

*Debate*

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

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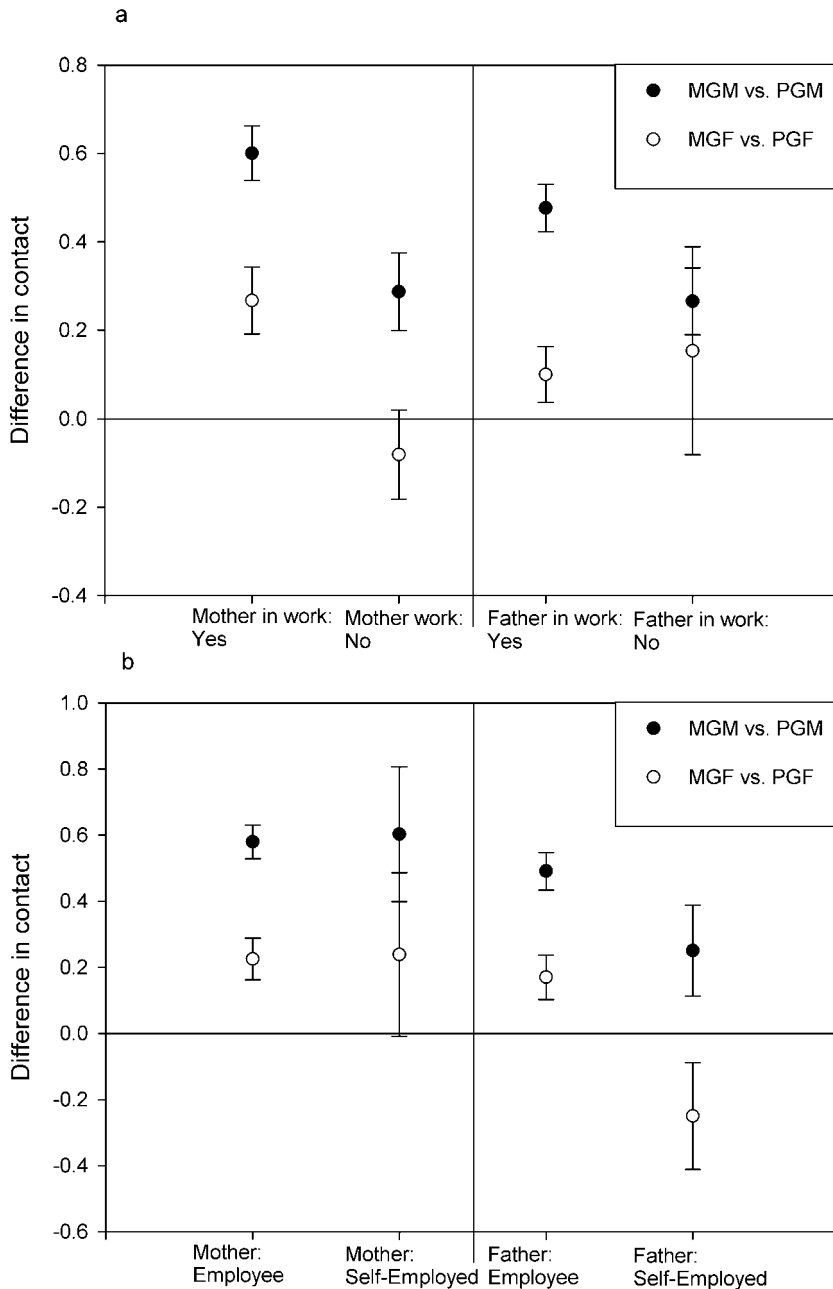
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Ghysels (2012) argues for a ‘gendered need’ explanation of lineage based differences in grandparental investment. Maternal grandmothers are subsidiary care-givers: only if mothers fail to fulfil this gender role, (maternal) grandmothers will step in. 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.

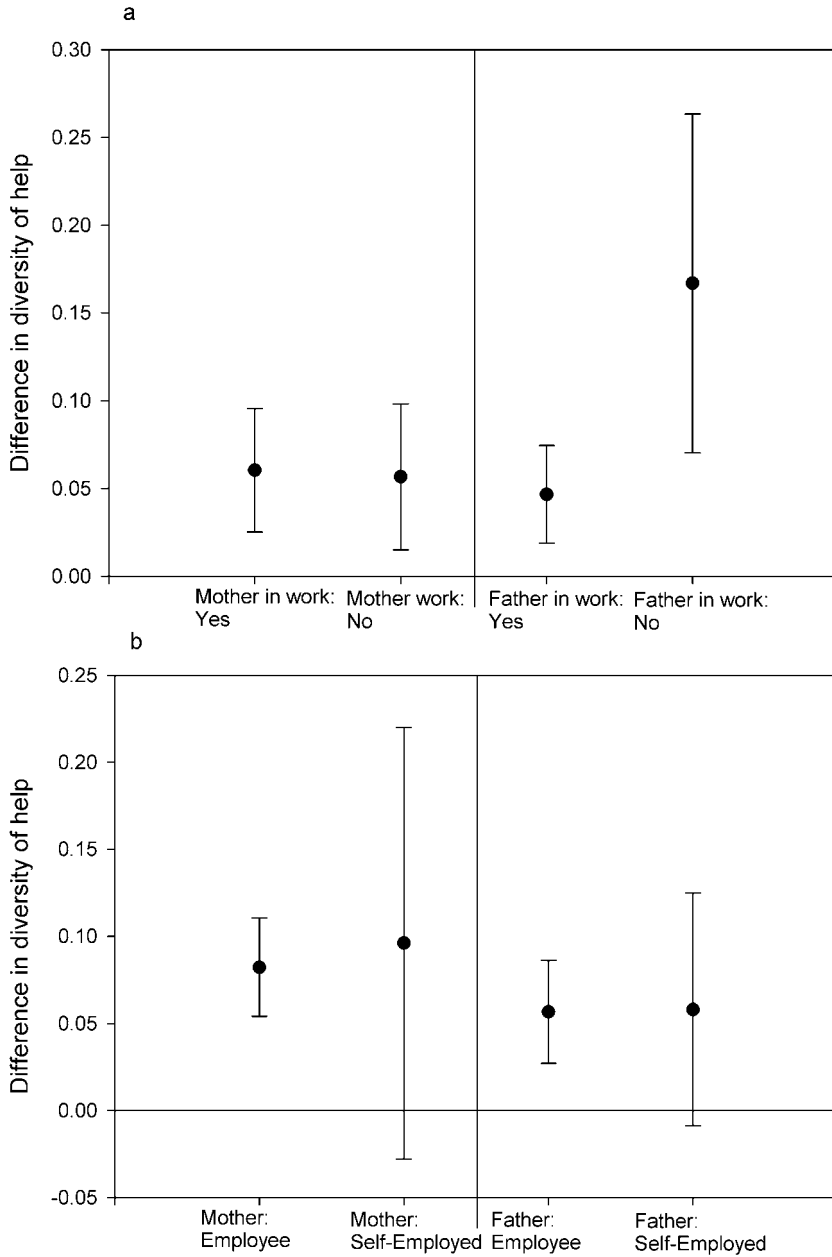
Following Ghysels, first the effect of parental workforce/employment status on differences in contact between maternal grandmother/father and paternal grandmother/father was investigated (MGM vs. PGM and MGF vs. PGF) in the Millennium cohort sample (Hansen, 2006; Pollet *et al.*, 2009). Lineage differences 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.

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**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.

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### 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  $\chi^2$  test between models, but the alternative of using model selection criteria (AIC; BIC; Burnham & Anderson, 2002, 2004) should be preferred as: (1)  $\chi^2$  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  $AIC = (-2LL) + 2 \times k$  ( $-2LL$  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,  $AIC \text{ Model 1} = (2 \times 15) + 25,150.6 = 25,180.6$ ;  $AIC \text{ Model 2} = (2 \times 20) + 25,145 = 25,185$ . The difference between these two models ( $\Delta AIC$ ) 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 ( $BIC = -2LL + k \times \ln(n)$ ; with  $n$  being the sample size; Schwarz, 1978). The difference in BIC ( $\Delta BIC$ ) is 38.63. As a rule of thumb, it is generally assumed that more than ten units in  $\Delta BIC$  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  $\chi^2$  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.