Appendix S3. Negative binomial generalized linear model details.

Table S3a. Analysis of Generalized Estimating Equation for the stress-related behaviors analysis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent Variable** | **Effect** | **Estimate** | **Standard Error** | **Z** | **Pr > |Z|** |
| Body Turn | Intercept | -0.3923 | 0.2654 | -1.48 | 0.1394 |
| Group Aversive | 2.1908 | 0.2963 | 7.39 | <0.0001 |
| Group Mixed | 1.6889 | 0.2622 | 6.44 | <0.0001 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Dog Age | -0.0252 | 0.0099 | -2.55 | 0.0107 |
| Children Not Present | -0.5888 | 0.2060 | -2.37 | 0.0178 |
| Children Present | 0.0000 | 0.0000 | n.a. | n.a. |
| Move Away | Intercept | 0.9859 | 0.1395 | 7.07 | <0.0001 |
| Group Aversive | 0.4617 | 0.2034 | 2.27 | 0.0232 |
| Group Mixed | 0.3806 | 0.2382 | 1.60 | 0.1101 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Crouch | Intercept | -0.5274 | 0.2783 | -1.89 | 0.0581 |
| Group Aversive | 1.7963 | 0.3776 | 4.76 | <0.0001 |
| Group Mixed | 1.1306 | 0.3667 | 3.08 | 0.0020 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Yawn | Intercept | -0.9814 | 0.3463 | -2.83 | 0.0046 |
| Group Aversive | 2.3215 | 0.3535 | 6.57 | <0.0001 |
| Group Mixed | 1.0856 | 0.4538 | 2.39 | 0.0167 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Dog Age | -0.0348 | 0.0126 | -2.77 | 0.0056 |
| Lip Lick | Intercept | 1.4126 | 0.1103 | 12.81 | <0.0001 |
| Group Aversive | 2.6110 | 0.1569 | 16.64 | <0.0001 |
| Group Mixed | 1.4691 | 0.2004 | 7.33 | <0.0001 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Body Shake | Intercept | -0.8817 | 0.2565 | -3.44 | 0.0006 |
| Group Aversive | 0.7425 | 0.2617 | 2.84 | 0.0046 |
| Group Mixed | 0.0205 | 0.3351 | 0.06 | 0.9512 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Children Not Present | 0.5774 | 0.2386 | 2.42 | 0.0155 |
| Children Present | 0.0000 | 0.0000 | n.a. | n.a. |

|  |
| --- |
| **Score statistics for type III Generalized Estimating Equation Analysis** |
| **Dependent Variable** | **Effect** | **Num DF** | **Chi-Square** | **Pr > Chi-Square** |
| Body Turn | Group | 2 | 25.89 | <0.0001 |
| Dog Age | 1 | 4.47 | 0.0344 |
| Children | 1 | 3.83 | 0.0504 |
| Move Away | Group | 2 | 5.25 | 0.0725 |
| Crouch | Group | 2 | 13.26 | 0.0013 |
| Yawn | Group | 2 | 19.64 | <0.0001 |
| Dog Age | 1 | 4.35 | 0.037 |
| Lip Lick | Group | 2 | 35.87 | <0.0001 |
| Body Shake | Group | 2 | 5.82 | 0.0545 |
| Children | 1 | 5.30 | 0.0214 |

n.a.=not applicable.

Table S3b. Analysis of Generalized Estimating Equation for the behavioral state analysis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent Variable** | **Effect** | **Estimate** | **Standard Error** | **Z** | **Pr > |Z|** |
| Excited  | Intercept | 2.2192 | 0.0602 | 36.84 | <0.0001 |
| Group Aversive | -1.8875 | 0.2104 | -8.97 | <0.0001 |
| Group Mixed | -0.4679 | 0.1110 | -4.21 | <0.0001 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Training Session 1 | 0.2404 | 0.0732 | 3.28 | 0.0010 |
| Training Session 2 | 0.0433 | 0.0726 | 0.60 | 0.5506 |
| Training Session 3 | 0.0000 | 0.0000 | n.a. | n.a. |
| Relaxed | Intercept | 0.9923 | 0.2219 | 4.47 | <0.0001 |
| Group Aversive | -1.1194 | 0.4047 | -2.77 | 0.0057 |
| Group Mixed | -0.0254 | 0.2307 | -0.11 | 0.9124 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Training Session 1 | -0.4816 | 0.3220 | -1.50 | 0.1347 |
| Training Session 2 | 0.0586 | 0.2795 | 0.21 | 0.8339 |
| Training Session 3 | 0.0000 | 0.0000 | n.a. | n.a. |
| Tense | Intercept | -0.4865 | 0.1709 | -2.85 | 0.0044 |
| Group Aversive | 2.5925 | 0.1777 | 14.59 | <0.0001 |
| Group Mixed | 1.6936 | 0.2231 | 7.59 | <0.0001 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Low | Intercept | -3.0740 | 0.8063 | -3.81 | 0.0001 |
| Group Aversive | 2.9413 | 0.7610 | 3.86 | 0.0001 |
| Group Mixed | 1.1397 | 0.8062 | 1.41 | 0.1575 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |
| Children Not Present | -1.1801 | 0.4610 | -2.56 | 0.0105 |
| Children Present | 0.0000 | 0.0000 | n.a. | n.a. |

|  |
| --- |
| **Score statistics for type III Generalized Estimating Equation Analysis** |
| **Dependent Variable** | **Effect** | **Num DF** | **Chi-Square** | **Pr > Chi-Square** |
| Excited | Group | 2 | 50.34 | <0.0001 |
| Training Session | 2 | 10.33 | 0.0057 |
| Relaxed | Group | 2 | 12.26 | 0.0022 |
| Training Session | 2 | 5.13 | 0.0769 |
| Tense | Group | 2 | 52.77 | <0.0001 |
| Low | Group | 2 | 9.87 | 0.0072 |
| Children | 1 | 4.32 | 0.0377 |

n.a.=not applicable.

Table S3c. Analysis of Generalized Estimating Equation for the panting analysis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent Variable** | **Effect** | **Estimate** | **Standard Error** | **Z** | **Pr > |Z|** |
| Panting | Intercept | 0.9228 | 0.1589 | 5.81 | <0.0001 |
| Group Aversive | 0.9062 | 0.1954 | 4.64 | <0.0001 |
| Group Mixed | 0.5566 | 0.2266 | 2.46 | 0.0140 |
| Group Reward | 0.0000 | 0.0000 | n.a. | n.a. |

|  |
| --- |
| **Score statistics for type III Generalized Estimating Equation Analysis** |
| **Dependent Variable** | **Effect** | **Num DF** | **Chi-Square** | **Pr > Chi-Square** |
| Panting | Group | 2 | 17.08 | 0.0002 |

n.a.=not applicable.

Table S3d. Solutions for fixed effects from the generalized mixed model for the cognitive bias analysis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent Variable** | **Effect** | **Estimate** | **Standard Error** | **t** | **Pr > |t|** |
| Latency to reach bowl | Intercept | 0.9654 | 0.0694 | 13.91 | <0.0001 |
| Group Aversive | 0.2174 | 0.0845 | 2.57 | 0.0106 |
| Group Mixed | 0.1811 | 0.0925 | 1.96 | 0.0511 |
| Group Reward | 0.0000 | n.a. | n.a. | n.a. |
| Bowl Location M | 0.3388 | 0.0692 | 4.90 | <0.0001 |
| Bowl Location NN | 0.6478 | 0.0692 | 9.37 | <0.0001 |
| Bowl Location NP | -0.0064 | 0.0692 | -0.09 | 0.9261 |
| Bowl Location N | 1.4428 | 0.0692 | 20.86 | <0.0001 |
| Bowl Location P | 0.0000 | n.a. | n.a. | n.a. |

|  |
| --- |
| **Type III Tests of Fixed Effects** |
| **Dependent Variable** | **Effect** | **Num DF** | **F** | **Pr > F** |
| Latency to reach bowl | Group | 2 | 3.89 | 0.0214 |
| Bowl Location | 4 | 150.69 | <0.0001 |

n.a.=not applicable.