

**KIN INVESTMENT BIASES OF GRANDPARENTS, AUNTS AND
UNCLES IN GERMANY, GREECE AND THE USA: EVOLUTIONARY
INTERPRETATIONS OF DIFFERENT KIN CAREGIVING BEHAVIOR**

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The human social behavior of child rearing is characterized not only by parental child-care, but also by the caregiving of other close relatives. *Homo sapiens'* prolonged childhood means that there is the need intensive child-care. Parents require help from other relatives of the child, such as grandparents or aunts and uncles. From an evolutionary point of view, a crucial question is whether close kin caregiving could be explained along with the theories of nepotistic altruism and kin selection. The more closely an individual is genetically related to offspring, the more this individual should be likely to care for the related child. Thus, from an evolutionary point of view it is interesting to observe which relatives have a special role as caregivers and which differences in kin caregiving exist.

Although the degree of kinship to grandparents, aunts and uncles is always 25 % on average, empirical research on the caregiving of relatives has found asymmetric patterns of caregiving intensity, which appear to be cross-cultural universal (Hoffman 1979/80, Hartshorne & Manaster 1982, Littlefield & Rushton 1986, Euler & Weitzel 1996, Gaulin, McBurney & Brakeman-Wartell 1997, Steinbach & Henke 1998, Pashos 2000, Hoier, Euler & Hänze 2001, McBurney, Simon, Gaulin & Geliebter 2002). In most societies, maternal relatives care more on average than paternal relatives for grandchildren or nieces and nephews, and female relatives care more than male. Hence, maternal grandmothers or maternal aunts care the most, and paternal grandfathers or paternal uncles care the least for related children.

Evolutionary researchers (Russell & Wells 1997, Smith 1988) have interpreted the kin caregiving biases as being mainly due to evolutionary paternity certainty. A mother can always be certain that her child is genetically related to her. In the paternal lineage, however, there is genetic uncertainty and therefore more reluctance to be involved in childcare. As a

result, grandmothers should care more than grandfathers for grandchildren, maternal grandparents should care more than paternal, and finally, as a combination of the first two postulates, grandparental caregiving should follow the order, maternal grandmother cares the most, with the maternal grandfather and paternal grandmother being in the middle, and the paternal grandfather caring the least for grandchildren, because he has the highest grandparental uncertainty (see figure 1). The paternity certainty hypothesis has also been applied to the asymmetric caregiving of aunts and uncles. Genetic relatedness to a sister's child is more certain than to a brother's child (figure 2).

However, some recent studies contradict the paternity certainty hypothesis as an explanation for the differential kin caregiving of grandparents and of aunts and uncles. Pashos (1998, 2000) investigated grandparental caregiving in an empirical cross-cultural questionnaire study in Greece and in Germany. Old traditional Greek mainland culture is characterized by certain traits that designate the paternal grandparents as the intensive caregivers. There is some continuity of patrilineally inherited lands, there is patrilocal residence, and paternal grandparents also tend to have the social duty of caring for grandchildren, especially for sons and heirs. However, the paternity certainty theory expects the maternal grandparents, especially the maternal grandmother, to be the most intensive caregivers for the grandchildren. The results of the questionnaire study revealed a differential picture. Whereas in Germany and urban Greece the grandparental caregiving was in the predicted order as postulated by the paternity certainty hypothesis, in rural Greece, paternal grandparents cared more than maternal grandparents for grandchildren (see figure 3). The higher level of caregiving by the paternal grandparents could not be explained by the paternity certainty theory.

A further result that contradicts the paternity certainty hypothesis was a comparison study of aunt and uncle investment by McBurney et al. (2002). The authors compared the kin investment biases of orthodox Jews, who are expected to have high paternity certainty, with that of other Americans from Pittsburgh. Among the orthodox Jews, the caregiving asymmetries of aunts and uncles were as pronounced as in the Pittsburgh sample; i.e., the assumed higher paternity certainty of the orthodox Jews had no diminishing effect on the kin investment asymmetries. This is not in accordance with the paternity certainty hypothesis so paternity certainty cannot completely explain asymmetric pattern in kin caregiving as a proximate cause.

Because of the discrepancies of the paternity certainty hypothesis with recent empirical results, some researchers have proposed combination models as theoretical explanation for the asymmetric kin investment. These evolutionary theories explain the asymmetric kin caregiving through both the paternity certainty theory and other evolutionary explanations such as sex-specific reproductive strategies (Euler & Weitzel 1996, Gaulin et al. 1997). Some authors have also differentiated between the two main effects of asymmetric kin investment, assuming that they have to be explained separately (Pashos 2000, McBurney et al. 2002): the matrilateral bias, i.e. higher level of caregiving by maternal relatives compared to paternal relatives, and the sex effect, i.e. higher level of caregiving by female kinship compared to male kinship.

However, also other theories have been proposed to explain biased kin investment, such as the hypothesis of matrilineal family ties (Pashos 2000). Empirical research shows that women have closer family ties than men (Rossi & Rossi 1990, Salmon 1999). Thus, the maternal lineage is strengthened over the paternal lineage. These stronger matrilineal family

bonds could also result in different levels of child-care, and hence explain the asymmetric kin investment of grandparents and aunts and uncles.

In a very recent survey from Pittsburgh, USA, Pashos & McBurney (in prep.; Pashos, in press) investigated the kin investment of grandparents, aunts and uncles in a two-generation questionnaire study in order to test the different evolutionary theories on a proximate level. In an anonymous questionnaire, 188 subjects estimated their relationships to parents, grandparents, aunt and uncles regarding the received investment in childhood, emotional closeness and resemblance. Investment was defined as including donations, money, time, and help/protection, as compared with the overall resources the caregiver was able to give. The ratings were made on a 7-point scale. In a second, separate questionnaire, the parents of the participants rated their emotional closeness to their own parents, i.e. the grandparents of the participants, and to their sisters and brothers, i.e. the aunts and uncles of the participants. The main question of the study was whether the relationship between parents and grandparents or aunts and uncles has an influence on the investment and emotional closeness of these relatives to grandchildren or nieces and nephews.

The results of a regression analysis show that the emotional closeness of the subjects' parents to the grandparents highly influenced the investment of the grandparents in their grandchildren, especially among the maternal grandmothers (beta from .30 to .43). The influence of residential distance on grandparental investment, however, was comparatively much smaller (beta from -.08 to -.28). The same was true for the investment made by aunts and uncles. Parent-sibling closeness greatly influenced the caregiving of aunts and uncles for their nieces and nephews (beta from .29 to .44). The emotional closeness between parent and sibling played a particular major role in the kin investment of aunts (beta = .42 and .44). The

influence of residential distance, however, was much smaller and predominantly not significant (beta from -.07 to .20).

These results show that the parent-grandparent relationship greatly affects the different grandchild-care of the four grandparents, and the parent-sibling relationship greatly affects the different care of aunts and uncles for nieces and nephews. However, the parent-kin relationship could not completely explain the caregiving asymmetries measured by questionnaire studies, because the difference in emotional closeness to parents between men and women was only slight. The questions of why, in most cultures, women have closer family ties than men, and why there are exceptions, such as in traditional rural Greece, where patrilateral family ties prevail, have not yet been completely answered. Paternity certainty may play a role here as an ultimate cause but it is clear that as a proximate cause, paternity certainty cannot sufficiently explain kin caregiving asymmetries.

An additional interesting new result of the Pittsburgh two-generation study was found among the kin caregiving of maternal aunts. The maternal aunts cared much more than all other aunts and uncles for their nieces and nephews. Although there is normally a correlation between the parent-sibling closeness and the investment of aunts and uncles in nieces and nephews, there was one particular exception: the younger sisters of the mother. Table 1 reveals that younger maternal aunts, i.e. the younger sisters of the mother, cared much more than other maternal aunts for nieces and nephews and were much closer to them. From an evolutionary point of view, this result could be explained by young girls' learning of mothering behavior. When younger sisters, who often do not already have their own children, care for the children of their older sisters, they are learning the nurturing and caregiving behavior that is necessary for child-care. The training of mothering behavior of young girls is

biologically advantageous and can often be observed in modern as well as in traditional societies.

The cross-cultural investigation of kin investment biases is making an important contribution towards understanding nepotistic altruism among humans. Moreover, this research helps to explore universal patterns of human family-care for children and to provide insights into the social structures of our paleolithic ancestors. The understanding of the evolutionary significance of grandmotherhood for the second half of the female life cycle and the question of the evolutionary origin and formation of grandparenthood is closely connected with the question of the causes of kin caregiving biases in grandparents and other close family members.

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Figure 1

Paternity certainty hypothesis and degree of kinship to grandparents.

(+) means certainty of relatedness, (-) uncertainty of relatedness. p stands for paternity certainty (e.g., $p = .9$ means 10% paternity uncertainty in a society).

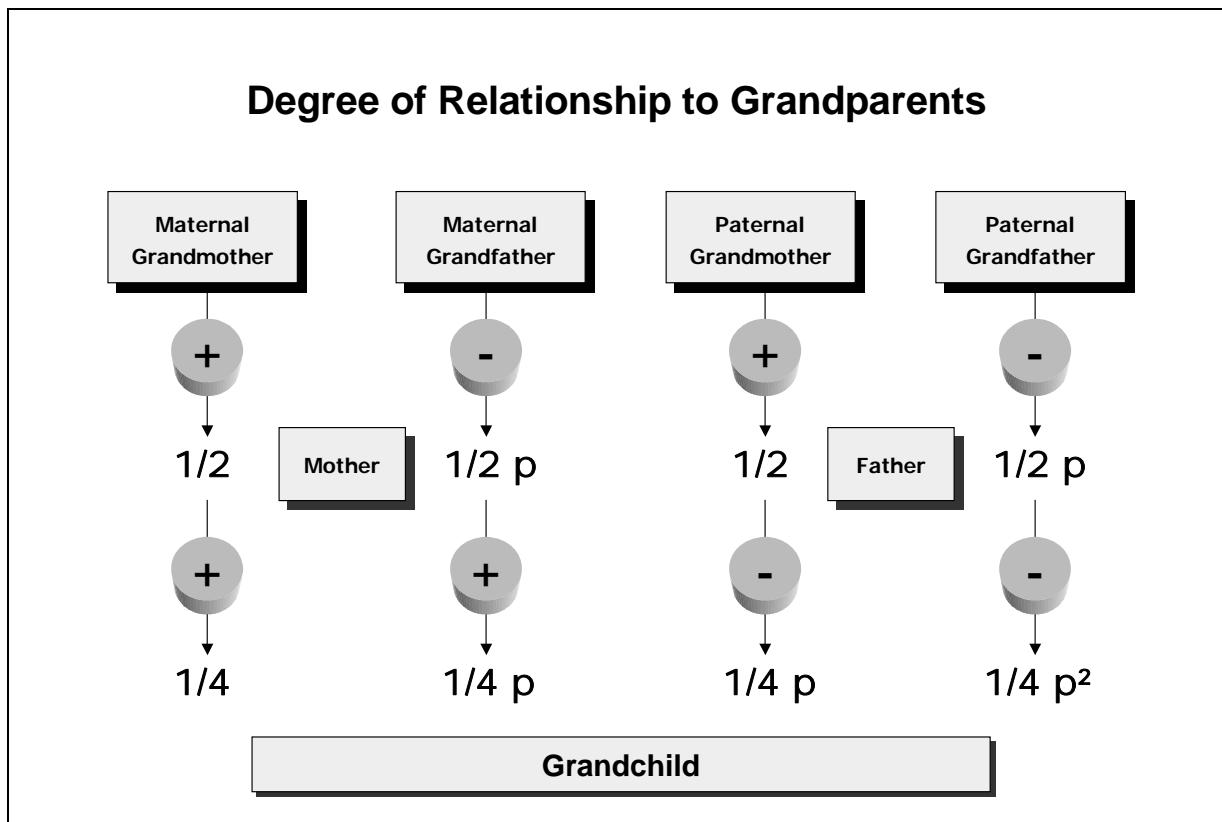


Figure 2

Paternity certainty hypothesis and degree of kinship to aunts and uncles of the first degree.

(+) means certainty of relatedness, (-) uncertainty of relatedness, (\pm) half-certain [through mother], half-uncertain [through father]. p stands for paternity certainty.

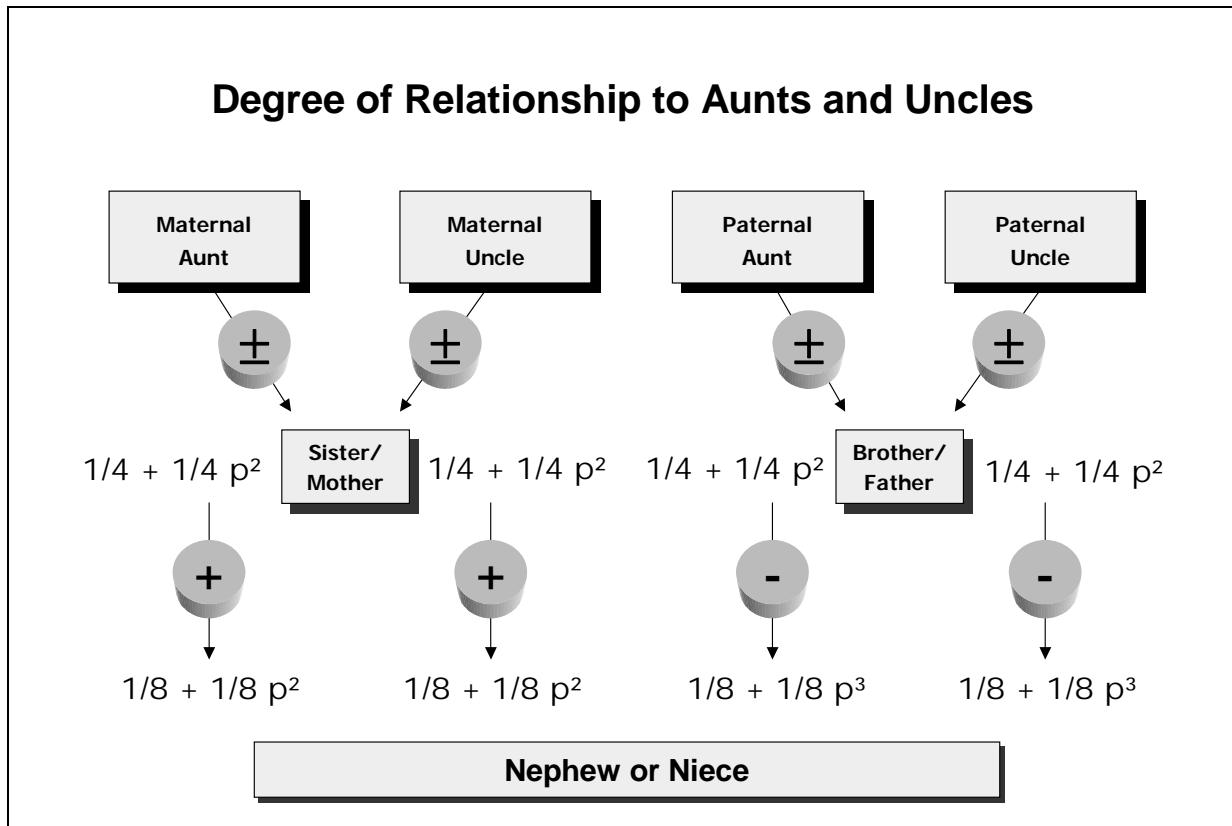


Figure 3

[From Pashos & Christiansen 2000:] Caregiving of grandparents in Greece and Germany.

7-point rating scale from 1 (not at all) to 7 (very much): "Wie sehr haben sich Deine Großeltern um Dich gekümmert, als Du ein Kind (unter 7 Jahre) warst?", "Πόσο πολύ σε φρόντιζαν η γιαγιά και ο παπούς σου, όταν ήσουν παιδί (κάτω των 7 ετών);"

Germans and Greeks as well as Urban and Rural Greeks

Paternal vs. Maternal Grandparents

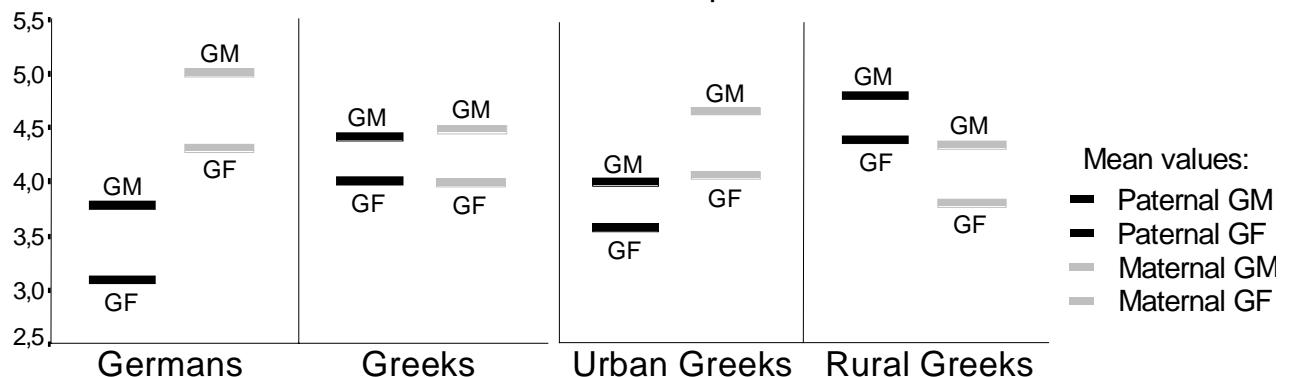


Table 1

Two-generation study from Pittsburgh, USA (Pashos, in press). Mean investment and mean emotional closeness of all aunts and uncles, which were older or younger than the parent (7-point scale from 1 [not at all] to 7 [very much]).

Mean Value of All	Investment Aunts/Uncles						Closeness Aunts/Uncles					
	Older Siblings			Younger Siblings			Older Siblings			Younger Siblings		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Maternal Aunts	4.28 (1.65)		81	4.77 (1.53)		66	4.35 (1.78)		81	5.03 (1.71)		66
Paternal Aunts	3.67	(1.85)	71	3.52	(1.57)	76	3.70	(1.83)	71	3.60	(1.85)	76
Maternal Uncles	3.69	(1.56)	80	3.46	(1.72)	77	3.48	(1.64)	80	3.39	(1.90)	76
Paternal Uncles	3.20	(1.51)	66	3.43	(1.54)	78	3.15	(1.69)	66	3.75	(1.60)	78