**Table A1.**

Results of pre-network randomization tests that compared the observed mean strength of macaques within their grooming networks, with a distribution of mean values calculated from 1000 permuted networks generated by randomly swapping the edges of the original networks.

|  |  |  |  |
| --- | --- | --- | --- |
| Group ID | Number of nodes (females) | Mean strength (pre-introduction) | Mean strength (post-introduction) |
| I | 40 | 27.78\*\* |  |
| II | 30 | 34.92\*\* |  |
| IIIa | 14 | 27.43\*\* | 21.57\*\* |
| IVa | 14 | 26.43\*\* | 27.43\*\* |
| V | 14 | 29.23\*\* | 24.92\*\* |
| VI | 18 | 21.88\*\* |  |
| VII | 37 | 36.97\*\* |  |

a The same group observed in sequential years.

\*\**p* < 0.01.

**Table A2.**

Negative binomial GLMMs examining the relationship between male introduction success and the behavioral outcomes of individuals’: aggression given, aggression received, submissive status given and submissive status received.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | *β* | SE | *z* | Pr(>|*z*|) |
| Outcome: Aggression given |  |  |  |  |
| (Intercept) | 2.81 | 0.08 | 37.13 | <0.01\*\* |
| Introduction (unsuccessful vs successful) | -0.27 | 0.16 | -1.65 | 0.09(\*) |
| Age | -0.05 | 0.11 | -0.45 | 0.65 |
| Dominance rank (Percentile) | 1.23 | 0.11 | 10.93 | <0.01\*\* |
| Relatedness coefficient | 0.02 | 0.12 | 0.19 | 0.85 |
|  |  |  |  |  |
| Outcome: Aggression received | | | | |
| (Intercept) | 2.80 | 0.10 | 28.43 | <0.01\*\* |
| Introduction (unsuccessful vs successful) | -0.31 | 0.21 | -1.49 | 0.14 |
| Age | -0.68 | 0.09 | -7.82 | <0.01\*\* |
| Dominance rank (Percentile) | -1.08 | 0.08 | -12.72 | <0.01\*\* |
| Relatedness coefficient | 0.02 | 0.09 | 0.28 | 0.78 |
|  |  |  |  |  |
| Outcome: Status given | | | | |
| (Intercept) | 3.57 | 0.12 | 28.62 | <0.01\*\* |
| Introduction (unsuccessful vs successful) | -0.39 | 0.24 | -1.61 | 0.11 |
| Age | -0.35 | 0.09 | -4.05 | <0.01\*\* |
| Dominance rank (Percentile) | -1.14 | 0.09 | -12.47 | <0.01\*\* |
| Relatedness coefficient | -0.04 | 0.09 | -0.45 | 0.66 |
|  |  |  |  |  |
| Outcome: Status received | | | | |
| (Intercept) | 3.28 | 0.13 | 24.99 | <0.01\*\* |
| Introduction (unsuccessful vs successful) | -0.54 | 0.26 | -2.07 | 0.04\* |
| Age | 0.21 | 0.12 | 1.68 | 0.09(\*) |
| Dominance rank (Percentile) | 2.14 | 0.13 | 16.59 | <0.01\*\* |
| Relatedness coefficient | -0.35 | 0.14 | -2.57 | 0.01\* |

In each model, we included a 3-level nested random effect of categorical ‘group size’ (level-3), ‘group ID’ (level-2), and ‘year of observation’ (level-1).

\**p* < 0.05; \*\**p* < 0.01; (\*)0.05 < *p* < 0.10.

**Table A3.**

Negative binomial GLMMs examining the relationship between period of study and the behavioral outcomes of individuals’: aggression given, aggression received, submissive status given and submissive status received, for groups that experienced a successful male introduction.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Predictor | *β* | SE | *z* | Pr(>|*z*|) |
| Outcome: Aggression given |  |  |  |  |
| (Intercept) | 1.37 | 0.26 | 5.18 | <0.01\*\* |
| Period (post- vs pre-introduction) | -0.82 | 0.17 | 4.92 | <0.01\*\* |
| Age | -0.03 | 0.02 | -1.61 | 0.11 |
| Dominance rank (Percentile) | 2.30 | 0.31 | 7.52 | <0.01\*\* |
| Relatedness coefficient | -0.13 | 0.44 | -0.29 | 0.77 |
| Outcome: Aggression received | | | | |
| (Intercept) | 4.11 | 0.22 | 18.93 | <0.01\*\* |
| Period (post- vs pre-introduction) | -0.79 | 0.13 | 6.16 | <0.01\*\* |
| Age | -0.10 | 0.02 | -6.35 | <0.01\*\* |
| Dominance rank (Percentile) | -1.81 | 0.23 | -7.83 | <0.01\*\* |
| Relatedness coefficient | -0.09 | 0.34 | -0.28 | 0.78 |
| Outcome: Status given | | | | |
| (Intercept) | 5.00 | 0.32 | 15.86 | <0.01\*\* |
| Period (post- vs pre-introduction) | -0.49 | 0.35 | 1.40 | 0.16 |
| Age | -0.07 | 0.01 | -4.49 | <0.01\*\* |
| Dominance rank (Percentile) | -1.93 | 0.21 | -9.13 | <0.01\*\* |
| Relatedness coefficient | -0.09 | 0.31 | -0.29 | 0.77 |
| Outcome: Status received | | | | |
| (Intercept) | 1.87 | 0.31 | 5.99 | <0.01\*\* |
| Period (post- vs pre-introduction) | -0.61 | 0.36 | 1.71 | 0.09(\*) |
| Age | -0.03 | 0.02 | -1.96 | 0.05\* |
| Dominance rank (Percentile) | 3.47 | 0.24 | 14.45 | <0.01\*\* |
| Relatedness coefficient | -1.15 | 0.37 | -3.16 | <0.01\*\* |

In each model, we included a 3-level nested random effect of categorical ‘group size’ (level-3), ‘group ID’ (level-2), and ‘year of observation’ (level-1).

\**p* < 0.05; \*\**p* < 0.01; (\*)0.05 < *p* < 0.10.

Chart, scatter chart

Description automatically generated

**Figure A1.** Relationship between dominance rank and Normalized David’s Scores that indicate significant differences in the slopes, i.e., in hierarchy steepness, for groups that experienced successful (black) versus unsuccessful (grey) male introductions.

![Chart, box and whisker chart

Description automatically generated]()

**Figure A2.** Box and whisker plots showing the mean grooming clustering coefficients by period, for each of three groups that experienced successful male introductions.