

# MATRILATERAL BIASES IN THE INVESTMENT OF AUNTS AND UNCLES

## A Consequence and Measure of Paternity Uncertainty

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In a study of the kin investment of aunts and uncles we show that the laterality effect expected as a result of paternity uncertainty is statistically reliable but somewhat smaller than the sex effect. Matrilateral aunts invest significantly more than patrilateral aunts, and the same is true for uncles. Regardless of laterality, however, aunts invest significantly more than uncles. Multivariate controls show that the matrilateral bias is fully independent of any age or distance confounds that might result from sex differences in age at marriage or dispersal. We discuss our results in relation to recent findings on the kin investment of grandparents (Euler and Weitzel 1996). In addition, we propose a simple method for estimating the level of paternity uncertainty from kin investment data; application of this method to our data on aunts and uncles suggests that between 13% and 20% of children are not the offspring of their putative father. Our parallel analyses of Euler and Weitzel's (1996) data on grandparental investment suggest a similar estimate, that paternity uncertainty lies between 9% and 17%.

KEY WORDS: Kin investment; Matrilateral bias; Paternity uncertainty.

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Sex differences in parental certainty are a common result of mammalian reproductive physiology, and their effects on male reproductive strate-

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gies have been widely discussed (e.g., Alexander 1979; Hartung 1985; Hawkes et al. 1995; Hrdy 1980; Kurland 1979). Hartung (1985) emphasized that putative fathers are not the only actors whose optimal reproductive strategies would be sensitive to decreasing levels of paternity certainty when he argued that matrilineal inheritance could be best understood as a grandmaternal strategy. Some evidence exists that mothers and other matrilineal relatives (Daly and Wilson 1982; Hrdy 1980; Regalski and Gaulin 1993) and perhaps even infants themselves (Christenfeld and Hill 1995; cf. Nesse et al. 1990) attempt to minimize the possible costs of perceived low paternal certainty. Nevertheless, few studies have sought to evaluate the effects of paternity uncertainty on the investment tendencies of distal kin. A study by Euler and Weitzel (1996) that examines grandparental solicitude is a recent exception.

When extra-pair copulations reduce paternity certainty, they decrease the probability of genetic relatedness in a way that compounds multiplicatively over kinship links through males. Thus if under a given mating regime a man has a paternity certainty of 0.8, he has a grandpaternity certainty through his wife's sons of 0.64 but a corresponding grandpaternity certainty through his wife's daughters of 0.8. Under such a regime a woman's maternity certainty is of course 1.0, and her grandmaternity certainty through daughters and sons is 1.0 and 0.8, respectively. Euler and Weitzel (1996) examine whether the resulting asymmetries in grandparental certainty are reflected in the degree of observed grandparental solicitude.

They asked subjects to rate the solicitude during their childhoods of each of their four grandparents using a seven-point rating scale. Mean solicitude ratings were, in decreasing order: maternal grandmothers, 5.16; maternal grandfathers, 4.52; paternal grandmothers, 4.09; and paternal grandfathers, 3.70. In ANOVA format, laterality (maternal vs. paternal grandparents), sex of grandparent (grandfathers vs. grandmothers), and their interaction all yielded significant effects. The greater solicitude of maternal grandfathers compared with paternal grandmothers was also significant by post-hoc comparison (Euler and Weitzel 1996).

An attempt was made to control for the possibility that residential distance between the grandparent and the grandchild or grandparental age might explain the observed differences in solicitude. Residential distance was negatively correlated with solicitude for each class of grandparents—most strongly for paternal grandfathers and least strongly for maternal grandmothers—whereas age did not correlate significantly with solicitude for any of the four categories of grandparent. Unfortunately the effects of residential distance and age were examined separately, and separately for each class of relatives, rather than simul-