J. Biosoc. Sci., (2012) **44**, 377–381, © Cambridge University Press, 2011
doi:10.1017/S0021932011000691

Debate

A 'GENDERED NEED' EXPLANATION DOES NOT FULLY EXPLAIN LINEAGE BASED DIFFERENCES IN GRANDPARENTAL INVESTMENT FOUND IN A LARGE BRITISH COHORT STUDY

THOMAS V. POLLET*§, MARK NELISSEN† AND DANIEL NETTLE‡

**Social and Organizational Psychology, VU University Amsterdam, The Netherlands,*
†Behavioural Biology, University of Antwerp, Belgium and
‡Centre for Behaviour and Evolution, Newcastle University, UK

Ghysels (2012) argues for a 'gendered need' explanation of lineage based differences in grandparental investment. Maternal grandmothers are subsidiary care-givers: only if mothers fail to fulfil this gender role, (maternal) grandmothers will step in. The SHARE data do indeed seem to support this explanation (though see Appendix). However, it is not at odds with an evolutionary explanation, such as paternity uncertainty theory. Paternity uncertainty theory suggests that matrilineal biases will emerge *all else being equal* (see Euler & Michalski, 2008, for review). If there are differences in need, then all else is not equal, and we should expect grandparents to respond accordingly.

Following Ghysels, first the effect of parental workforce/employment status on differences in contact between maternal grandmother/father and paternal grandmother/father was investigated (MGM vs. PGM and MGF vs. PGF) in the Millennium cohort sample (Hansen, 2006; Pollet *et al*., 2009). Lineage differences in the diversity of help offered were also examined (Pollet *et al*., 2009). As measures, current workforce status (parent currently in paid work: yes, no; *ampjob00; appjob00*) and employment status for those in work were used (current or most recent job: self-employed or employee; *amemse00; apemse00*). Due to space constraints, the baseline effects (without controls) are only shown graphically, and not the statistical models.

Figure 1a does indeed show that parental workforce status attenuates some of the findings: if the mother is in work (vs. not), then the maternal side has relatively more frequent contact. Moreover, there is also an indication that if the father is currently working, the maternal side has relatively more contact than when the father is not.

§Contact address: Department of Social and Organizational Psychology, VU University Amsterdam, Van der Boechorststraat 1 (Room 1B-84), 1081BT, Amsterdam, The Netherlands.
Email: t.v.pollet@vu.nl.

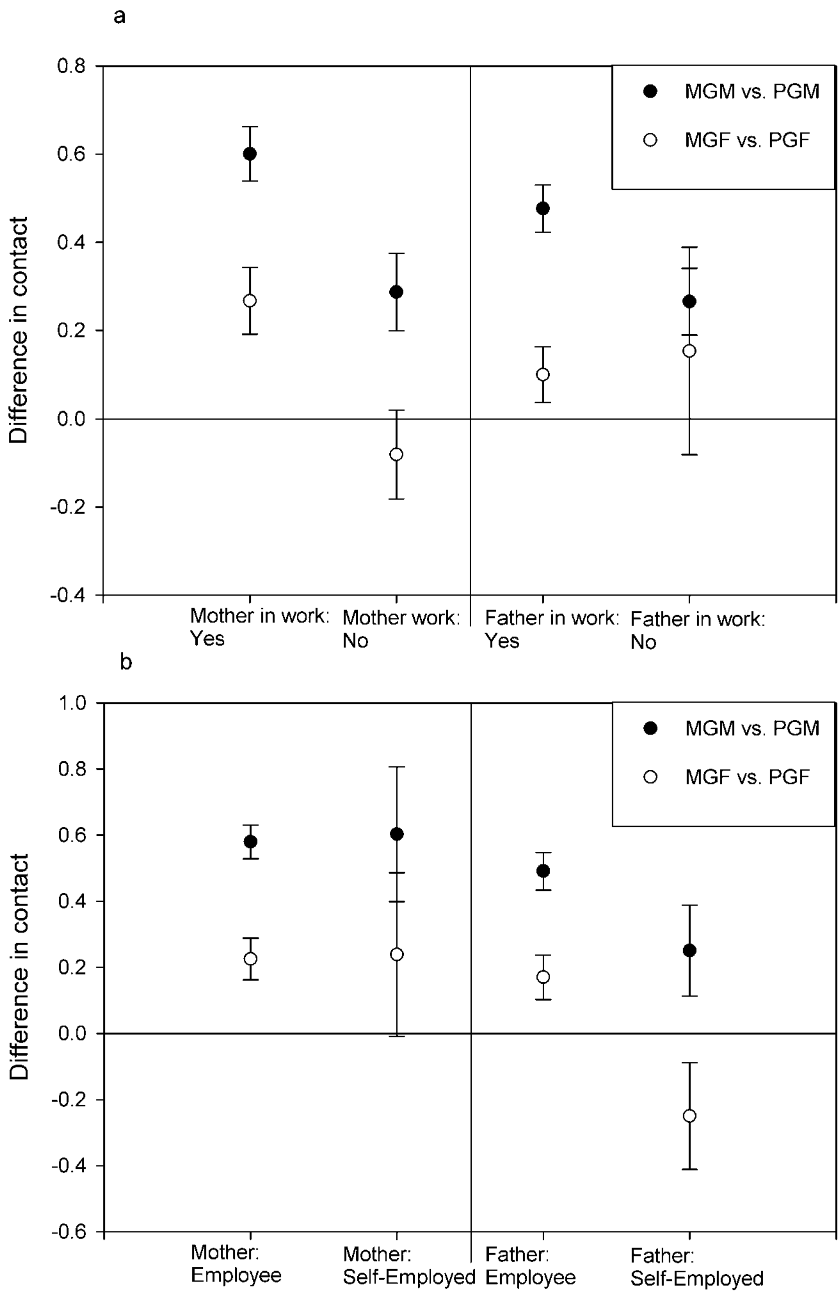

Fig. 1. Difference scores in contact by parental workforce status (a) and employment status (b). A positive score indicates a matrilineal bias. Error bars are 95% confidence intervals. MGM, maternal grandmother; PGM, paternal grandmother; MGF, maternal grandfather; PGF, paternal grandfather.

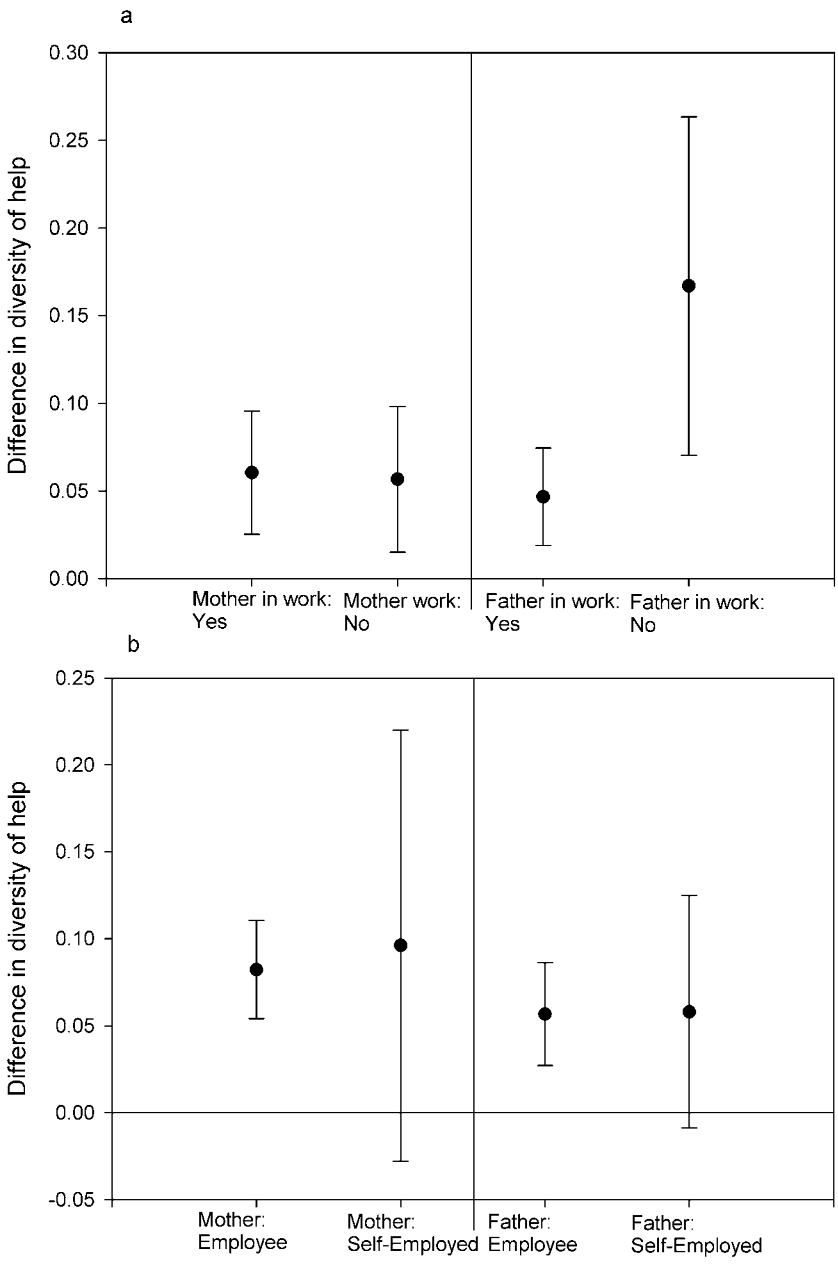

Fig. 2. Difference scores in diversity of grandparental help offered by (a) parental work-force status and (b) employment status. A positive score indicates a matrilineal bias. Error bars are 95% confidence intervals.

Figure 1b shows, contrary to Ghysels (2012), that self-employment of mothers does not attenuate lineage based differences in contact. Contrary to a gendered need explanation, it is also found that paternal grandparents are relatively more inclined to help if the father is self-employed vs. employed. Overall, Fig. 1a and b show that the lineage based differences in contact remain when employment status is controlled for, with the exception of contact with grandfathers. Turning to investment, it is found that there is little evidence that parental workforce/employment status is related to lineage differences diversity of grandparental investment offered (Fig. 2a and b). The only indication for attenuation is that when the father is unemployed (vs. employed), the maternal bias in diversity of help is larger.

In conclusion, some attenuation for lineage differences in face-to-face contact as a function of parental employment is found, but none for the diversity of help offered. With the exception of grandpaternal face-to-face contact, lineage based differences in grandparental investment exist (all means are above 0) and thus appear unlikely to be explained away by parental employment status. Ghysels' study highlights the relevance of taking into account factors such as parental employment status. It appears, however, that at least in the Millennium cohort study, the key difference between maternal and paternal grandparental investment largely holds after taking this into account.

Acknowledgments

The authors would like to thank the Centre for Longitudinal Studies (Institute of Education, University of London) and the ESRC Data Archive for access to the Millennium Cohort Study (MCS). The MCS is funded by the ESRC and a consortium of government departments led by the Office of National Statistics. Research at the Institute of Child Health and Great Ormond Street Hospital for Children NHS Trust benefits from R&D funding received from the NHS Executive. For further information, please see: http://www.cls.ioe.ac.uk/studies.asp?section=0001000200010007. Thomas Pollet is supported by The Netherlands Organisation for Scientific Research (Veni; 451.10.032).

References

Akaike, H. (1974) A new look at the statistical model identification. *IEEE Transactions on Automatic Control* **19**(6), 716–723.

Burnham, K. P. & Anderson, D. R. (2002) *Model Selection and Multimodel Inference: A Practical Information-Theoretic Approach* (2nd edition). Springer-Verlag, New York.

Burnham, K. P. & Anderson, D. R. (2004) Multimodel inference: understanding AIC and BIC in model selection. *Sociological Methods & Research* **33**, 261–304.

Euler, H. A. & Michalski, R. (2008) Grandparental and extended kin relationships. In Salmon, C. A. & Shackelford, T. K. (eds) *Family Relationships: An Evolutionary Perspective*. Oxford University Press, Oxford, pp. 230–256.

Ghysels, J. (2012) Lineage based differences in grandparental investment: a gender alternative. *Journal of Biosocial Science* **44**, 373–375.

Hansen, K. (ed.) (2006) *Millennium Cohort Study: First and Second Surveys. A Guide to the Datasets*. Institute of Education, University of London, London.

Pollet, T. V., Nelissen, M. & Nettle D. (2009) Lineage based differences in grandparental investment: evidence from a large British cohort study. *Journal of Biosocial Science* **41**(3), 355–379.

Raftery, A. E. (1996) Approximate Bayes factors and accounting for model uncertainty in generalized linear regression models. *Biometrika* **83**, 251–266.
Schwarz, G. (1978) Estimating the dimension of a model. *Annals of Statistics* **6**, 461–464.

Appendix

Ghysels (2012) argues that Model 2 receives more support than Model 1 in his analysis, but this depends on the approach one uses. He uses a χ^2 test between models, but the alternative of using model selection criteria (AIC; BIC; Burnham & Anderson, 2002, 2004) should be preferred as: (1) χ^2 testing dichotomizes model selection (yes/no vs. relative support for one model over another) and (2) such an approach typically leads to overfitting models. The Akaike information criterion (AIC) for a model in smaller-is-better form can be described as AIC $= (-2\text{LL}) + 2 \times k$ (-2LL is -2 log likelihood of the estimated model; $k =$ number of parameters in a model; Akaike, 1974; Burnham & Anderson, 2002). Fifteen fixed parameters were counted (8 (grandchild/child) + 7 (respondent)) for Model 1 and 20 fixed parameters (13 (grandchild/child) + 7 (respondent)) for Model 2. Thus, AIC Model 1 $= (2 \times 15) + 25{,}150.6 = 25{,}180.6$; AIC Model 2 $= (2 \times 20) + 25{,}145 = 25{,}185$. The difference between these two models (ΔAIC) is 4.4 units, *in favour of Model 1*. A difference in AIC of more than four units suggests a considerable difference, in favour of Model 1 (Burnham & Anderson, 2004). A Bayesian approach overwhelmingly favours Model 1 over Model 2 (BIC $= -2\text{LL} + k \times \ln(n)$; with n being the sample size; Schwarz, 1978). The difference in BIC (ΔBIC) is 38.63. As a rule of thumb, it is generally assumed that more than ten units in ΔBIC implies that Model 2 receives no support over Model 1 (Raftery, 1996; Burnham & Anderson, 2004). So while Model 2 might be a more significant fit to the data than Model 1 with a χ^2 test and null hypothesis testing, model selection criteria suggest that Model 1 is better supported than Model 2. This information theoretic approach thus suggests that the added explanatory value of taking into account the interaction between gender and employment status is weak at best.