**Appendix**

**Contact call acoustic structure is associated with inter-individual distances during antiphonal vocal exchanges in wild red-tailed monkeys (*Cercopithecus ascanius schmidti*)**

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**Table A1.**

Model selection for predictors of each acoustic parameter (call duration; mean entropy; maximum, mean, and minimum frequency) using deviance information criterion (DIC) ranks

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | Duration (ms) | | | | Mean entropy (bits) | | | |
| df | DIC | DIC ∆ null model | Weight | df | DIC | DIC ∆ null model | Weight |
| Null (fixed control and random effects only) | *6* | *2449.56* | *0.00* | *0.33* | 6 | 2445.69 | 0.00 | 0.00 |
| NN distance + preceding grunt + NN age-sex class + group travel speed (main effects only) | 16 | 2452.39 | 2.83 | 0.08 | 16 | 2437.40 | -8.29 | 0.16 |
| NN distance \* preceding grunt | 20 | 2453.60 | 4.04 | 0.04 | *20* | *2435.16* | *-10.53* | *0.49* |
| NN distance \* NN age-sex class | 20 | 2450.87 | 1.31 | 0.17 | 20 | 2443.45 | -2.24 | 0.01 |
| NN distance \* group travel speed | 17 | 2452.97 | 3.41 | 0.06 | 17 | 2438.85 | -6.85 | 0.08 |
| NN distance \* preceding grunt + NN distance \* NN age-sex class | 24 | 2452.35 | 2.79 | 0.08 | 24 | 2440.79 | -4.91 | 0.03 |
| NN distance \* preceding grunt + NN distance \* group travel speed | 21 | 2453.31 | 3.75 | 0.05 | 21 | 2436.72 | -8.98 | 0.22 |
| NN distance \* NN age-sex class + NN distance \* group travel speed | 21 | 2451.88 | 2.32 | 0.10 | 21 | 2445.05 | -0.64 | 0.00 |
| NN distance \* preceding grunt + NN distance \* NN age-sex class + NN distance \* group travel speed | 25 | 2452.65 | 3.08 | 0.07 | 25 | 2442.36 | -3.33 | 0.01 |

**Table A1 continued**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | Maximum frequency (Hz) | | | | Mean frequency (Hz) | | | | Minimum frequency (Hz) | | | |
| df | DIC | DIC ∆ null model | Weight | df | DIC | DIC ∆ null model | Weight | df | DIC | DIC ∆ null model | Weight |
| Null (fixed control and random effects only) | *6* | *2540.12* | *0.00* | *0.99* | 6 | 2463.09 | 0.00 | 0.06 | *6* | *2501.31* | *0.00* | *1.00* |
| NN distance + preceding grunt + NN age-sex class + group travel speed (main effects only) | 16 | 2550.72 | 10.60 | 0.00 | 16 | 2461.02 | -2.07 | 0.16 | 16 | 2514.45 | 13.14 | 0.00 |
| NN distance \* preceding grunt | 20 | 2552.76 | 12.64 | 0.00 | *20* | *2459.31* | *-3.78* | *0.39* | 20 | 2521.39 | 20.08 | 0.00 |
| NN distance \* NN age-sex class | 20 | 2556.65 | 16.53 | 0.00 | 20 | 2464.87 | 1.79 | 0.02 | 20 | 2519.93 | 18.62 | 0.00 |
| NN distance \* group travel speed | 17 | 2550.57 | 10.44 | 0.01 | 17 | 2462.74 | -0.35 | 0.07 | 17 | 2516.14 | 14.83 | 0.00 |
| NN distance \* preceding grunt + NN distance \* NN age-sex class | 24 | 2557.55 | 17.43 | 0.00 | 24 | 2462.21 | -0.88 | 0.09 | 24 | 2526.33 | 25.02 | 0.00 |
| NN distance \* preceding grunt + NN distance \* group travel speed | 21 | 2552.51 | 12.39 | 0.00 | 21 | 2461.05 | -2.04 | 0.16 | 21 | 2523.06 | 21.75 | 0.00 |
| NN distance \* NN age-sex class + NN distance \* group travel speed | 21 | 2556.75 | 16.62 | 0.00 | 21 | 2466.73 | 3.64 | 0.01 | 21 | 2521.68 | 20.37 | 0.00 |
| NN distance \* preceding grunt + NN distance \* NN age-sex class + NN distance \* group travel speed | 25 | 2557.71 | 17.59 | 0.00 | 25 | 2464.05 | 0.96 | 0.04 | 25 | 2528.08 | 26.77 | 0.00 |

For each parameter, the models tested comprise fixed control and random effects with each possible combination of fixed main and interaction effects (italics, selected best fitting model; NN, nearest neighbour; df, degrees of freedom).

**Table A2.**

Summary output for models of all five acoustic parameters (call duration; mean entropy; maximum, mean, and minimum frequency). Results correspond to the model selected in this table (parentheses, categorical variable levels; NN, nearest neighbour; CI, credible interval).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Fixed effect | Duration (ms) | | | | Mean entropy (bits) | | | |
| Posterior mean | Lower 95% CI | Upper 95% CI | Posterior probability | Posterior mean | Lower 95% CI | Upper 95% CI | Posterior probability |
| Intercept | -0.281 | -0.571 | 0.007 | - | 0.068 | -0.447 | 0.570 | 60.8 |
| NN distance |  |  |  |  | 0.103 | -0.122 | 0.332 | 81.1 |
| Preceding grunt (no) a |  |  |  |  | -0.035 | -0.269 | 0.200 | 62.0 |
| Preceding grunt (yes - caller NN) a |  |  |  |  | 0.024 | -0.257 | 0.292 | 56.1 |
| Preceding grunt (yes - unknown if caller NN) a |  |  |  |  | 0.238 | -0.016 | 0.480 | 97.0 |
| Interaction: NN distance \* preceding grunt (no) a |  |  |  |  | -0.227 | -0.455 | 0.031 | 96.5 |
| Interaction: NN distance \* preceding grunt (yes - NN) a |  |  |  |  | -0.255 | -0.549 | 0.049 | 95.0 |
| Interaction: NN distance \* preceding grunt (yes - unknown if NN) a |  |  |  |  | -0.326 | -0.589 | -0.081 | 99.4 |
| NN (adult female) b |  |  |  |  | -0.173 | -0.575 | 0.224 | 79.6 |
| NN (subadult) b |  |  |  |  | -0.140 | -0.550 | 0.275 | 74.3 |
| NN (juvenile) b |  |  |  |  | -0.031 | -0.468 | 0.425 | 54.9 |
| Group travel speed |  |  |  |  | 0.048 | -0.013 | 0.112 | 93.5 |
| [Control] Vegetation class (primary forest) c | 0.237 | -0.031 | 0.499 | – | 0.110 | -0.171 | 0.373 | 78.7 |
| [Control] Vegetation class (secondary forest) c | 0.056 | -0.240 | 0.371 | – | -0.091 | -0.401 | 0.201 | 72.1 |

**Table A2 continued**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Fixed effect | Maximum frequency (Hz) | | | | Mean frequency (Hz) | | | | Minimum frequency (Hz) | | | |
|  | Posterior mean | Lower 95% CI | Upper 95% CI | Posterior probability | Posterior mean | Lower 95% CI | Upper 95% CI | Posterior probability | Posterior mean | Lower 95% CI | Upper 95% CI | Posterior probability |
| Intercept | -0.161 | -0.449 | 0.115 | - | -0.194 | -0.691 | 0.309 | 77.5 | -0.172 | -0.460 | 0.101 | - |
| NN distance |  |  |  |  | 0.119 | -0.116 | 0.344 | 84.6 |  |  |  |  |
| Preceding grunt (no) a |  |  |  |  | 0.114 | -0.114 | 0.349 | 83.5 |  |  |  |  |
| Preceding grunt (yes - caller NN) a |  |  |  |  | 0.194 | -0.096 | 0.468 | 91.4 |  |  |  |  |
| Preceding grunt (yes - unknown if caller NN) a |  |  |  |  | 0.153 | -0.099 | 0.400 | 88.8 |  |  |  |  |
| Interaction: NN distance \* preceding grunt (no) a |  |  |  |  | -0.142 | -0.399 | 0.098 | 87.6 |  |  |  |  |
| Interaction: NN distance \* preceding grunt (yes - NN) a |  |  |  |  | -0.186 | -0.495 | 0.103 | 88.5 |  |  |  |  |
| Interaction: NN distance \* preceding grunt (yes - unknown if NN) a |  |  |  |  | -0.281 | -0.544 | -0.030 | 98.3 |  |  |  |  |
| NN (adult female) b |  |  |  |  | -0.080 | -0.484 | 0.311 | 65.7 |  |  |  |  |
| NN (subadult) b |  |  |  |  | 0.086 | -0.332 | 0.505 | 65.5 |  |  |  |  |
| NN (juvenile) b |  |  |  |  | 0.080 | -0.368 | 0.532 | 63.8 |  |  |  |  |
| Group travel speed |  |  |  |  | 0.108 | 0.044 | 0.168 | 100.0 |  |  |  |  |
| [Control] Vegetation class (primary forest) c | 0.078 | -0.207 | 0.344 | – | 0.157 | -0.120 | 0.433 | 86.9 |  |  |  |  |
| [Control] Vegetation class (secondary forest) c | 0.209 | -0.119 | 0.525 | – | 0.058 | -0.258 | 0.361 | 64.5 | 0.249 | -0.009 | 0.536 | – |

a Reference: “yes - caller not NN”.

b Reference: “edge”.

c Reference: “adult male”.