Table 1 supplement, Results from the MCMCglmm and pGLS analysis, ROB – Rest of brain, OB – Olfactory bulb, Asterisk indicates lambda values <0 and >1. β – regression coefficient, SE – standard error, PD > 0 – posterior distribution above 0 in percentage, DIC – deviance information criterion, t – t-test value, p – p-value, λ – phylogenetic signal in the residuals and DF – degrees of freedom for each model.

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|  | **MCMCglmm** | | | | **pGLS** | | | |
| **Model** | **β** | **SE** | **PD > 0** | **DIC** | **t** | **p** | **λ** | **DF** |
| Seasonality  **ROB**  Temperature  Precipitation  **OB**  Temperature  Precipitation | 0.0005  -0.0007  0.0336  0.0032 | 0.052  0.005  0.0791  0.0075 | 51  44  67  68 | -25.8  -22 | 0.32  0.76  0.42  0.44 | 0.75  045  0.67  0.66 | -0.37\*  0.69 | 18 |
| Maternal investment  **ROB**  Litter Size  Gestation Length  **OB**  Litter Size  Gestation Length | 0.0242  0.003  0.0324  -0.0024 | 0.0345  0.007  0.054  0.012 | 77  67  74  41 | -28.3  -22.3 | 0.81  0.25  0.68  -0.17 | 0.43  0.8  0.51  0.87 | -0.28\*  0.67 | 17 |
| Spatial  **ROB**  Home Range  Geographic Area  **OB**  Home Range  Geographic Area | 0.0534  -0.006  0.0628  -0.0195 | 0.0179  0.012  0.0285  0.0206 | **100**  30  **98**  16 | -42.8  -38.3 | 3.47  -0.77  2.53  -1.41 | **0.006**  0.46  **0.03**  0.19 | 0.89  1.37\* | 14 |
| Diet  ***ROB***  Diet Breadth  ***OB***  Diet Breadth | 0.0858  0.0661 | 0.0939  0.1189 | 88  73 | -26.8  -23.9 | -0.24  -0.46 | 0.8  0.65 | 1.03\*  0.69 | 14 |
| Behavioural (activity)  ***ROB***  Locomotor mode Generalised  Locomotor mode Saltatorial  Diurnal  Nocturnal  Burrow  ***OB***  Locomotor mode Generalised  Locomotor mode Saltatorial  Diurnal  Nocturnal  Burrow | -0.0902  0.0106  0.1243  -0.0502  0.1775  -0.2017  0.0079  0.1948  -0.0221  0.1728 | 0.1135  0.0814  0.0994  0.1037  0.0540  0.2262  0.1560  0.2111  0.2094  0.1094 | 20  55  90  30  **100**  17  52  84  45  94 | -35.1  -24.8 | -1.48  -0.82  1.43  -1.13  3.83  -1.03  -0.03  1.07  -0.18  1.82 | 0.17  0.43  0.18  0.29  **0.003**  0.32  0.97  0.31  0.86  0.09 | -0.19\*  0.73 | 18 |