Duration and outcome of intergroup conflict influences intragroup affiliative behaviour

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Supplementary Material

Statistical Analysis

Data sets containing repeated measures from the same group and individual were analysed using mixed models to allow the inclusion of random, as well as fixed, terms. Box-plots were examined to check data for outliers, normality and equality of variance. Normally distributed data with a constant variance were analysed using Linear Mixed Models (LMMs) with an identity link function, while data with a Poisson distribution were analysed using Generalised Linear Mixed Model (GLMMs) with a log link function. In all mixed models, variance components were estimated using the Restricted Maximum Likelihood (REML) method, and random terms were retained in the model unless the variance component was found to be zero (and hence their removal did not influence the findings reported). In each model, all fixed terms were entered and then sequentially dropped until only terms whose elimination would have significantly reduced the explanatory power of the model remained (the minimal model). The significance of eliminated terms was derived by adding them individually to the minimal model. The significance of each term was determined using the Wald statistic, which approximates the χ^2 distribution. All two-way interactions were tested, but only those that were significant were retained in the minimal model and are presented in the Tables (below) and in the Results of the main paper. Group identity was included as a random term in all models; individual identity was included as a random term in the GLMMs investigating the influence of sex and dominance status on rates of individual allopreening donation and receipt.

Supplementary Table 1 Summary of a LMM investigating the influence of recent intergroup conflict on the rate of intragroup body allopreening by green woodhoopoe groups.

model term	estimate ± s.e.m.	Wald statistic (χ^2)	d.f.	*P*
conflict situation		102.90	1	<0.001
nonconflict	0 ± 0			
postconflict	1.856 ± 0.183			
group size	0.840 ± 0.132	40.36	1	<0.001
month		54.74	6	<0.001
January	0 ± 0			
February	0.279 ± 0.055			
March	0.534 ± 0.091			
April	1.643 ± 0.332			
May	1.588 ± 0.356			
November	0.193 ± 0.067			
December	-0.089 ± 0.009			
group identity (random term)	0.047 ± 0.062			
constant	2.001 ± 0.254			

Results based on 201 intragroup allopreening rates from 12 groups. Mean effect estimates (±s.e.m.) provided for significant terms in minimal model.

Supplementary Table 2 Summary of a LMM investigating the influence of intergroup conflict duration and outcome on the rate of intragroup body allopreening by green woodhoopoe groups.

model term	estimate ± s.e.m.	Wald statistic (χ^2)	d.f.	*P*
conflict duration x conflict outcome	0.041 ± 0.019	4.90	1	0.029
conflict duration	0.073 ± 0.013			
conflict outcome				
won	0 ± 0			
lost	0.351 ± 0.212			
group size	0.910 ± 0.119	58.62	1	<0.001
month		17.04	6	0.013
January	0 ± 0			
February	0.500 ± 0.121			
March	0.637 ± 0.145			
April	0.854 ± 0.267			
May	1.308 ± 0.413			
November	-0.088 ± 0.045			
December	-0.137 ± 0.042			
group identity (random term)	0.012 ± 0.056			
constant	2.360 ± 0.306			

Results based on 125 postconflict intragroup allopreening rates from 12 groups. Mean effect estimates (±s.e.m.) provided for significant terms in minimal model.

Supplementary Table 3 Summary of two GLMMs investigating the influence of dominance status and sex on the change in rate of individual intragroup body allopreening (a) donation and (b) receipt following intergroup conflicts of different outcome.

model term	estimate ± s.e.m.	Wald statistic (χ^2)	d.f.	*P*
(a) donation				
dominance status x conflict outcome	0.896 ± 0.429	4.36	1	0.040
dominance status				
breeding pair	0 ± 0			
helpers	-1.253 ± 0.278			
conflict outcome				
won	0 ± 0			
lost	0.990 ± 0.248			
sex		0.07	1	0.793
group size	0.310 ± 0.123	6.34	1	0.014
month		6.85	6	0.346
group identity (random term)	0 ± 0			
individual identity (random term)	0.062 ± 0.043			
constant	0.544 ± 0.131			
(b) receipt				
dominance status x conflict outcome	-1.074 ± 0.511	4.41	1	0.038
dominance status				
breeding pair	0 ± 0			
helpers	1.725 ±0.323			
conflict outcome				
won	0 ± 0			
lost	0.184 ± 0.436			
sex		1.23	1	0.271
group size		0.02	1	0.899
month		7.14	6	0.320
group identity (random term)	0 ± 0			
individual identity (random term)	0.094 ± 0.062			
constant	-0.884 ± 0.297			

Results based on 168 changes in hourly body allopreening rate (postconflict hour rate minus preconflict hour rate) from 36 individuals in 10 groups (two groups contained no helpers). Mean effect estimates (±s.e.m.) provided for significant terms in minimal model.