that patterns of proximity favor paternal grandchildren which, in theory, gives them an edge in terms of frequency of contact and opportunities for the development of close ties (King & Elder, 1995). Closer inspection of the matrilineal advantage reveals that it reflects a greater likelihood among grandchildren to rate their relations with maternal grandparents as excellent (49% for maternal vs. 39% for paternal) and a greater likelihood to give fair, poor, and very poor ratings to paternal grandparents (19% for maternal vs. 27% for paternal).

Table 1. Means for Grandparent (G1) Characteristics and Measures of the Quality of Their Relations with Grandchildren (G3) and Parents (G2) by Lineage of Grandparent

<table>
<thead>
<tr>
<th>Measure</th>
<th>Maternal Grandparents (n = 576)</th>
<th>Paternal Grandparents (n = 546)</th>
<th>t test for Group Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3-G1 Relationship Quality</td>
<td>4.21</td>
<td>3.99</td>
<td>*</td>
</tr>
<tr>
<td>G2-G1 Relations Congeniality, Favors Maternal Side</td>
<td>3.29</td>
<td>3.33</td>
<td>ns</td>
</tr>
<tr>
<td>Social support, G2 father</td>
<td>.47</td>
<td>.68</td>
<td>*</td>
</tr>
<tr>
<td>Congeniality, G2 mother</td>
<td>3.40</td>
<td>3.00</td>
<td>*</td>
</tr>
<tr>
<td>Social support, G2 mother</td>
<td>.57</td>
<td>.42</td>
<td>*</td>
</tr>
<tr>
<td>Grandparent Characteristics Proximity</td>
<td>4.14</td>
<td>4.58</td>
<td>*</td>
</tr>
<tr>
<td>Health</td>
<td>3.67</td>
<td>3.68</td>
<td>ns</td>
</tr>
<tr>
<td>Farm background</td>
<td>.40</td>
<td>.56</td>
<td>ns</td>
</tr>
<tr>
<td>Education</td>
<td>11.42</td>
<td>11.45</td>
<td>*</td>
</tr>
<tr>
<td>Working</td>
<td>.38</td>
<td>.28</td>
<td>*</td>
</tr>
<tr>
<td>Age</td>
<td>66.08</td>
<td>67.71</td>
<td>*</td>
</tr>
<tr>
<td>Male</td>
<td>.43</td>
<td>.46</td>
<td>ns</td>
</tr>
</tbody>
</table>

Note: Estimates from the Iowa Youth and Families Project (1,122 grandparents of 343 grandchildren).

Table 2. Lineage Differentials in Parent (G2) Congeniality and Social Support Toward Grandparents (G1) by Gender of Parent (% Distribution)

<table>
<thead>
<tr>
<th>Differential</th>
<th>G2 mother</th>
<th>G2 father</th>
<th>G2 mother</th>
<th>G2 father</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both Sides Equal</td>
<td>36</td>
<td>39</td>
<td>57</td>
<td>68</td>
</tr>
<tr>
<td>Favors Maternal Side</td>
<td>46</td>
<td>26</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>Favors Paternal Side</td>
<td>19</td>
<td>34</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Authors’ tabulations from the Iowa Youth and Families Project. For congeniality, both sides of the family are considered equal if average ratings for each lineage are within 5% of each other. Conversely, a lineage is favored if its average exceeds the other’s by at least 5%. With regard to social support, equality indicates that both sides received or did not receive support. A side is favored if it received support while the other side did not. Chi-square goodness-of-fit tests for each of the variables were statistically significant at $\alpha = .05$. 

maternal and paternal grandparents. These lineage differentials are presented in Table 2.

In terms of congeniality, only a minority of parents—between 30% and 40% of fathers and mothers—expressed equinominous relations with grandparents. Instead, most parents had unequal relations by lineage. Almost half of the mothers favored maternal grandparents compared with only 19% reporting friendlier ties with the paternal side. On the other hand, 34% of fathers had friendlier relations with
their parents, whereas only 26% have more congenial relations with the maternal side of the family.

The story with respect to social support was similar. A majority of fathers and mothers provided the same levels of support to both sides of the family, but those that had unequal relations by lineage tended to favor their own side of the family. Mothers who had a matrilineal bias outnumbered those who had a patrilineal bias by more than a 2-to-1 margin (29/14), whereas there were almost four times (27/4) as many fathers with a patrilineal bias than there were fathers who had a matrilineal bias.

Together, the results in Tables 1 and 2 provide support for Hypothesis 1. Fathers and mothers were likely to favor their own side of the family when they had unequal relations with grandparents. Mothers were more likely to provide support and have congenial ties with the maternal grandparents, whereas fathers were more likely to favor paternal grandparents. Parents had a greater probability of having unequal rather than equal levels of congeniality, but equal levels of social support to both sides of the family were more likely than unequal levels.

The contrasting differentials for fathers and mothers raise important questions about the type of biases that grandchildren are likely to face within a family. Are grandchildren likely to have parents with differing biases in their relations with the grandparent generation? Or is it more the case that the contrasting differentials observed in the tables are located in different families so grandchildren are likely to face only one type of bias? We addressed these questions by cross-tabulating the lineage differentials of fathers and mothers. Figure 1 presents the joint father–mother differentials for congeniality, whereas Figure 2 provides the differentials for social support.

Parents rarely have opposing biases within the same family. As Figure 1 shows, only 10.8% of the grandchildren had parents who simultaneously exhibited patrilineal and matrilineal biases in levels of congeniality. The results also indicate that only a small minority of grandchildren—about 1 in 5—had parents with no biases at all. In most cases, mothers and fathers jointly brought only one type of bias into their family. Over 40% of grandchildren only faced a matrilineal bias in parent-grandparent ties, whereas 29% only encountered a patrilineal bias as a result of their parents' lineage differentials in congeniality. These grandchildren faced only one type of bias because both of their parents simultaneously favored one side of the family or because one parent had a bias whereas the other had equanimous ties with grandparents.

The graph for social support reveals similar patterns. Both parents provided equal levels of support to the maternal and paternal lines for a higher percentage of grandchildren (43%) but, just as in case of congeniality, few had parents with opposing biases (9.9%), and many faced only one type of bias in their family. However, unlike the patterns for congeniality, the number of grandchildren who faced a patrilineal bias (26.5%) was slightly higher than the number who were exposed to a matrilineal bias in their parents' ties to grandparents (21.5%).

Overall, these descriptive analyses revealed how G2–G1 ties varied within families. As expected, fathers and mothers tended to favor their own sides of the family when it came to the quality of their ties with the grandparent generation. However, this does not mean that grandchildren had to contend with parents who simultaneously favored different sides of the family. On the contrary, our analyses indicate that few grandchildren faced conflicting biases and most grandchildren faced only one type of G2–G1 inequality, with matrilineal biases being most prevalent in the case of congeniality. This suggests that patrilineal and matrilineal biases in parent-grandparent ties tend to exist in different families and, as such,
are likely to have relevance for different grandchildren. In the remainder of this section, we examine whether these differentials in relations between the middle and the grandparent generations were linked to matrilineal advantage in grandchild-grandparent ties.

We analyzed the sources of matrilineal advantage using Table 3, which presents the results from fixed-effect models of the quality of grandchild-grandparent ties. As our first task, we estimated the magnitude of the lineage differential in grandchild-grandparent ties, net of variation in grandparent characteristics (Model 1). This serves as the baseline matrilineal advantage that we try to explain away in the subsequent models.

The coefficient for maternal lineage in Model 1 was positive and statistically significant, indicating that, on average, grandchildren rated their maternal grandparents .21 points higher on the quality of the relationship. Of the grandparent characteristics, only proximity and health were significant, suggesting that the physical availability of a grandparent may be a necessary (but not sufficient) precondition for close relations with a grandchild. Grandparents who live nearby and who are in good health can travel easily to see a grandchild. This provides opportunities for interaction that may be the source of closer relations with a grandchild. However, despite their importance for grandchild-grandparent relations as a whole, variations in health and proximity did not explain matrilineal advantage. One has to look elsewhere for an explanation.

Are lineage differentials in parent-grandparent relations at the root of the maternal bias of grandchildren? We turned to this central issue by examining the influence of two measures of G2-G1 relations: social support and congeniality. Model 2 considers the impact of relations involving G2 fathers, whereas Model 3 takes into account the actions and feelings of G2 mothers.

The results in Model 2 provide support for Hypothesis 2 by reaffirming the importance of relations between the grandparent and middle generation for the quality of grandparent-grandchild bonds (King & Elder, 1995; Whitbeck et al., 1993). Specifically, congeniality of father-grandparent ties had a positive relation to the quality of the grandchild-grandparent bond.

Table 3. Influences of Parent-Grandparent (G2-G1) Ties and Grandparent Characteristics on the Quality of Grandchild-Grandparent Relations: Coefficients From Fixed-Effect Models

<table>
<thead>
<tr>
<th>Measure</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Lineage</td>
<td>0.217*</td>
<td>.263*</td>
<td>.101</td>
</tr>
<tr>
<td></td>
<td>(.048)</td>
<td>(.048)</td>
<td>(.050)</td>
</tr>
<tr>
<td>Grandparent Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proximity</td>
<td>.054*</td>
<td>.073*</td>
<td>.061*</td>
</tr>
<tr>
<td></td>
<td>(.021)</td>
<td>(.021)</td>
<td>(.020)</td>
</tr>
<tr>
<td>Health</td>
<td>.070*</td>
<td>.042</td>
<td>.035</td>
</tr>
<tr>
<td></td>
<td>(.033)</td>
<td>(.032)</td>
<td>(.031)</td>
</tr>
<tr>
<td>G2-G1 Relations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congeniality, G2 father</td>
<td>.422**</td>
<td>.221*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.048)</td>
<td>(.053)</td>
<td></td>
</tr>
<tr>
<td>Social Support, G2 father</td>
<td>.132</td>
<td>.101</td>
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</tr>
<tr>
<td></td>
<td>(.083)</td>
<td>(.080)</td>
<td></td>
</tr>
<tr>
<td>Congeniality, G2 mother</td>
<td>.334*</td>
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<td></td>
<td>(.074)</td>
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</tr>
<tr>
<td>Social Support, G2 mother</td>
<td>.130</td>
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<td></td>
<td>(.070)</td>
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<td></td>
</tr>
<tr>
<td>Within-family $R^2$</td>
<td>.04</td>
<td>.14</td>
<td>.21</td>
</tr>
<tr>
<td>N, grandparents</td>
<td>1,122</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N, families (grandchildren)</td>
<td>343</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Estimates from the Iowa Youth and Families Project. All models control for the work status, education, gender, age, and farm background of grandparents (these variables have nonsignificant effects). Standard errors are in parentheses.

*p < .01
**p < .05
effect on grandchild–grandparents ties, indicating that the friendlier the relationship between the father and a grandparent, the better the relationship between that grandparent and the grandchild. Social support, on the other hand, had a nonsignificant effect, perhaps as a result of its association with levels of congeniality. In other words, the effects of social support may be indirect, promoting close ties between grandparents and grandchildren by facilitating closer ties between parents and grandparents. Indeed, father’s (and also mother’s) social support had a strong positive impact on grandchild–grandparent relations in models where it was the sole measure of parent–grandparent relations (analyses not shown). However, its effects disappeared once we controlled for the congeniality of parent–grandparent relations. This suggests that the impact of support was mediated by congeniality (see Appendix, Note 10).

Model 2 also provides support for Hypothesis 3 by showing that within-family variation in father–grandparent relations was linked to lineage differentials in grandchild–grandparent ties. Notice that the effect of matrilineal lineage increased by 21% (from .217 to .263), once we controlled for variations in fathers’ support and the congeniality of their relations with grandparents. This indicates that within-family differentials in father’s relations with grandparents was linked to a patrilineal bias in grandchild–grandparent ties. Specifically, fathers’ greater likelihood of providing support and friendlier ties to the paternal rather than the maternal side was connected to closer ties between grandchildren and the paternal side. Thus, father’s social support and congeniality functioned as suppressor variables because the patrilineal bias that they induced tended to reduce the magnitude of the overall matrilineal advantage in the sample. Controlling for these variables removed the sources of patrilineal advantage, thereby increasing the estimated effect of maternal lineage (see Appendix, Note 11).

Having found evidence that variations in the social relations of fathers in the middle generation promote stronger ties between grandchildren and their paternal grandparents, we move on to Model 3 and consider the relevance of mothers’ relations with grandparents for grandchild–grandparent ties. Just as in the case of fathers, congeniality had a significant effect on grandchild–grandparent ties, whereas the coefficient of social support was positive but nonsignificant. The effect of congeniality provides further support for Hypothesis 2 by showing that grandchildren perceived better relations with grandparents who have friendlier ties with mothers. Note also that the congeniality of G2–G1 relations had independent effects for fathers and mothers, suggesting that it is important to consider both parents when analyzing the quality of ties between grandparents and grandchildren living in intact families (see Appendix, Note 12).

Is within-family variation in mother–grandparent ties linked to a matrilineal advantage in grandchild–grandparent bonds, as we speculated in Hypothesis 4? The answer is yes. Accounting for variations in G2 mothers’ support and congeniality reduced the lineage coefficient by more than 60%, from .263 to .101, clearly indicating that mothers’ friendlier ties and a higher likelihood of providing support to the maternal side accounted for a large portion of the matrilineal advantage. This clearly suggests that the lineage differential in mother–grandparent ties favoring the maternal side explains matrilineal advantage in grandchild–grandparent relations. In short, grandchildren have closer relations with maternal parents because their mothers have closer ties to the maternal side. These results imply that a grandchild’s ties with maternal and paternal grandparents would be more equinomous if the mother had more equinomous ties with each side of the family.

In summary, the descriptive and multivariate analyses demonstrated the existence of significant differentials by lineage in parent–grandparent ties and the importance of these parental biases for explaining matrilineal advantage in grandchild–grandparent ties. We discuss the implications of these results in the next section.

**Discussion and Conclusion**

Our analyses of data from the Iowa Youth and Families Project reveal the partisan nature of intergenerational relations in extended families. Mothers are more likely to provide support and have more congenial relations with maternal grandparents, whereas fathers have a patrilineal bias in their relations with grandparents. These lineage differentials in parent–grandparent relations are linked to lineage differentials in the quality of grandchild–grandparent ties. Although the effects of social support were not statistically significant in any of the models, fathers’ and mothers’ congeniality had strong positive effects, indicating that the more congenial or friendly the relationship between parent and grandparent, the more positive the relationship between that grandparent and a grandchild. Controlling for variations in fathers’ support and the congeniality of their relations with grandparents increases the magnitude of the lineage differential, indicating that variations in fathers’ relations with grandparents are linked to a patrilineal bias in grandchild–grandparent relations. On the other hand, controlling for variations in mothers’ support and congeniality reduces the effect of maternal lineage on grandchild–grandparent relations by a substantial amount, indicating that the matrilineal bias in parent–grandparent ties explains a large portion of matrilineal advantage in grandchild–grandparent relations.

Thus, matrilineal advantage in grandchild–grandparent relations reflects lineage differentials in relations between parents and grandparents. Mothers and fathers in the middle generation are likely to have a “parental” bias, having closer ties to their own parents than to their parents-in-law. Consequently, their children—the grandchild generation—are likely to have unequal relations with the grandparent generation. Closer ties between mothers and maternal grandparents facilitate warmer ties between grandchildren and the maternal side, whereas better rela-
tions between fathers and paternal grandparents create a patrilineal advantage.

Given that the grandparent ties of fathers and mothers promote both patrilineal and matrilineal biases, how does one explain the overall matrilineal advantage in our sample of rural Iowa grandchildren? We believe that the answer lies in the types of biases in parent-grandparent ties that fathers and mothers jointly bring into the lives of grandchildren. Although parents, as a whole, are likely to favor their own side of the family in relations with grandparents, our analyses of joint differentials indicate that most grandchildren were exposed to only one type of lineage differential (i.e., a bias going in one direction). Particularly, our analyses of within-family variation in the congeniality variable indicated that the most prevalent group of grandchildren only encountered a matrilineal bias, having two parents with closer relations to the maternal side, or one parent with a matrilineal bias and another parent with equinominous relations. Thus, matrilineal advantage may have emerged because grandchildren with a strong potential for developing a matrilineal bias in grandchild-grandparent relations outnumbered children with the potential for developing lineage differentials going in other directions. In other words, an overall matrilineal advantage emerged in the sample because matrilineal biases in parent-grandparent relations were more prevalent than patrilineal biases.

These findings enhance our understanding of grandchild-grandparent relations by bringing greater specificity to the role of kinkeeping in the creation of matrilineal advantage. Specifically, they suggest that the kinkeeping role of mothers, in and of itself, does not promote the observed maternal advantage in grandchild-grandparent ties; rather, it is the differential support and attention that G2 mothers accord to parents and parents-in-law that explains why maternal grandparents have an advantage when it comes to relations with grandchildren. Furthermore, fathers play a significant role in the determination of grandchild-grandparent relations, so their influences have to be taken into consideration. In the present study, we found that many of the mothers who favored the maternal side in their relations with the grandparent generation had husbands who shared the same preferences. Thus, it is conceivable that, for some grandchildren, the matrilineal bias in grandchild-grandparent relations reflects lineage differentials in their mothers' and fathers' ties with grandparents, not just their mothers' alone.

By identifying the sources of closer relations between maternal grandparents and grandchildren in intact families, the findings also suggest a broader perspective on the study of matrilineal advantage in single-parent families. In the aftermath of divorce or marital separation, maternal grandparents usually visit more frequently, provide extra financial support, and act as surrogate parents in an effort to insulate their grandchildren from the harsh consequences of change (Cherlin & Furstenberg, 1991). The results raise the possibility that this postdivorce matrilineal advantage is not only the by-product of maternal custody after separation but also the end result of a long-term process that was put into motion while the family was still intact. Specifically, lineage differences in parent-grandparent relations promote closer ties between grandchildren and maternal grandparents, thereby turning this set of grandparents into latent resources. This lineage group is then called into action later on after a family crisis such as divorce. Thus, we speculate that matrilineal advantage after marital dissolution may result from a combination of lineage differentials in parent-grandparent relations prior to marital dissolution and maternal custody after dissolution, which brings out or reinforces the preexisting differential.

These results imply that, after divorce, paternal grandparents can play a more significant role than the maternal side, even if the mother has custody of children. Their relevance depends on lineage differentials in parent-grandparent ties prior to family change. If mothers and fathers favored the maternal side before divorce, then it is likely the case that maternal grandparents were closer to grandchildren in the past and they would probably be more salient than paternal grandparents after marital dissolution. Similarly, if mothers and fathers had equinominous relations with both lineages prior to marital dissolution, then parental grandparents will still have a difficult time in establishing more salient ties with the grandchildren after family breakup because maternal custody, combined with the diminished role of fathers, will tip the balance in favor of maternal grandparents. However, if fathers and mothers had closer ties to paternal grandparents prior to divorce, then paternal grandparents may have a chance of having equally salient or more significant ties to grandchildren than the maternal side after divorce because the preexisting paternal advantage in grandchild-grandparent ties brought about by parental biases may be strong enough to overcome all of the built-in maternal advantages that arise after family breakups.

More work is needed before we can fully understand the matrilineal advantage in grandchild-grandparent ties. Future studies should examine the influences of parent-grandparent relations on grandchild-grandparent ties by using other measures. In the present study, controlling for variations in G2-G1 relations reduced—but did not eliminate—the effects of maternal lineage (see Model 3 in Table 3). This suggests that the measures of social support and congeniality may have failed to capture some other aspects of G2-G1 ties that are also influential for grandchild-grandparent relations. Researchers can address these possibilities by examining other measures of G2-G1 relations. For instance, the measures of support and congeniality in the present study only captured variations in the quality of G2-G1 relations at a single point in time, so other variables that capture stability and change in G2-G1 ties may prove to be more effective in explaining matrilineal advantage.

In addition, future work should examine the sources of maternal advantage in grandchild-grandparent ties for other groups and in other settings. Because the present study focused on the intergenerational relations of White intact families in a rural setting, further analy-
es of families with other social backgrounds are needed not only to examine the broader applicability of the models tested but also to evaluate the effectiveness of alternative approaches to explaining matrilineal advantage. For example, one can examine how culture, history, and parent-grandparent relations combine to create matrilineal advantage by comparing the intergenerational dynamics of families from diverse social settings. Culture, history, and other extrasmall factors may determine the social norms that guide intergenerational relations, which then generate microlevel group variations in parent-grandparent and grandchild-grandparent relations. Disentangling these important alternative influences requires a broader study sample.

Finally, future studies should investigate matrilineal advantage from the grandparents’ perspective. Although the present study examined why grandchildren favor maternal over paternal grandparents, a grandparent’s view would enable us to consider why grandparents favor the children of their daughters over the offspring of their sons. The grandparent perspective could yield different insights if grandparent ratings of their relations with grandchildren differ systematically from grandchildren’s perceptions. That is, a G3–G1 tie that was perceived as excellent by the grandchild may not be an excellent or the best relationship from the grandparent’s perspective. Finally, analyzing grandchild–grandparent ties from the grandparent’s perspective also allows researchers to examine issues that we have not been able to address in the present study, such as how differences in the qualities of grandchildren contribute to lineage differences of grandchild-grandparents. One could examine whether grandparents tend to favor sets of siblings over others, or one gender over the other, and whether this is in any way relevant for matrilineal advantage.

In conclusion, we have found strong empirical evidence in our sample of rural lowans suggesting that lineage differentials in the relations of parents and grandparents explain the emergence of matrilineal advantage in grandchild–grandparent relations. These results advance our understanding of grandchild–grandparent relations not only by bringing greater specificity to the process underlying matrilineal advantage but also by formulating a robust conceptual framework that can be used to explain lineage differentials in other settings and for broader populations. Future work should explore the broader applicability and limits of this model.

References
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Appendix

Notes

1. The link between G1–G2 relations and G1–G3 ties could also reflect the causal effect of grandchild-grandparent relations on the quality of ties between the grandparent and middle generation. For example, a grandparent may establish close ties with a grandchild to facilitate close relations with the parent. However, the contingent nature of grandchild-grandparent ties suggests that close parent-grandparent need to exist before grandchild-grandparent relations can be established. Therefore, it is likely that the causal link is in the other direction: Parent-grandparent ties affect grandchild-grandparent relations.

2. Other data sources, such as the National Survey of Families and Households, only have summary measures for each generation or information regarding a single grandparent-grandchild bond per family, thereby precluding researchers from doing within-family analyses altogether.

3. Indeed, a rough comparison of patterns of proximity and contact in the IYFP with those in the national sample used in the Cherlin-Furstenberg study (1991) reveals notable differences. Half of the grandparents in the national sample lived within 10 miles of their grandchildren, with 38% having contact at least once a week (based on the tables on p. 72 and 241 in Cherlin & Furstenberg 1991). In contrast, only 33% of the grandparents in the IYFP sample resided within 25 miles of the grandchild, with only 18% having contact at least on a weekly basis. The sources of these disparities are difficult to identify. They may reflect sample differences in sampling design, variable definition, age, and racial composition, or residential location. For instance, the IYFP has information on surviving grandparents of adolescent grandchildren, while the Cherlin-Furstenberg sample had data on the grandparents who could be contacted for interview (these tended to be grandparents who lived close by and had closer ties to the grandchildren’s families). The Cherlin-Furstenberg sample is also more diverse, including grandparents of grandchildren in single-parent or Black families while the IYFP is restricted to grandparents of grandchildren in rural, White, intact families.

4. Unfortunately, we do not have data on support of parents by grandparents, so we cannot examine and separate the influences of this factor on grandchild-grandparent relations.

5. Note that one can also consider matrilineal advantage from the grandparents’ perspective (i.e., grandparent as ego) by examining the sources of variation in their relations with maternal and paternal grandchildren. Such a perspective could provide unique insights into matrilineal advantages, but because of data constraints, we leave it as an area for future research.

6. Such a modifying approach has been used to examine a wide variety of social phenomena, including the impact of occupational segregation and marital status on wages (Korenman & Neumark, 1991), the effects of teenage pregnancy on adult outcomes (Geronimus & Korenman, 1993), and the effects of nonmarital childbearing on marriage (Bennett, Bloom, & Miller, 1995).

7. The fixed-effect model is simply an ordinary least squares (OLS) regression model with 343 intercepts. These intercepts are dummy variables that indicate whether dyads belong to a particular grandchild. For example, a grandchild with 4 available grandparents would contribute 4 cases to the analysis. The intercept for this grandchild would be coded 1 for each of these dyads and coded 0 for all the other dyads pertaining to other grandchildren.

8. By contrast, a standard OLS model would use between- and within-family sources of variation in the independent and dependent variables to estimate the parameters. Therefore, the resulting coefficients would be a composite of between- and within-family relationships.

9. The results in this article are robust and not sensitive to the sample or measures. Alternative measures of relationship quality, such as a grandchild’s happiness with a grandparent or their feelings of closeness, yields similar results. Results were also similar when we only focused on lineage differences between grandmothers or between grandfathers or when we only looked at situations in which the grandchild had an equal number of grandparents on each side.

10. Another possible explanation for the nonsignificance of social support is that there may have been insufficient variation in the measure itself. However, Table 1 clearly shows that a high proportion of fathers and mothers (between 40% and 68%) provided social support to either their parents or parents-in-law. Note also that social support did have an effect if congeniality was not in the model, which is consistent with the idea that correlations between congeniality and social support explain the nonsignificance of social support.

11. Note that the effects of health decline substantially after the addition of controls for social support and congeniality. This suggests that G2–G1 relations mediate some of the influences of health on G3–G1 relations. Healthy grandparents enjoy warmer ties with the middle generation and this explains why they have closer relations with grandchildren. Conversely, poor health among grandparents may create stresses in their relations with parents, and this has a negative impact on relations with grandchildren.

12. The difference in the effects of congeniality for G2 mothers and fathers was not statistically significant at \( \alpha = .05 \) (1,767) = 1.86, p > .1730.

Description of Variables

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>Grandchild (G3) report of quality of relations with each grandparent (G1). “How would you describe your current relationship with each of the following people?” Responses range from very poor (1) to excellent (5).</td>
</tr>
<tr>
<td>G2-G1 Relations</td>
<td>Mean response to two questions asked of parents (G2) in 1990: (a) “Generally, how much conflict, tension, or disagreement do you feel there is between you and ______?” (b) “How happy are you with your relationship with ______?” Higher score indicates more congenial ties. Measured separately for fathers and mothers.</td>
</tr>
<tr>
<td>Congeniality</td>
<td>Support (emotional, transportation, housework, help when sick, personal care, and money) provided by a parent to grandparents. G2 reports in 1990. Equal to 1 if at least one type of support is provided. Measured separately for G2 fathers and mothers.</td>
</tr>
<tr>
<td>Social support</td>
<td>Maternal lineage 1 = Matrilineal; 0 = Patrilineal</td>
</tr>
<tr>
<td>Proximity</td>
<td>G2 parents’ report (in 1989) measuring distance between grandparent and grandchild. Possible responses range from more than 250 miles from each other (1) to we live together (6).</td>
</tr>
<tr>
<td>Health</td>
<td>G2 reports of grandparents’ health. Scores range from very poor (1) to excellent (5).</td>
</tr>
<tr>
<td>Education</td>
<td>In years</td>
</tr>
<tr>
<td>Gender</td>
<td>Coded 1 if grandparent is male; 0 otherwise</td>
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<td>Work status</td>
<td>1 = working; 0 = others</td>
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<tr>
<td>Age</td>
<td>In years</td>
</tr>
<tr>
<td>Farm history</td>
<td>1 = owned/lived on farm; 2 = others</td>
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