

Table S1: List of Bayesian phylogenetic mixed models presented in this study, including sensitivity analyses. As the variables ‘litter size’ and ‘social group size’ were only known for a small, spatially- and taxonomically-biased subset of species, sensitivity analyses were conducted omitting these variables. Furthermore, models containing social group size (scored as an ordinal variable, here included in the model as a categorical variable) were also run a second time with the trait included as a pseudo-continuous variable. All models were run over a sample of 100 phylogenies from Upham et al. (2019) as a random effect.

Response variable	Sample Size	Predictor variables
Relative tail length	1207	Litter size, temperature, arboreality, fossoriality
Relative tail length	1207	Litter size*temperature, arboreality*temperature, fossoriality*temperature
Relative tail length	1951	Temperature, arboreality, fossoriality
<i>Tail colour</i>		
White colouration	808	Litter size, arboreality, aquaticity, habitat shade levels, nocturnality, social group size (categorical)
White colouration	808	Litter size, arboreality, aquaticity, habitat shade levels, nocturnality, social group size (pseudo-continuous)
White colouration	1191	Litter size, arboreality, aquaticity, habitat shade levels, nocturnality
White colouration	1081	Arboreality, aquaticity, habitat shade levels, nocturnality, social group size (categorical)
White colouration	1081	Arboreality, aquaticity, habitat shade levels, nocturnality, social group size (pseudo-continuous)
White colouration	1924	Arboreality, aquaticity, habitat shade levels, nocturnality
Contrasting tail tips	1090	Arboreality, aquaticity, habitat shade levels, social group size (categorical)
Contrasting tail tips	1090	Arboreality, aquaticity, habitat shade levels, social group size (pseudo-continuous)
Contrasting tail tips	1944	Arboreality, aquaticity, habitat shade levels
Black tips	1101	Habitat shade levels, diurnality, social group size (categorical)
Black tips	1101	Habitat shade levels, diurnality, social group size (pseudo-continuous)
Black tips	2026	Habitat shade levels, diurnality
White tips	1087	Arboreality, aquaticity, habitat shade levels, nocturnality, social group size (categorical)
White tips	1087	Arboreality, aquaticity, habitat shade levels, nocturnality, social group size (pseudo-continuous)
White tips	1938	Arboreality, aquaticity, habitat shade levels, nocturnality
<i>Tail texture</i>		
Naked tails	2039	Temperature
Fluffy tails	1095	Temperature, diurnality, social group size (categorical), snake threat, body size
Fluffy tails	1095	Temperature, diurnality, social group size (pseudo-continuous), snake threat, body size
Fluffy tails	2011	Temperature, diurnality, snake threat, body size
Fluffy tail tufts	1921	Terrestriality, arboreality, habitat openness, owl threat, raptor threat, body size
<i>Ecological role</i>		
Prehensility	1914	Tail length, arboreality
Tail autotomy	1906	Tail length, terrestriality, arboreality, diurnality, habitat openness, body size
Fatty tail deposits	1070	Temperature, hibernation, precipitation variation