

Supplementary Material

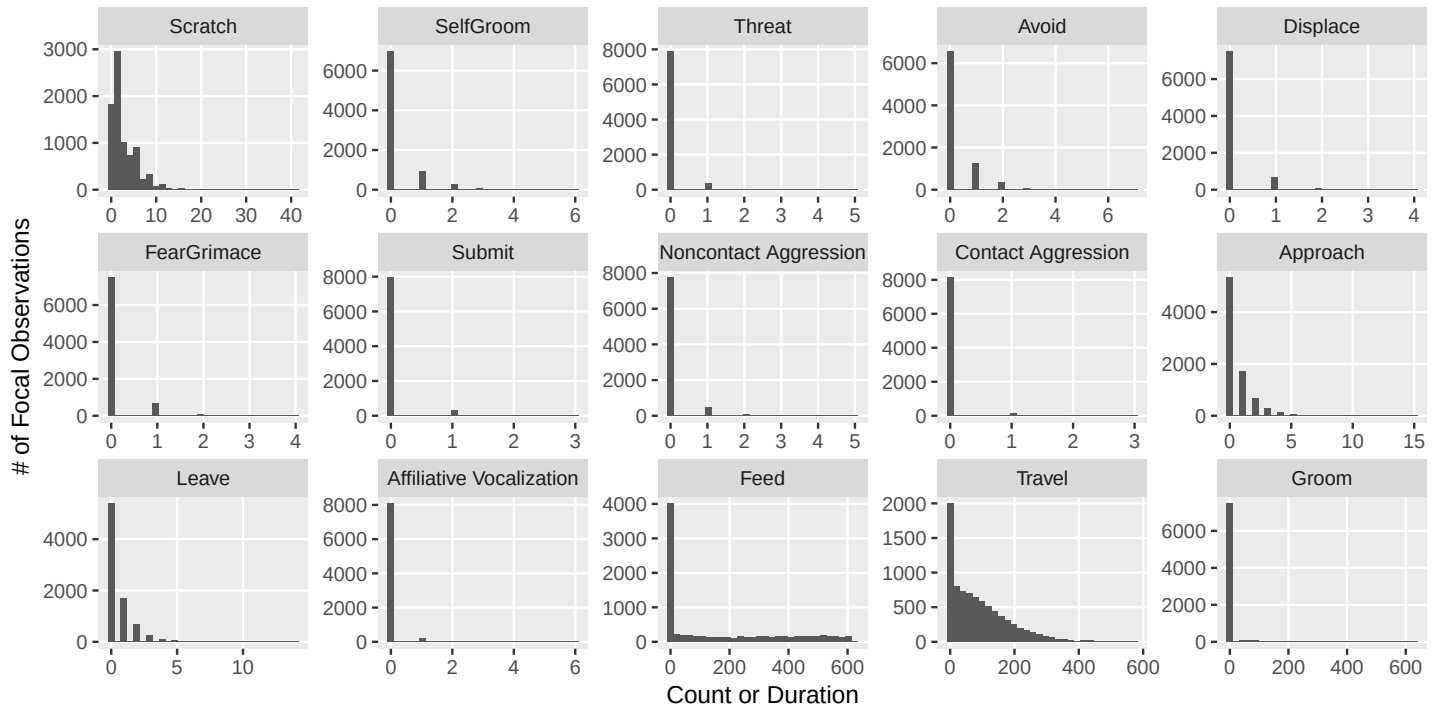


Figure S1: Distribution of behavior amounts across focal observations. Note that behaviors are not separated into give/receive as they are in the model, so the fit data has a higher proportion of zeros per behavior than presented here.

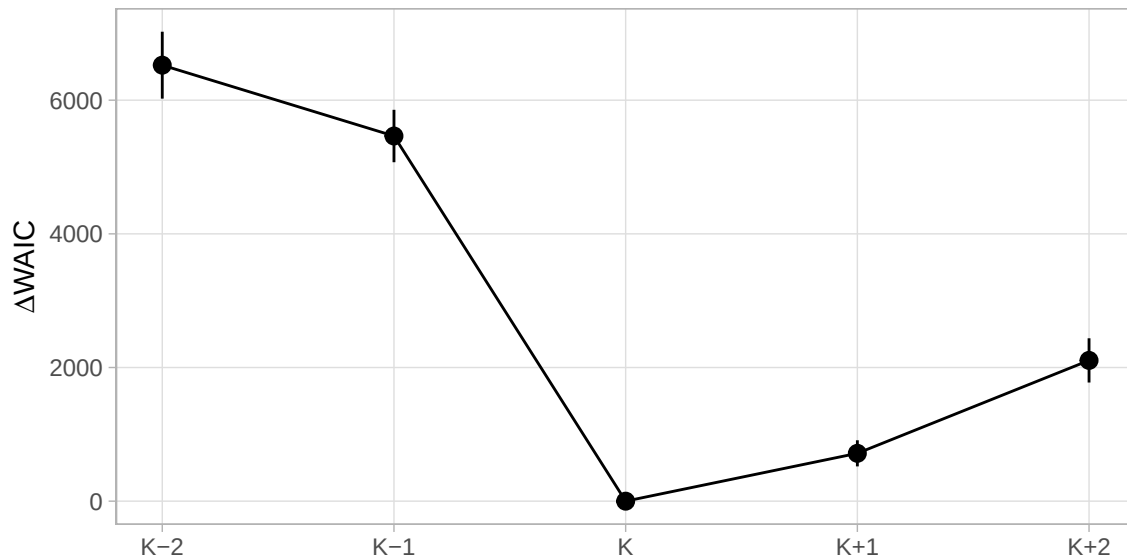


Figure S2: Choosing number of states for simulated data using WAIC. Y-axis shows difference in WAIC between the model with the correct number of states, K , and models with more and fewer states. Error bars represent two standard errors. Lower is better.

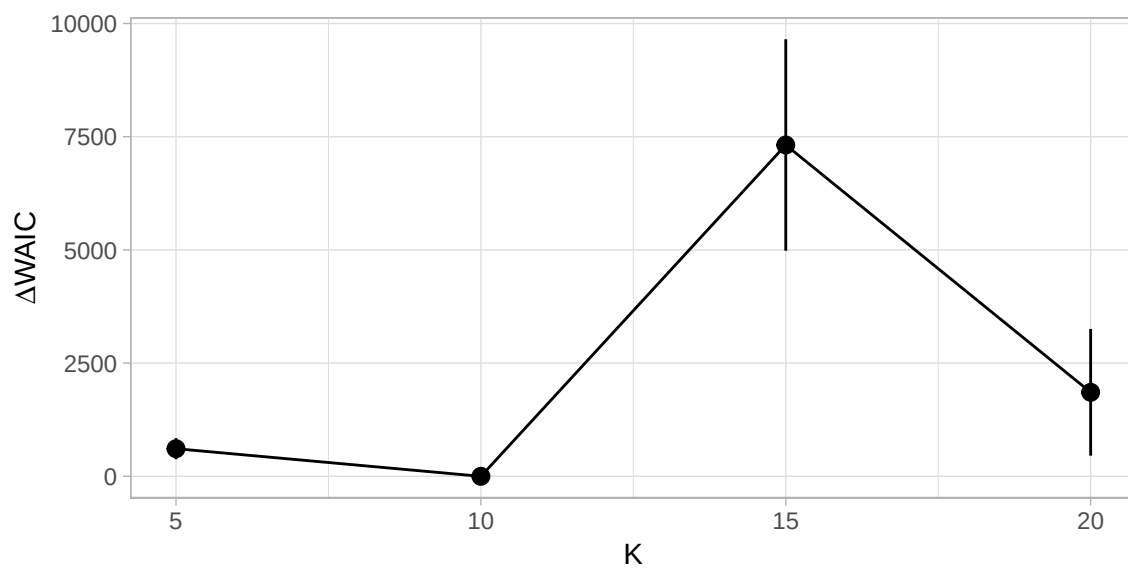


Figure S3: Choosing number of states for the Cayo Santiago data using WAIC. Y-axis shows difference in WAIC between the model with 10 states and models with more and fewer states. Error bars represent two standard errors. Lower is better.

	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8	Factor9	Factor10
<i>Scratch</i>	-0.034	-0.023	-0.028	-0.014	0.031	0.7	...	0.019	-0.037	-0.01
<i>SelfGroom</i>	-0.018	0.013	...	...	0.015	0.39	-0.079	-0.14	0.013	...
<i>Threat(give)</i>	...	...	0.03	...	...	-0.022	0.12	...	-0.032	0.17
<i>Threat(receive)</i>	...	0.018	...	0.019	...	...	...	0.048	...	0.25
<i>Avoid(give)</i>	...	0.011	0.02	0.014	-0.056	-0.063	0.44	...	-0.016	0.077
<i>Avoid(receive)</i>	0.012	0.047	0.02	0.032	-0.063	-0.066	-0.043	0.37	0.12	0.16
<i>Displacement(give)</i>	0.014	0.015	-0.014	...	-0.029	-0.011	0.31	0.05	0.029	-0.032
<i>Displacement(receive)</i>	-0.026	0.012	-0.016	...	-0.021	-0.03	...	0.17	0.4	0.097
<i>FearGrimace(give)</i>	...	...	0.013	-0.023	0.045	0.017	-0.042	0.086	0.12	0.16
<i>FearGrimace(receive)</i>	-0.03	...	...	...	0.04	0.027	0.39	-0.082	...	0.014
<i>Submit(give)</i>	0.018	0.018	0.046	0.044	-0.013	-0.052	-0.087	0.16	0.027	0.12
<i>Submit(receive)</i>	0.015	...	...	...	...	-0.02	0.22	...	...	0.023
<i>NonContactAgg(give)</i>	0.017	-0.012	0.024	...	-0.025	0.015	0.15	...	...	0.32
<i>NonContactAgg(receive)</i>	...	-0.025	...	-0.039	-0.014	...	0.039	0.064	...	0.36
<i>ContactAggression(give)</i>	...	0.017	0.029	0.029	0.015	-0.011	0.095	0.013	0.018	0.08
<i>ContactAggression(receive)</i>	-0.012	0.028	-0.03	0.062	0.014	...	-0.027	...	0.069	0.16
<i>Approach(give)</i>	0.21	0.41	-0.053	0.68	0.12	...	0.12	0.11	0.1	0.11
<i>Approach(receive)</i>	0.21	0.23	0.9	0.14	0.18	-0.03	0.069	0.1	0.12	0.023
<i>Leave(displace)</i>	0.077	...	0.079	0.053	0.053	...	0.048	-0.03	0.52	-0.018
<i>Leave(give)</i>	0.19	0.91	0.22	0.17	0.11	-0.02	0.12	0.13	0.02	0.055
<i>Leave(receive)</i>	0.25	-0.041	0.42	0.67	0.15	-0.029	0.042	0.11	0.025	0.071
<i>AffilVocal(give)</i>	0.016	...	0.018	...	0.09	0.034	0.018	...	0.026	...
<i>AffilVocal(receive)</i>	0.018	...	...	...	0.052	0.031	...	0.012	...	...
<i>Groom(give)</i>	...	0.07	-0.038	0.096	0.42	-0.024	-0.045	-0.067	...	...
<i>Groom(receive)</i>	...	0.015	0.067	0.042	0.47	-0.012	-0.032	-0.046	...	-0.019
<i>Feed</i>	-0.011	0.036	0.072	0.065	-0.35	-0.29	0.19	0.46	0.063	0.029
<i>Travel</i>	-0.12	0.069	...	0.047	-0.17	0.079	0.34	0.34	...	0.097
<i>PassiveContact</i>	0.097	0.023	...	...	0.3	-0.066	-0.017	-0.057	-0.032	...
<i>SocialProximity</i>	0.89	0.087	0.094	0.12	0.19	-0.032	-0.01	-0.04	0.029	...
<i>ProximityGroupSize</i>	0.95	0.11	0.12	0.15	0.18	-0.025	0.021	0.022	0.054	...

Table S1. Factor loadings for factor model 1. Loadings below 0.01 are omitted for clarity.

	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8	Factor9	Factor10
<i>Scratch</i>	-0.29	-0.039	-0.02	0.17	-0.073	0.11	0.48	-0.038	-0.054	-0.031
<i>SelfGroom</i>	-0.16	...	-0.077	0.23	...	-0.015	0.12	-0.095	...	...
<i>Threat(give)</i>	...	0.052	0.22	...	0.095	0.13	0.18	0.084	0.19	0.11
<i>Threat(receive)</i>	0.012	0.48	0.036	0.028	...	0.045	0.15	...	0.035	...
<i>Avoid(give)</i>	...	-0.23	0.76	0.032	0.026	0.011	-0.047	0.055	-0.027	-0.024
<i>Avoid(receive)</i>	0.04	0.73	-0.11	-0.15	0.067	-0.16	-0.31	0.063	0.077	-0.077
<i>Displacement(give)</i>	-0.026	-0.083	0.4	-0.014	0.059	0.096	0.022	-0.11	0.052	0.011
<i>Displacement(receive)</i>	0.05	0.59	-0.074	-0.15	0.38	-0.011	-0.068	0.056	...	0.21
<i>FearGrimace(give)</i>	0.06	0.31	-0.091	0.12	0.17	-0.047	-0.2	-0.01	0.02	...
<i>FearGrimace(receive)</i>	-0.033	-0.27	0.82	0.17	-0.074	0.03	-0.034	0.16	0.039	-0.01
<i>Submit(give)</i>	0.19	0.44	-0.15	-0.12	0.024	-0.072	-0.051	0.033	-0.057	0.063
<i>Submit(receive)</i>	0.11	0.096	0.46	-0.031	...	-0.06	0.083	0.016	...	0.012
<i>NonContactAgg(give)</i>	...	-0.031	0.28	-0.13	-0.037	0.38	0.45	-0.06	0.059	-0.018
<i>NonContactAgg(receive)</i>	-0.093	0.34	-0.092	-0.091	-0.32	0.32	0.07	-0.16	-0.052	-0.094
<i>ContactAggression(give)</i>	0.028	...	0.038	0.068	0.026	0.51	0.099	0.045	0.037	0.013
<i>ContactAggression(receive)</i>	0.039	0.25	-0.1	0.076	...	0.15	0.13	0.039	0.05	0.029
<i>Approach(give)</i>	0.64	0.24	0.21	0.16	0.12	0.033	-0.039	0.19	0.63	0.046
<i>Approach(receive)</i>	0.67	0.21	...	0.12	0.18	0.17	-0.22	0.34	...	0.36
<i>Leave(displace)</i>	0.23	0.27	0.066	-0.041	0.65	0.044	-0.036	0.01	0.056	-0.02
<i>Leave(give)</i>	0.66	0.18	0.11	0.09	0.11	0.013	-0.077	0.66	0.24	0.029
<i>Leave(receive)</i>	0.73	0.32	0.076	0.11	0.027	...	0.01	0.012	0.28	0.52
<i>AffilVocal(give)</i>	0.18	-0.028	-0.15	0.13	...	0.16	0.069	-0.027	-0.02	...
<i>AffilVocal(receive)</i>	0.21	-0.12	-0.21	0.038	0.02	0.08	-0.12	0.012	0.17	...
<i>Groom(give)</i>	0.31	0.15	...	0.55	-0.076	0.085	-0.077	0.15	0.15	...
<i>Groom(receive)</i>	0.26	-0.11	-0.028	0.55	0.026	0.12	...	0.14	0.091	0.11
<i>Feed</i>	...	0.13	-0.16	-0.62	0.015	-0.038	-0.065	0.031	0.056	0.052
<i>Travel</i>	-0.26	-0.3	0.31	-0.41	-0.21	0.14	0.16	0.17	0.11	...
<i>PassiveContact</i>	0.32	-0.17	0.08	0.31	-0.078	0.37	-0.088	-0.063	-0.011	0.04
<i>SocialProximity</i>	0.98	0.042	...	0.13	0.11	-0.025	-0.03	...	-0.028	-0.069
<i>ProximityGroupSize</i>	0.95	0.097	-0.032	0.078	0.12	0.056	-0.12	...	0.018	-0.049

Table S2. Factor loadings for factor model 2. Loadings below 0.01 are omitted for clarity.