**Table S3.** For each predictor of the best-fit models in each set of models, estimate, estimate error and two-sided 95% Credible intervals (CIs) based on quantiles.

|  |  |  |  |
| --- | --- | --- | --- |
| **Predictors** | **Estimate** | **Est. error** | **2.5 to 97.5% CI** |
| **M1-Ind: individual repertoire size** | | | |
| Intercept | 0.16 | 0.09 | -0.01 to 0.33 |
| *Effort* | 0.62 | 0.08 | 0.46 to 0.78 |
| *Sex (male)* | -0.10 | 0.15 | -0.37 to 0.20 |
| **M2-Ind: individual probability of accounting for others’ attentional states** | | | |
| Intercept | 0.65 | 0.15 | 0.36 to 0.94 |
| Centrality | 0.10 | 0.09 | -0.08 to 0.28 |
| Age | 0.30 | 0.08 | 0.13 to 0.46 |
| Species (orangutan) | 0.23 | 0.20 | -0.15 to 0.63 |
| Species (siamang) | -0.21 | 0.20 | -0.60 to 0.20 |
| Visual modality | 2.11 | 0.44 | 1.31 to 3.03 |
| Centrality \* visual modality | 0.26 | 0.29 | -0.32 to 0.82 |
| Age \* visual modality | 1.06 | 0.44 | 0.30 to 2.03 |
| Species (orangutan) \* visual modality | 2.56 | 0.86 | 1.08 to 4.44 |
| Species (siamang) \* visual modality | 0.81 | 0.56 | -0.34 to 1.90 |
| *Sex (male)* | 0.18 | 0.18 | -0.16 to 0.53 |
| **M3-Ind: individual flexibility** | | | |
| Intercept | 1.05 | 0.13 | 0.80 to 1.31 |
| *Effort* | -0.17 | 0.10 | -0.37 to 0.02 |
| *Sex (male)* | 0.20 | 0.22 | -0.23 to 0.63 |
| **M4-Ind: individual probability of using gestural sequences** | | | |
| Intercept | -0.52 | 0.08 | -0.66 to -0.37 |
| Centrality | -0.21 | 0.04 | -0.29 to -0.12 |
| Age | -0.29 | 0.04 | -0.37 to -0.20 |
| Species (orangutan) | -0.44 | 0.10 | -0.63 to -0.24 |
| Species (siamang) | 0.00 | 0.09 | -0.17 to 0.18 |
| *Sex (male)* | 0.06 | 0.08 | -0.10 to 0.23 |
| **M5-Ind: individual probability of eliciting a response (i.e. effectiveness)** | | | |
| Intercept | 2.66 | 0.56 | 1.59 to 3.74 |
| Centrality | -0.01 | 0.05 | -0.12 to 0.10 |
| Age | 0.17 | 0.06 | 0.05 to 0.29 |
| Species (orangutan) | -0.32 | 0.12 | -0.56 to -0.08 |
| Species (siamang) | 0.04 | 0.10 | -0.15 to 0.23 |
| Repertoire size | 0.24 | 0.34 | -0.42 to 0.90 |
| Probability of accounting for attention | -0.91 | 0.50 | -1.87 to 0.07 |
| Flexibility | -0.55 | 0.52 | -1.59 to 0.46 |
| Probability of using sequences | -2.30 | 0.33 | -2.95 to -1.66 |
| *Sex (male)* | 0.00 | 0.10 | -0.19 to 0.21 |
| **M1-Dyad: dyadic repertoire size** | | | |
| Intercept | -2.21 | 0.18 | -2.57 to -1.86 |
| Dyadic bond | 0.14 | 0.04 | 0.06 to 0.22 |
| Kinship | -0.03 | 0.13 | -0.29 to 0.23 |
| Species (orangutan) | 0.58 | 0.22 | 0.14 to 1.02 |
| Species (siamang) | 1.19 | 0.24 | 0.72 to 1.68 |
| *Effort* | 0.35 | 0.04 | 0.26 to 0.43 |
| *Age difference* | -0.03 | 0.04 | -0.11 to 0.06 |
| *Sex combination (female-male)* | -0.02 | 0.13 | -0.27 to 0.24 |
| *Sex combination (male-male)* | 0.15 | 0.23 | -0.28 to 0.62 |
| **M2-Dyad: dyadic probability of accounting for others’ attentional states** | | | |
| Intercept | 0.76 | 0.14 | 0.49 to 1.03 |
| *Age difference* | -0.03 | 0.05 | -0.13 to 0.07 |
| *Sex combination (female-male)* | 0.24 | 0.14 | -0.04 to 0.51 |
| *Sex combination (male-male)* | 0.05 | 0.24 | -0.42 to 0.54 |
| **M3-Dyad: dyadic flexibility** |  |  |  |
| Intercept | 1.97 | 0.18 | 1.62 to 2.33 |
| *Effort* | -0.29 | 0.09 | -0.46 to -0.12 |
| *Age difference* | 0.00 | 0.09 | -0.19 to 0.18 |
| *Sex combination (female-male)* | -0.01 | 0.20 | -0.40 to 0.36 |
| *Sex combination (male-male)* | 0.20 | 0.32 | -0.39 to 0.86 |
| **M4-Dyad: dyadic probability of using gestural sequences** | | | |
| Intercept | -0.87 | 0.18 | -1.24 to -0.52 |
| *Age difference* | -0.04 | 0.05 | -0.14 to 0.07 |
| *Sex combination (female-male)* | 0.36 | 0.17 | 0.03 to 0.71 |
| *Sex combination (male-male)* | 0.38 | 0.32 | -0.25 to 1.01 |
| **M5-Dyad: dyadic probability of eliciting a response (i.e. effectiveness)** | | | |
| Intercept | 1.00 | 0.50 | 0.02 to 2.00 |
| Dyadic bond | 0.01 | 0.06 | -0.10 to 0.13 |
| Kinship | -0.06 | 0.16 | -0.37 to 0.26 |
| Species (orangutan) | -0.38 | 0.27 | -0.90 to 0.16 |
| Species (siamang) | -0.05 | 0.28 | -0. 58 to 0.51 |
| Repertoire size | 0.17 | 0.51 | -0.87 to 1.17 |
| Probability of accounting for attention | 1.23 | 0.29 | 0.66 to 1.81 |
| Flexibility | -0.70 | 0.43 | -1.56 to 0.14 |
| Probability of using sequences | -1.65 | 0.28 | -2.19 to -1.11 |
| *Age difference* | 0.03 | 0.06 | -0.08 to 0.14 |
| *Sex combination (female-male)* | 0.04 | 0.17 | -0.29 to 0.36 |
| *Sex combination (male-male)* | -0.32 | 0.27 | -0.86 to 0.20 |

Subject identity was included as random factor in M2-Ind, whereas both subjects’ identities were included as random factors in all the dyadic multi-membership models (M1-Dyad to M5-Dyad).