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SUPPLEMENTARY INFORMATION

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Primate brain size is predicted by diet but not sociality

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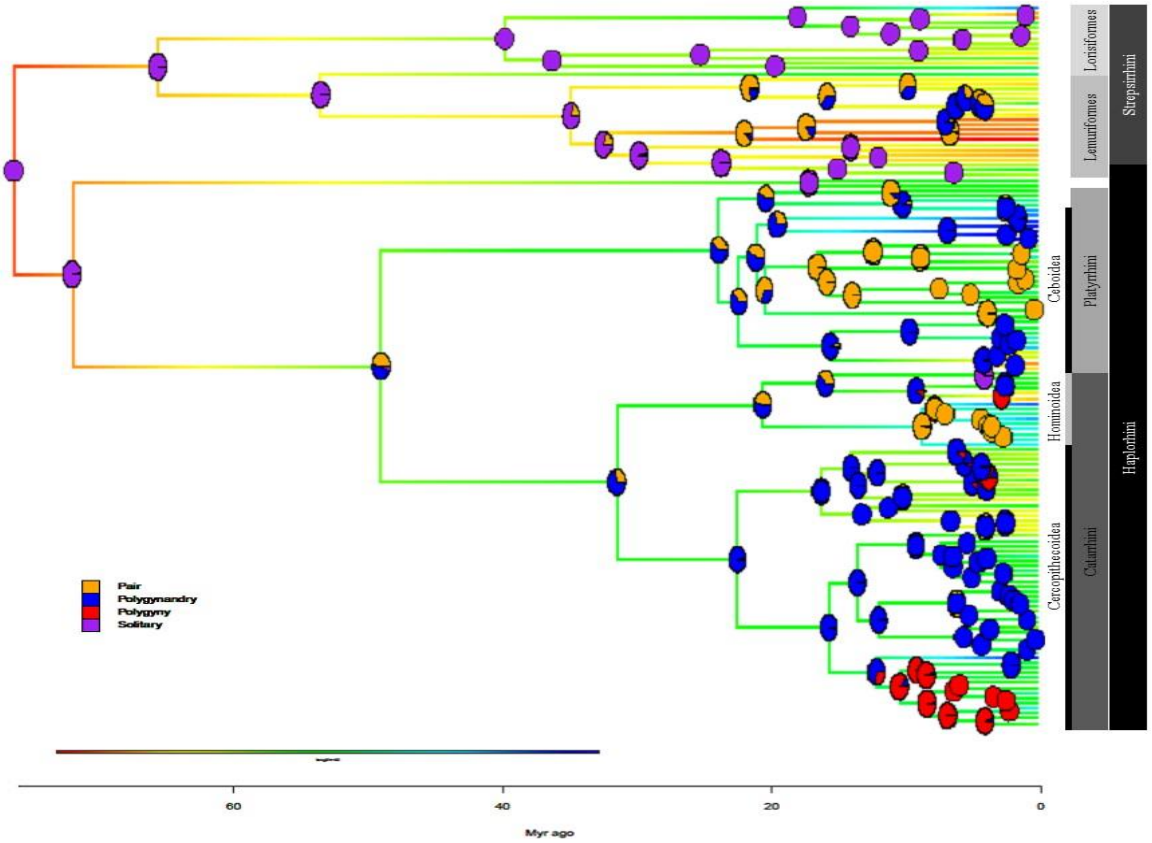
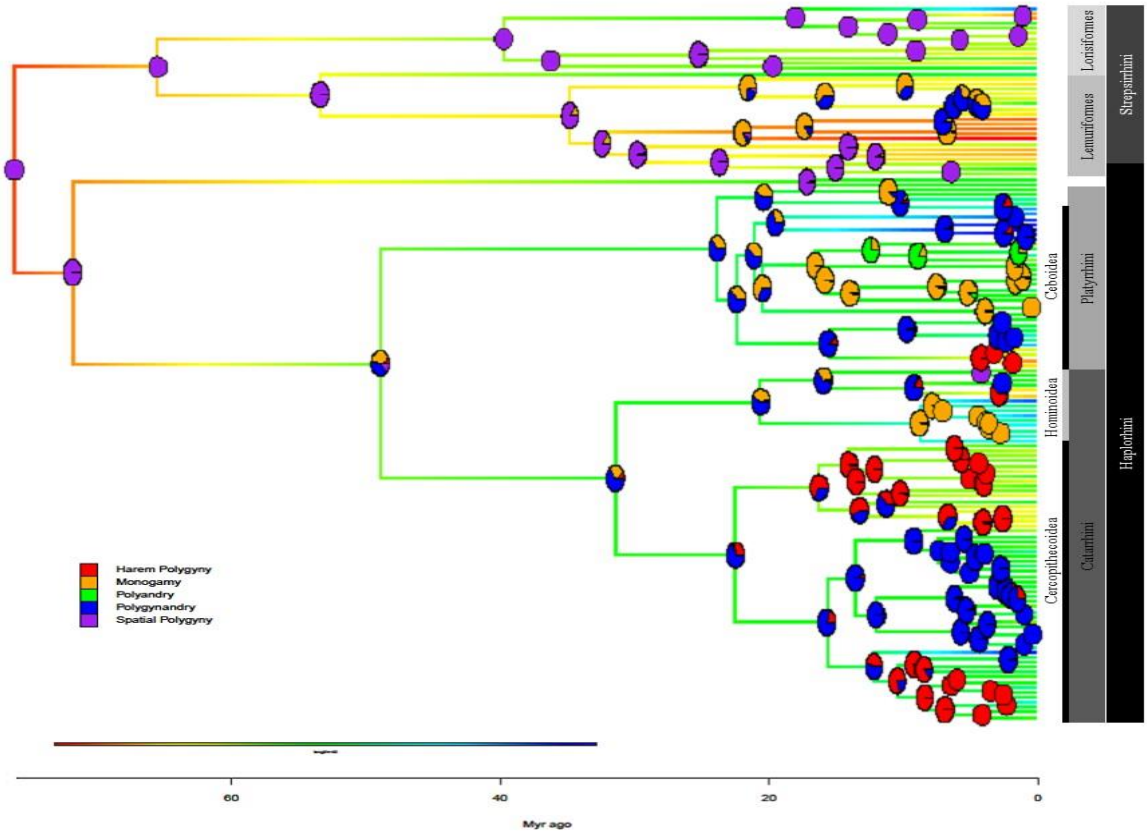
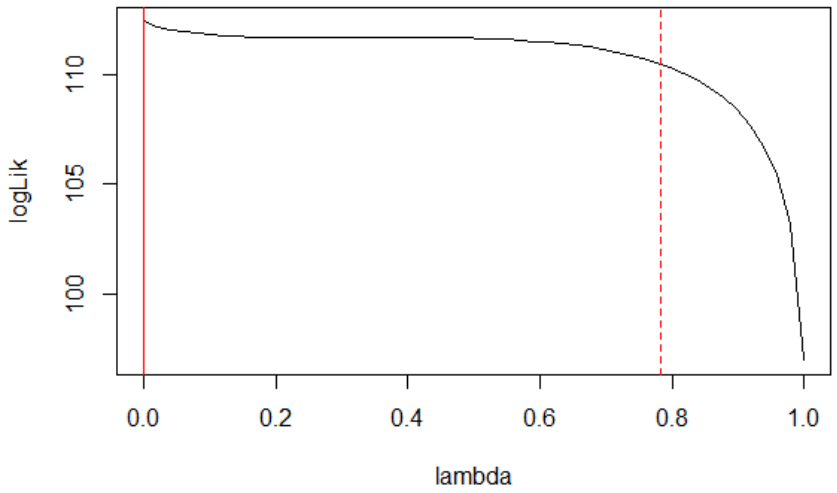


Supplementary Figure 1 | Ancestral reconstructions of primate EQ and social system. Lower EQ values are shown in redder colors; higher values are shown in blue (n=142 species). Reconstructions presented here and elsewhere[66] support a reverse-jump model in which sociality proceeds from solitary foraging directly to multi-male/multi-female groups, followed by pair-living systems or harems within certain lineages. If polygynandry is the most "complex" system since it necessitates the most interactions[17], then transitions away from it could relax selection on brain size; however, traits sustained by multiple sources of selection ("general-purpose" traits) are likely to maintain their fitness advantage after one source is removed[92].



Supplementary Figure 2 | Ancestral reconstructions of primate EQ and mating system. Lower EQ values are shown in redder colors; higher values are shown in blue (n=142 species). Reconstructions presented here and elsewhere[66] support a reverse-jump model in which sociality proceeds from solitary foraging directly to multi-male/multi-female groups, followed by monogamy/polyandry or harems within certain lineages. If polygynandry is the most "complex" system since it necessitates the most interactions[17], then transitions away from it could relax selection on brain size; however, traits sustained by multiple sources of selection ("general-purpose" traits) are likely to maintain their fitness advantage after one source is removed[92].



Supplementary Figure 3 | Log-likelihood plot of lambda for catarrhines-only diet and social system models (spp. n = 70): Brain (log) ~ Body (log) + Diet + Social System

Supplementary Tables

1. **Results using entire dataset**
   - 1.1. Results using 10k Trees consensus phylogeny[27] and percent frugivory (Tables S1-S4)
   - 2.1. ANOVA results when order in which diet and sociality variables are entered into the model is switched (Tables S5-S10)
   - 3.1. Results using Perelman and colleagues[28] consensus phylogeny (Tables S11-S18)
   - 4.1. Results across block of 1000 trees from 10kTrees[27] (maximum-likelihood model averaging) (Tables S19-S26)
   - 5.1. Results across block of 1000 trees from 10kTrees[27] (Bayesian MCMC analysis) (Tables S27-S29)
   - 6.1. Results across block of 100 trees from 10kTrees[27] (Bayesian mixed models) (Tables S30-S37)
2. **Results using female-only data**
   - 1.1. Results using 10k Trees consensus phylogeny[27] (Tables S38-S45)
   - 2.1. ANOVA results when order in which diet and sociality variables are entered into the model is switched (Tables S46-S51)
   - 3.1. Results using Perelman and colleagues[28] consensus phylogeny (Tables S52-S59)
3. **Results from suborder analyses**
   - **1.1. Anthropoids**
     - 3.1.1. Results using 10k Trees consensus phylogeny[27] (Tables S60-S67)
     - 3.1.2. ANOVA results when order in which diet and sociality variables are entered into the model is switched (Tables S68-S73)
     - 3.1.3. Results using Perelman and colleagues[28] consensus phylogeny (Tables S74-S81)

2.1. Catarrhines

3.2.1. Results using 10k Trees consensus phylogeny[27] (Tables S82-S89)

3.2.2. ANOVA results when order in which diet and sociality variables are entered into the model is switched (Tables S90-S95)

3.2.3. Results using Perelman and colleagues[28] consensus phylogeny (Tables S96-S103)

4. Post-hoc analyses (Tables S104-S107)

Notes for Supplementary Tables:

*Parameter listed is estimated using maximum-likelihood (ML), with others set to 1

†dBIC=difference in BIC value from best fit model (dBIC > 6 indicates strong evidence of relatively poor model fit)[29]

‡Type I analysis of variance (ANOVA) of best fit model including all predictor variables

§Mean Sq = mean squares

ǁModels constructed using ML branch length transformation of best fit model

¶Corrected significant p value cut-offs: diet category and social system = 0.05/6 = 0.0083; mating system = 0.05/10 = 0.005

**Maximum-likelihood estimation encountered an optimization error, so lambda set to 1.

††Maximum-likelihood estimation of lambda was 0, but this value was not used. Models were run using a likelihood weighted average value of lambda across the 95% confidence interval (see Materials and Methods for details).

1. Results using entire dataset

1.1. Results using 10k Trees consensus phylogeny and percent frugivory

Table S1

% Fruit & Group Size Models (spp. n = 90)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.995	**0.0**	**0.34**
Kappa = 0.943	0.0	0.34
Delta = 1.044	0.1	0.32
All Branch Lengths = 1	36.2	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2045**	**<2e-16**
% Fruit	**0.0030**	**0.01**
Group (log)	0.0005	0.29
Residuals	0.0004	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.68
Body (log)	2.4	0.20
Body (log) + % Fruit + Group (log)	3.4	0.12

Table S2

% Fruit & Social System Models (spp. n = 90)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.991	**0.0**	**0.37**
Kappa = 0.941	0.3	0.32
Delta = 1.015	0.4	0.31
All Branch Lengths = 1	35.0	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2028**	**<2e-16**
% Fruit	**0.0027**	**0.01**
Social System	0.0008	0.13
Residuals	0.0004	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.76
Body (log)	2.4	0.23

Body (log) + % Fruit + Social System	7.8	0.02

Table S3

% Fruit & Mating System Models (spp. n = 90)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 1**	**0.0**	**0.33**
Kappa = 1.012	0.0	0.33
Delta = 0.920	0.0	0.33
All Branch Lengths = 1	38.4	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2068**	**<2e-16**
% Fruit	**0.0036**	**<0.01**
Mating System	0.0009	0.06
Residuals	0.0004	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.76
Body (log)	2.4	0.23
Body (log) + % Fruit + Mating System	8.4	0.01

Table S4

% Fruit Models (spp. n = 90)		
Brain (log) ~ Body (log) + % Fruit		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 1	**0.0**	**0.33**
Kappa = 0.974	0.0	0.33
Delta = 0.984	0.0	0.33
All Branch Lengths = 1	53.0	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2066**	**<2e-16**
% Fruit	**0.0035**	**0.01**
Residuals	0.0004	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.77
Body (log)	2.4	0.23

1.2. ANOVA results when order in which diet and sociality variables are entered into the model is switched

Table S5

Diet & Group Size Models (spp. n = 140)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2214**	**<2e-16**
Group (log)	0.0000	0.94
Diet	**0.0012**	**0.02**
Residuals	0.0004	

Table S6

Diet & Social System Models (spp. n = 142)		
Brain (log) ~ Body (log) + Diet + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2232**	**<2e-16**
Social System	0.0003	0.43
Diet	**0.0012**	**0.02**
Residuals	0.0003	

Table S7

Diet & Mating System Models (spp. n = 142)		
Brain (log) ~ Body (log) + Diet + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2241**	**<2e-16**
Mating System	0.0005	0.20
Diet	**0.0013**	**0.01**
Residuals	0.0003	

Table S8

% Fruit & Group Size Models (spp. n = 90)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2044**	**<2e-16**
Group (log)	0.0003	0.44
% Fruit	**0.0032**	**0.01**
Residuals	0.0004	

Table S9

% Fruit & Social System Models (spp. n = 90)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2028**	**<2e-16**
Social System	0.0008	0.11
% Fruit	**0.0025**	**0.01**
Residuals	0.0004	

Table S10

% Fruit & Mating System Models (spp. n = 90)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2021**	**<2e-16**
Mating System	**0.0012**	**0.02**
% Fruit	**0.0020**	**0.03**
Residuals	0.0004	

1.3. Results using Perelman and colleagues consensus phylogeny

Table S11

Diet & Group Size Models (spp. n = 105)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.954	**0.0**	**0.99**
Kappa = 0.381	9.9	0.01
All Branch Lengths = 1	30.6	<0.001
Delta = 1.807	47.1	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**253.679**	**<2e-16**
Diet	**1.855**	**0.01**
Group (log)	0.082	0.67
Residuals	0.458	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.75
Body (log) + Diet	2.4	0.23
Body (log) + Diet + Group (log)	6.8	0.03

Table S12

Diet & Social System Models (spp. n = 106)		
Brain (log) ~ Body (log) + Diet + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.948	**0.0**	**0.98**
Kappa = 0.342	7.9	0.02
All Branch Lengths = 1	28.2	<0.001
Delta = 1.605	51.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**252.308**	**<2e-16**
Diet	**1.894**	**0.01**
Social System	0.115	0.85
Residuals	0.432	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.68
Body (log) + Diet	1.5	0.32
Body (log) + Diet + Social System	14.7	<0.001

Table S13

Diet & Mating System Models (spp. n = 106)		
Brain (log) ~ Body (log) + Diet + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.954	**0.0**	**0.97**
Kappa = 0.364	7.2	0.03
All Branch Lengths = 1	28.0	<0.001
Delta = 1.083	46.0	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**254.970**	**<2e-16**
Diet	**1.909**	**0.01**
Mating System	0.307	0.60
Residuals	0.447	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.69
Body (log) + Diet	1.6	0.31
Body (log) + Diet + Mating System	17.3	<0.001

Table S14

Diet Models (spp. n = 108)		
Brain (log) ~ Body (log) + Diet		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.951	**0.0**	**0.98**
Kappa = 0.339	8.2	0.02
All Branch Lengths = 1	28.7	<0.001
Delta = 1.597	53.0	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**252.926**	**<2e-16**
Diet	**1.893**	**0.01**
Residuals	0.428	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.70
Body (log) + Diet	1.7	0.30
Multiple Comparisons	**Estimate**	**P value¶**
Frugivores v. Folivores	**0.106**	**<0.001**
Frugivore/Folivores v. Folivores	**0.095**	**0.005**
Omnivores v. Folivores	0.085	0.019
Frugivore/Folivores v. Frugivores	-0.011	0.577
Omnivores v. Frugivores	-0.021	0.396
Omnivores v. Frugivore/Folivores	-0.010	0.751

Table S15

% Fruit & Group Size Models (spp. n = 65)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.709	**0.0**	**0.49**
Lambda = 0.986	0.9	0.31
Delta = 1.434	1.9	0.19
All Branch Lengths = 1	23.9	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**63.468**	**<2e-16**
% Fruit	**1.087**	**0.01**
Group (log)	0.019	0.72
Residuals	0.153	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.64
Body (log)	1.7	0.28
Body (log) + % Fruit + Group (log)	4.0	0.09

Table S16

% Fruit & Social System Models (spp. n = 65)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.730	**0.0**	**0.49**
Lambda = 0.988	1.0	0.30
Delta = 1.302	1.6	0.21
All Branch Lengths = 1	22.1	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**70.244**	**<2e-16**
% Fruit	**1.267**	**0.01**
Social System	0.082	0.70
Residuals	0.174	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.70
Body (log)	1.7	0.30
Body (log) + % Fruit + Social System	11.0	0.00

Table S17

% Fruit & Mating System Models (spp. n = 65)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.791	**0.0**	**0.42**
Lambda = 0.988	0.4	0.34
Delta = 1.205	1.1	0.24
All Branch Lengths = 1	23.3	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**94.308**	**<2e-16**
% Fruit	**1.956**	**0.01**
Mating System	0.212	0.48
Residuals	0.239	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.70
Body (log)	1.7	0.30
Body (log) + % Fruit + Mating System	13.0	<0.01

Table S18

% Fruit Models (spp. n = 65)
Brain (log) ~ Body (log) + % Fruit

Branch Length Comparisons*	dBIC†	Weight
Kappa = 0.717	**0.0**	**0.50**
Lambda = 0.989	1.1	0.29
Delta = 1.440	1.8	0.21
All Branch Lengths = 1	23.7	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**65.948**	**<2e-16**
% Fruit	**1.152**	**0.01**
Residuals	0.158	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.70
Body (log)	1.7	0.30

1.4. Results across block of 1000 trees from 10kTrees (maximum-likelihood model averaging)

Table S19

Diet & Group Size Models (spp. n = 140)				
Brain (log) ~ Body (log) + Diet + Group (log)				
# Trees Converged				1000
ML Lambda (median)				0.969
Sequential SS ANOVA (P values)				
	Median	**Min**	**Max**	**Freq Diff**
Body (log)	-	-	-	-
Diet	0.028	-	0.079	0.008
Group (log)	0.778	-	0.998	0.001
Model Averaging		**Avg Est**	**Lower.CL**	**Upper.CL**
Group Size		(0.032)	(0.095)	0.031

Table S20

Diet & Social System Models (spp. n = 142)	
Brain (log) ~ Body (log) + Diet + Social System	
# Trees Converged	1000
ML Lambda (median)	0.962
Sequential SS ANOVA (P values)	

	Median	Min	Max	Freq Diff
Body (log)	-	-	-	-
Diet	0.019	4.4e-16	0.056	0.002
Social System	0.606	0.254	0.816	-

Table S21

Diet & Mating System Models (spp. n = 142)				
Brain (log) ~ Body (log) + Diet + Mating System				
# Trees Converged				1000
ML Lambda (median)				0.965
Sequential SS ANOVA (P values)				
	Median	**Min**	**Max**	**Freq Diff**
Body (log)	-	-	-	-
Diet	0.0187	2.2e-16	0.0637	0.0020
Mating System	0.2121	0.0897	0.5194	-

Table S22

Diet Models (spp. n = 144)				
Brain (log) ~ Body (log) + Diet				
# Trees Converged				1000
ML Lambda (median)				0.967
Sequential SS ANOVA (P values)				
	Median	**Min**	**Max**	**Freq Diff**
Body (log)	-	-	-	-
Diet	0.019	1.1e-16	0.058	0.002
Model Averaging	**Avg Est**	**Lower.CL**	**Upper.CL**	**P values**
Frugivores v. Folivores	0.097	0.035	0.158	**0.002**
Frugivore/Folivores v. Folivores	0.099	0.033	0.165	**0.003**
Omnivores v. Folivores	0.073	0.005	0.142	0.037
Frugivore/Folivores v. Frugivores	0.002	(0.033)	0.037	0.918
Omnivores v. Frugivores	(0.024)	(0.065)	0.017	0.254
Omnivores v. Frugivore/Folivores	(0.026)	(0.072)	0.021	0.277

Table S23

% Fruit & Group Size Models (spp. n = 90)				
Brain (log) ~ Body (log) + % Fruit + Group (log)				
# Trees Converged				1000
ML Lambda (median)				1.000
Sequential SS ANOVA (P values)				
	Median	**Min**	**Max**	**Freq Diff**
Body (log)	-	-	-	-
% Fruit	0.008	-	0.632	0.009
Group (log)	0.329	2.2e-16	0.955	0.019
Model Averaging		**Avg Est**	**Lower.CL**	**Upper.CL**
% Fruit		0.0008	0.0003	0.0014
Group Size		0.0314	(0.0234)	0.0863

Table S24

% Fruit & Social System Models (spp. n = 90)				
Brain (log) ~ Body (log) + % Fruit + Social System				
# Trees Converged				1000
ML Lambda (median)				0.990
Sequential SS ANOVA (P values)				
	Median	**Min**	**Max**	**Freq Diff**
Body (log)	-	-	-	-
% Fruit	0.014	-	0.075	0.010
Social System	0.153	0.033	0.495	0.001
Model Averaging		**Avg Est**	**Lower.CL**	**Upper.CL**
% Fruit		0.0006	0.0005	0.0007

Table S25

% Fruit & Mating System Models (spp. n = 90)				
Brain (log) ~ Body (log) + % Fruit + Mating System				
# Trees Converged				1000
ML Lambda (median)				0.990
Sequential SS ANOVA (P values)				
	Median	**Min**	**Max**	**Freq Diff**
Body (log)				

	-	-	-	-
% Fruit	0.014	-	0.057	0.006
Mating System	0.055	0.019	0.274	0.355
Model Averaging		**Avg Est**	**Lower.CL**	**Upper.CL**
% Fruit		0.0007	0.0003	0.0011

Table S26

% Fruit Models (spp. n = 90)				
Brain (log) ~ Body (log) + % Fruit				
# Trees Converged				1000
ML Lambda (median)				1.000
Sequential SS ANOVA (P values)				
	Median	**Min**	**Max**	**Freq Diff**
Body (log)	-	-	-	-
% Fruit	0.008	-	0.076	0.014
Model Averaging		**Avg Est**	**Lower.CL**	**Upper.CL**
% Fruit		0.0006	0.0005	0.0008

1.5. Results across block of 1000 trees from 10kTrees[25] (Bayesian MCMC analysis)

Table S27

% Fruit and Group Size Model (spp. n=90)				
2 000 000 iterations; 200 000 burnin; 200 thining interval				
Lambda=0.977				
Variable	**Posterior Mean**	**Lower 95% CI**	**Upper 95% CI**	**pMCMC**
Intercept	**-0.6498**	**-0.8613**	**-0.4383**	**-**
Body (log)	**0.6102**	**0.5562**	**0.6642**	**0.00**
% Frugivory	**0.0009**	**0.0002**	**0.0015**	**0.01**
Group Size (log)	0.0397	-0.0150	0.0943	0.09

Table S28

% Fruit Model (spp. n=90)
2 000 000 iterations; 200 000 burnin; 200 thining interval
Lambda=0.983

Variable	Posterior Mean	Lower 95% CI	Upper 95% CI	pMCMC
Intercept	**-0.6435**	**-0.8585**	**-0.4286**	**-**
Body (log)	**0.6163**	**0.5628**	**0.6698**	**0.00**
% Frugivory	**0.0008**	**0.0002**	**0.0014**	**0.01**

Table S29

Group Size Model (spp. n=90)				
2 000 000 iterations; 200 000 burnin; 200 thining interval				
Lambda=0.973				
Variable	**Posterior Mean**	**Lower 95% CI**	**Upper 95% CI**	**pMCMC**
Intercept	**-0.6336**	**-0.8495**	**-0.4176**	**-**
Body (log)	**0.6150**	**0.5597**	**0.6703**	**0.00**
Group Size (log)	0.0346	-0.0216	0.0907	0.13

1.6. Results across block of 100 trees from 10kTrees (Bayesian mixed models)

Table S30

Diet & Group Size Models (spp. n = 140)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.716**	**-0.929**	**-0.474**	**<2e-16**
Body (log)	**0.623**	**0.568**	**0.677**	**<2e-16**
Frugivores v. Folivores	**0.098**	**0.031**	**0.162**	**0.003**
Frugivore/Folivores v. Folivores	**0.095**	**0.029**	**0.168**	**0.007**
Omnivores v. Folivores	0.076	<0.001	0.146	0.041
Group (log)	-0.017	-0.046	0.038	0.442

Table S31

Diet & Social System Models (spp. n = 142)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.678**	**-0.909**	**-0.438**	**<2e-16**
Body (log)	**0.613**	**0.557**	**0.667**	**<2e-16**
Frugivores v. Folivores	**0.097**	**0.032**	**0.161**	**0.003**
Frugivore/Folivores v. Folivores	**0.119**	**0.030**	**0.166**	**0.001**

Omnivores v. Folivores	0.071	0.001	0.146	0.053
Polygynandry v. Pair	0.019	-0.025	0.096	0.555
Polygyny v. Pair	0.024	-0.052	0.099	0.551
Solitary v. Pair	-0.012	-0.128	0.102	0.844

Table S32

Diet & Mating System Models (spp. n = 142)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.733**	**-0.950**	**-0.485**	**<2e-16**
Body (log)	**0.578**	**0.543**	**0.656**	**<2e-16**
Frugivores v. Folivores	**0.094**	**0.031**	**0.160**	**0.005**
Frugivore/Folivores v. Folivores	0.079	0.027	0.162	0.022
Omnivores v. Folivores	0.045	-0.016	0.131	0.235
Monogamy v. Polyandry	0.085	0.012	0.192	0.063
Harem v. Polyandry	0.026	<0.001	0.117	0.382
Polygynandry v. Polyandry	0.117	0.018	0.185	0.006
Spatial Polygyny v. Polyandry	0.099	-0.015	0.213	0.087

Table S33

Diet Models (spp. n = 144)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.773**	**-0.922**	**-0.479**	**<2e-16**
Body (log)	**0.609**	**0.569**	**0.673**	**<2e-16**
Frugivores v. Folivores	**0.088**	**0.035**	**0.161**	**0.006**
Frugivore/Folivores v. Folivores	**0.112**	**0.033**	**0.167**	**0.001**
Omnivores v. Folivores	0.077	0.004	0.146	0.032

Table S34

% Fruit & Group Size Models (spp. n = 90)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.654**	**-0.873**	**-0.433**	**<2e-16**
Body (log)	**0.586**	**0.555**	**0.667**	**<2e-16**
% Fruit	**0.001**	**<0.001**	**0.002**	**0.018**
Group (log)	0.034	-0.017	0.100	0.254

Table S35

% Fruit & Social System Models (spp. n = 90)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.638**	**-0.878**	**-0.395**	**<2e-16**
Body (log)	**0.614**	**0.541**	**0.657**	**<2e-16**
% Fruit	**0.001**	**<0.001**	**0.001**	**0.022**
Polygynandry v. Pair	0.091	0.018	0.163	0.014
Polygyny v. Pair	0.070	-0.031	0.171	0.176
Solitary v. Pair	0.020	-0.087	0.169	0.768

Table S36

% Fruit & Mating System Models (spp. n = 90)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.721**	**-0.966**	**-0.473**	**<0.00001**
Body (log)	**0.597**	**0.527**	**0.643**	**<2e-16**
% Fruit	**0.001**	**<0.001**	**0.001**	**0.024**
Monogamy v. Polyandry	0.136	0.008	0.272	0.044
Harem v. Polyandry	0.198	0.068	0.354	0.007
Polygynandry v. Polyandry	**0.263**	**0.079**	**0.356**	**<0.001**
Spatial Polygyny v. Polyandry	0.168	-0.003	0.338	0.054

Table S37

% Fruit Models (spp. n = 90)				
500 000 iterations; 100 000 burnin; 200 thinning interval				
Term	**Mode**	**Lower CI**	**Upper CI**	**P Value¶**
Intercept	**-0.648**	**-0.869**	**-0.425**	**<2e-16**
Body (log)	**0.637**	**0.561**	**0.673**	**<2e-16**
% Fruit	**0.001**	**<0.001**	**0.001**	**0.015**

2. Results using female-only data

2.1. Results using 10k Trees consensus phylogeny

Table S38

Diet & Group Size Models (spp. n = 76)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.875	**0.0**	**0.72**
All Branch Lengths = 1	3.1	0.15
Kappa = 0.144	3.4	0.13
Delta = 2.731	27.1	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1481**	**<2e-16**
Diet	**0.0010**	**0.02**
Group (log)	0.0002	0.40
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.80
Body (log) + Diet	3.0	0.18
Body (log) + Diet + Group (log)	6.6	0.03

Table S39

% Fruit & Group Size Models (spp. n = 54)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Delta = 0.824	**0.0**	**0.34**
Kappa = 1.087	0.0	0.34
Lambda = 1	0.1	0.32
All Branch Lengths = 1	13.0	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2954**	**<2e-16**
% Fruit	**0.0141**	**<0.001**
Group (log)	0.0013	0.24
Residuals	0.0009	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.77
Body (log) + % Fruit + Group (log)	2.6	0.22
Body (log)	9.6	0.01

Table S40

Diet & Social System Models (spp. n = 76)		
Brain (log) ~ Body (log) + Diet + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.864	**0.0**	**0.49**
Kappa = 0.048	0.3	0.42
All Branch Lengths = 1	3.3	0.10
Delta = 3.000	26.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1480**	**<2e-16**
Diet	**0.0009**	**0.02**
Social System	0.0003	0.29
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.91
Body (log) + Diet	4.5	0.09
Body (log) + Diet + Social System	13.6	<0.01

Table S41

% Fruit & Social System Models (spp. n = 54)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Delta = 0.545	**0.0**	**0.41**
Kappa = 1.145	0.5	0.31
Lambda = 1.000	0.8	0.27
All Branch Lengths = 1	15.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1202**	**<2e-16**
% Fruit	**0.0055**	**<0.001**
Social System	0.0004	0.42
Residuals	0.0004	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.98
Body (log) + % Fruit + Social System	8.1	0.02
Body (log)	9.6	<0.01

Table S42

Diet & Mating System Models (spp. n = 76)		
Brain (log) ~ Body (log) + Diet + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.013	**0.0**	**0.55**

Lambda = 0.867	0.9	0.36
All Branch Lengths = 1	3.5	0.10
Delta = 3.000	26.3	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1482**	**<2e-16**
Diet	**0.0009**	**0.02**
Mating System	0.0002	0.55
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.91
Body (log) + Diet	4.5	0.09
Body (log) + Diet + Mating System	17.8	<0.001

Table S43

% Fruit & Mating System Models (spp. n = 54)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 1.390	**0.0**	**0.46**
Delta = 0.411	0.3	0.39
Lambda = 1.000	2.2	0.15
All Branch Lengths = 1	20.7	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0514**	**<2e-16**
% Fruit	**0.0045**	**<0.00001**
Mating System	**0.0005**	**0.02**
Residuals	0.0002	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.93
Body (log) + % Fruit + Mating System	5.8	0.05
Body (log)	7.3	0.02

Table S44

Diet Models (spp. n = 77)		
Brain (log) ~ Body (log) + Diet		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.895	**0.0**	**0.65**
All Branch Lengths = 1	2.5	0.19
Kappa = 0.150	2.8	0.16
Delta = 2.219	26.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**

Body (log)	**0.1506**	**<2e-16**
Diet	**0.0009**	**0.03**
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + Diet	0.0	0.91
Body (log)	4.6	0.09
Multiple Comparisons	**Estimate**	**P value¶**
Frugivores v. Folivores	**0.117**	**0.005**
Frugivore/Folivores v. Folivores	**0.128**	**0.007**
Omnivores v. Folivores	0.111	0.055
Frugivore/Folivores v. Frugivores	0.011	0.730
Omnivores v. Frugivores	-0.006	0.892
Omnivores v. Frugivore/Folivores	-0.017	0.746

Table S45

% Fruit Models (spp. n = 54)		
Brain (log) ~ Body (log) + % Fruit		
Branch Length Comparisons*	**dBIC†**	**Weight**
Delta = 0.772	**0.0**	**0.35**
Kappa = 1.079	0.1	0.33
Lambda = 1.000	0.2	0.32
All Branch Lengths = 1	12.0	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.3882**	**<2e-16**
% Fruit	**0.0188**	**<0.001**
Residuals	0.0013	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.99
Body (log)	9.6	0.01

2.2. ANOVA results when order in which diet and sociality variables are entered into the model is switched

Table S46

Diet & Group Size Models (spp. n = 77)
Brain (log) ~ Body (log) + Diet + Group (log)

Sequential SS ANOVA‡	Mean Sq§	P value
Body (log)	**0.1481**	**<2e-16**
Group (log)	0.0002	0.36
Diet	**0.0010**	**0.02**
Residuals	0.0003	

Table S47

% Fruit & Group Size Models (spp. n = 54)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2954**	**<2e-16**
Group (log)	0.0004	0.53
% Fruit	**0.0151**	**<0.001**
Residuals	0.0009	

Table S48

Diet & Social System Models (spp. n = 76)		
Brain (log) ~ Body (log) + Diet + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1480**	**<2e-16**
Social System	0.0001	0.80
Diet	**0.0012**	**0.01**
Residuals	0.0003	

Table S49

% Fruit & Social System Models (spp. n = 54)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**1.3720**	**<2e-16**
Social System	0.0047	0.37
% Fruit	**0.0719**	**<0.001**
Residuals	0.0044	

Table S50

Diet & Mating System Models (spp. n = 76)		
Brain (log) ~ Body (log) + Diet + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1482**	**<2e-16**

Mating System	0.0001	0.88
Diet	**0.0011**	**0.01**
Residuals	0.0003	

Table S51

% Fruit & Mating System Models (spp. n = 54)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0514**	**<2e-16**
Mating System	**0.0004**	**0.03**
% Fruit	**0.0047**	**<0.0001**
Residuals	0.0002	

2.3. Results using Perelman and colleagues consensus phylogeny

Table S52

Diet & Group Size Models (spp. n = 63)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.890	**0.0**	**0.90**
Kappa = 0.000	4.5	0.10
All Branch Lengths = 1	11.4	0.00
Delta = 3.000	42.9	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**134.168**	**<2e-16**
Diet	**1.598**	**0.01**
Group (log)	0.037	0.75
Residuals	0.368	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.67
Body (log) + Diet	1.5	0.33
Body (log) + Diet + Group (log)	48.4	<0.001

Table S53

% Fruit & Group Size Models (spp. n = 45)
Brain (log) ~ Body (log) + % Fruit + Group (log)

Branch Length Comparisons*	dBIC†	Weight
Delta = 1.570	**0.0**	**0.36**
Kappa = 0.836	0.1	0.35
Lambda = 1.000	0.4	0.29
All Branch Lengths = 1	14.4	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**486.46**	**<2e-16**
% Fruit	**37.23**	**<0.001**
Group (log)	3.32	0.21
Residuals	2.09	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.74
Body (log) + % Fruit + Group (log)	2.1	0.26
Body (log)	11.9	<0.01

Table S54

Diet & Social System Models (spp. n = 63)		
Brain (log) ~ Body (log) + Diet + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.890[A]	**0.0**	**0.57**
Kappa = 0.000	0.6	0.42
All Branch Lengths = 1	9.0	0.01
Delta = 3.000	43.3	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**134.982**	**<2e-16**
Diet	**1.568**	**0.01**
Social System	0.2080	0.65
Residuals	0.3750	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.71
Body (log) + Diet	1.8	0.29
Body (log) + Diet + Social System	12.3	<0.01

Table S55

% Fruit & Social System Models (spp. n = 45)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.869	**0.0**	**0.35**
Delta = 1.391	0.1	0.34
Lambda = 1.000	0.0	0.31

All Branch Lengths = 1	15.1	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**80.194**	**<2e-16**
% Fruit	**4.936**	**<0.001**
Social System	0.2460	0.55
Residuals	0.3470	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.93
Body (log)	5.4	0.06
Body (log) + % Fruit + Social System	9.1	0.01

Table S56

Diet & Mating System Models (spp. n = 63)		
Brain (log) ~ Body (log) + Diet + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.891	**0.0**	**0.52**
Kappa = 0.000	0.2	0.47
All Branch Lengths = 1	9.2	0.01
Delta = 3.000	42.7	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**135.186**	**<2e-16**
Diet	**1.568**	**0.01**
Mating System	0.0940	0.91
Residuals	0.3890	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.71
Body (log) + Diet	1.8	0.29
Body (log) + Diet + Mating System	17.2	<0.001

Table S57

% Fruit & Mating System Models (spp. n = 45)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Delta = 1.187	**0.0**	**0.34**
Kappa = 1.024	0.0	0.33
Lambda = 1.000	0.1	0.33
All Branch Lengths = 1	15.9	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**224.065**	**<2e-16**
% Fruit	**17.279**	**<0.001**

Mating System	1.3960	0.23
Residuals	0.9400	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.99
Body (log) + % Fruit + Mating System	9.1	0.01
Body (log)	11.9	<0.01

Table S58

Diet Models (spp. n = 64)		
Brain (log) ~ Body (log) + Diet		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.900	**0.0**	**0.90**
Kappa = 0.009	4.6	0.09
All Branch Lengths = 1	11.4	0.00
Delta = 3.000	43.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**136.557**	**<2e-16**
Diet	**1.561**	**0.01**
Residuals	0.3780	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.72
Body (log) + Diet	1.9	0.18
Multiple Comparisons	**Estimate**	**P value¶**
Frugivores v. Folivores	**0.121**	**0.003**
Frugivore/Folivores v. Folivores	**0.130**	**0.005**
Omnivores v. Folivores	**0.166**	**0.004**
Frugivore/Folivores v. Frugivores	0.009	0.781
Omnivores v. Frugivores	0.045	0.324
Omnivores v. Frugivore/Folivores	0.036	0.502

Table S59

% Fruit Models (spp. n = 45)		
Brain (log) ~ Body (log) + % Fruit		
Branch Length Comparisons*	**dBIC†**	**Weight**
Delta = 1.722	**0.0**	**0.37**
Kappa = 0.798	0.1	0.36
Lambda = 1.000	0.6	0.27
All Branch Lengths = 1	13.1	<0.001

Sequential SS ANOVA‡	Mean Sq§	P value
Body (log)	**674.56**	**<2e-16**
% Fruit	**51.45**	**<0.001**
Residuals	2.93	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	1.00
Body (log)	11.9	<0.01

3. Results from suborder analyses

3.1. Anthropoids

3.1.1. Results using 10k Trees consensus phylogeny

Table S60

Diet & Group Size Models (spp. n = 108)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.928	**0.0**	**0.94**
Kappa = 0.468	5.5	0.06
Delta = 3.000	10.1	0.01
All Branch Lengths = 1	17.5	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1293**	**<2e-16**
Diet	**0.0015**	**0.01**
Group (log)	0.0000	0.98
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.71
Body (log) + Diet	1.9	0.27
Body (log) + Diet + Group (log)	6.6	0.03

Table S61

% Fruit & Group Size Models (spp. n = 70)

Brain (log) ~ Body (log) + % Fruit + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.679	**0.0**	**0.39**
Delta = 1.563	0.5	0.31
Lambda = 0.987	0.5	0.30
All Branch Lengths = 1	11.4	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2179**	**<2e-16**
% Fruit	**0.0042**	**0.02**
Group (log)	0.0010	0.24
Residuals	0.0007	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.62
Body (log)	1.7	0.26
Body (log) + % Fruit + Group (log)	3.4	0.11

Table S62

Diet & Social System Models (spp. n = 106)		
Brain (log) ~ Body (log) + Diet + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.898	**0.0**	**0.99**
Kappa = 0.478	10.6	0.01
Delta = 3.000	17.2	<0.001
All Branch Lengths = 1	23.1	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1281**	**<2e-16**
Diet	**0.0015**	**<0.001**
Social System	**0.0012**	**<0.01**
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.53
Body (log) + Diet + Social System	1.5	0.25
Body (log) + Diet	1.8	0.22

Table S63

% Fruit & Social System Models (spp. n = 70)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.979	**0.0**	**0.37**
Kappa = 0.768	0.1	0.36

Delta = 1.284	0.7	0.27
All Branch Lengths = 1	15.4	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1239**	**<2e-16**
% Fruit	**0.0022**	**0.02**
Social System	**0.0014**	**0.01**
Residuals	0.0004	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.46
Body (log) + % Fruit + Social System	0.8	0.31
Body (log)	1.3	0.24

Table S64

Diet & Mating System Models (spp. n = 106)		
Brain (log) ~ Body (log) + Diet + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.906	**0.0**	**0.99**
Kappa = 0.508	9.5	0.01
Delta = 3.000	16.7	<0.001
All Branch Lengths = 1	23.9	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1284**	**<2e-16**
Diet	**0.0015**	**<0.01**
Mating System	**0.0012**	**<0.01**
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.59
Body (log) + Diet	1.8	0.24
Body (log) + Diet + Mating System	2.5	0.17

Table S65

% Fruit & Mating System Models (spp. n = 70)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.969	**0.0**	**0.43**
Kappa = 0.792	0.7	0.30
Delta = 1.595	1.0	0.27
All Branch Lengths = 1	16.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1230**	**<2e-16**

% Fruit	**0.0020**	**0.02**
Mating System	**0.0014**	**<0.01**
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.41
Body (log) + % Fruit + Mating System	0.6	0.31
Body (log)	0.8	0.27

Table S66

Diet Models (spp. n = 108)		
Brain (log) ~ Body (log) + Diet		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.929	**0.0**	**0.94**
Kappa = 0.443	5.7	0.06
Delta = 3.000	12.5	0.00
All Branch Lengths = 1	17.8	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1294**	**<2e-16**
Diet	**0.0015**	**0.01**
Residuals	0.0003	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + Diet	0.0	0.72
Body (log)	1.9	0.18
Multiple Comparisons	**Estimate**	**P value¶**
Frugivores v. Folivores	**0.130**	**<0.001**
Frugivore/Folivores v. Folivores	**0.129**	**0.001**
Omnivores v. Folivores	**0.115**	**0.005**
Frugivore/Folivores v. Frugivores	-0.001	0.941
Omnivores v. Frugivores	-0.015	0.485
Omnivores v. Frugivore/Folivores	-0.014	0.577

Table S67

% Fruit Models (spp. n = 70)		
Brain (log) ~ Body (log) + % Fruit		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.835	**0.0**	**0.35**
Delta = 1.407	0.1	0.34
Lambda = 1.000**	0.2	0.31
All Branch Lengths = 1	12.7	<0.001

Sequential SS ANOVA‡	Mean Sq§	P value
Body (log)	**0.1704**	**<2e-16**
% Fruit	**0.0037**	**0.01**
Residuals	0.0006	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.70
Body (log)	1.7	0.30

3.1.2. ANOVA results when order in which diet and sociality variables are entered into the model is switched

Table S68

Diet & Group Size Models (spp. n = 108)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1293**	**<2e-16**
Group (log)	0.0000	0.64
Diet	**0.0014**	**0.01**
Residuals	0.0003	

Table S69

% Fruit & Group Size Models (spp. n = 70)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.2179**	**<2e-16**
Group (log)	0.0003	0.49
% Fruit	**0.0050**	**0.01**
Residuals	0.0007	

Table S70

Diet & Social System Models (spp. n = 106)		
Brain (log) ~ Body (log) + Diet + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1281**	**<2e-16**
Social System	**0.0013**	**<0.01**
Diet	**0.0015**	**<0.01**

Residuals	0.0003

Table S71

% Fruit & Social System Models (spp. n = 70)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1239**	**<2e-16**
Social System	**0.0013**	**0.02**
% Fruit	**0.0027**	**0.01**
Residuals	0.0004	

Table S72

Diet & Mating System Models (spp. n = 106)		
Brain (log) ~ Body (log) + Diet + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1284**	**<2e-16**
Mating System	**0.0012**	**<0.01**
Diet	**0.0014**	**<0.01**
Residuals	0.0003	

Table S73

% Fruit & Mating System Models (spp. n = 70)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1230**	**<2e-16**
Mating System	**0.0013**	**<0.01**
% Fruit	**0.0021**	**0.01**
Residuals	0.0003	

3.1.3. Results using Perelman and colleagues consensus phylogeny

Table S74

Diet & Group Size Models (spp. n = 82)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**

Lambda = 0.883	**0.0**	**0.89**
Kappa = 0.124	4.3	0.10
All Branch Lengths = 1	8.4	0.01
Delta = 2.004	39.3	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**164.537**	**<2e-16**
Diet	**2.192**	**<0.01**
Group (log)	0.000	0.98
Residuals	0.449	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.53
Body (log) + Diet	0.5	0.42
Body (log) + Diet + Group (log)	4.9	0.05

Table S75

% Fruit & Group Size Models (spp. n = 50)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Delta = 2.344	**0.0**	**0.38**
Kappa = 0.716	0.2	0.34
Lambda = 0.979	0.6	0.29
All Branch Lengths = 1	10.8	0.00
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**11642.7**	**<2e-16**
% Fruit	**432.7**	**<0.01**
Group (log)	5.2	0.74
Residuals	45.9	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.84
Body (log) + % Fruit + Group (log)	4.3	0.10
Body (log)	5.3	0.06

Table S76

Diet & Social System Models (spp. n = 80)		
Brain (log) ~ Body (log) + Diet + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.873	**0.0**	**0.96**
Kappa = 0.155	6.2	0.04
All Branch Lengths = 1	12.3	0.00
Delta = 1.662	41.9	<0.001

Sequential SS ANOVA‡	Mean Sq§	P value
Body (log)	**164.2480**	**<2e-16**
Diet	**2.2020**	**<0.01**
Social System	0.8660	0.11
Residuals	0.4130	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.83
Body (log) + Diet	3.6	0.14
Body (log) + Diet + Social System	6.7	0.03

Table S77

% Fruit & Social System Models (spp. n = 50)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.762	**0.0**	**0.38**
Lambda = 0.984	0.3	0.33
Delta = 1.259	0.6	0.29
All Branch Lengths = 1	11.9	0.00
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**47.509**	**<2e-16**
% Fruit	**1.627**	**0.01**
Social System	0.351	0.18
Residuals	0.208	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.78
Body (log)	2.9	0.19
Body (log) + % Fruit + Social System	6.6	0.03

Table S78

Diet & Mating System Models (spp. n = 80)		
Brain (log) ~ Body (log) + Diet + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.888	**0.0**	**0.93**
Kappa = 0.209	5.3	0.07
All Branch Lengths = 1	11.6	0.00
Delta = 0.830	35.8	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**165.4370**	**<2e-16**
Diet	**2.2050**	**<0.01**
Mating System	0.9320	0.08

Residuals	0.4290	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.53
Body (log) + Diet	0.3	0.46
Body (log) + Diet + Mating System	8.6	0.01

Table S79

% Fruit & Mating System Models (spp. n = 50)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Kappa = 0.822	**0.0**	**0.36**
Delta = 1.632	0.1	0.34
Lambda = 0.994	0.4	0.29
All Branch Lengths = 1	11.7	0.00
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**66.3660**	**<2e-16**
% Fruit	**2.4340**	**0.01**
Mating System	0.5720	0.11
Residuals	0.2840	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.79
Body (log) + % Fruit + Mating System	2.9	0.19
Body (log)	7.5	0.02

Table S80

Diet Models (spp. n = 82)		
Brain (log) ~ Body (log) + Diet		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.883	**0.0**	**0.89**
Kappa = 0.124	4.3	0.10
All Branch Lengths = 1	8.4	0.01
Delta = 1.942	41.2	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**164.5190**	**<2e-16**
Diet	**2.1920**	**<0.01**
Residuals	0.4430	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.56
Body (log) + Diet	0.5	0.44

Multiple Comparisons	Estimate	P value[¶]
Frugivores v. Folivores	**0.130**	**<0.001**
Frugivore/Folivores v. Folivores	**0.114**	**0.003**
Omnivores v. Folivores	**0.115**	**0.007**
Frugivore/Folivores v. Frugivores	-0.016	0.464
Omnivores v. Frugivores	-0.015	0.567
Omnivores v. Frugivore/Folivores	0.001	0.983

Table S81

% Fruit Models (spp. n = 50)		
Brain (log) ~ Body (log) + % Fruit		
Branch Length Comparisons*	**dBIC[†]**	**Weight**
Delta = 2.409	**0.0**	**0.43**
Kappa = 0.784	0.6	0.31
Lambda = 0.990	1.0	0.26
All Branch Lengths = 1	11.2	0.00
Sequential SS ANOVA[‡]	**Mean Sq[§]**	**P value**
Body (log)	**14430.0**	**<2e-16**
% Fruit	**531.4**	**<0.01**
Residuals	55.2	
Model Comparisons[‖]	**dBIC[†]**	**Weight**
Body (log) + % Fruit	0.0	0.93
Body (log)	5.3	0.07

3.2. Catarrhines

3.2.1. Results using 10k Trees consensus phylogeny

Table S82

Diet & Group Size Models (spp. n = 70)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Branch Length Comparisons*	**dBIC[†]**	**Weight**
Lambda = 0.639	**0.0**	**1.00**
Kappa = 0.480	12.2	0.00
Delta = 3.000	12.9	0.00

All Branch Lengths = 1	20.5	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0584**	**<2e-16**
Diet	**0.0008**	**<0.01**
Group (log)	0.0001	0.52
Residuals	0.0001	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.56
Body (log) + Diet	0.8	0.38
Body (log) + Diet + Group (log)	4.6	0.06

Table S83

% Fruit & Group Size Models (spp. n = 47)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.915	**0.0**	**0.43**
Delta = 0.751	0.8	0.29
Kappa = 0.868	0.9	0.28
All Branch Lengths = 1	8.8	0.01
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0482**	**<2e-16**
% Fruit	**0.0014**	**0.01**
Group (log)	0.0001	0.57
Residuals	0.0002	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.72
Body (log)	3.1	16.00
Body (log) + % Fruit + Group (log)	3.5	0.12

Table S84

Diet & Social System Models (spp. n = 70)		
Brain (log) ~ Body (log) + Diet + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.394††	**0.0**	**1.00**
Kappa = 0.322	16.0	<0.001
Delta = 3.000	21.1	<0.001
All Branch Lengths = 1	21.7	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0617**	**<2e-16**
Diet	**0.0011**	**<0.0001**

Social System	0.0001	0.28
Residuals	0.0001	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.60
Body (log) + Diet	0.8	0.40
Body (log) + Diet + Social System	11.1	0.00

Table S85

% Fruit & Social System Models (spp. n = 47)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.896	**0.0**	**0.44**
Kappa = 0.802	0.9	0.28
Delta = 0.908	1.1	0.25
All Branch Lengths = 1	6.2	0.02
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0478**	**<2e-16**
% Fruit	**0.0014**	**0.01**
Social System	0.0001	0.79
Residuals	0.0002	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.82
Body (log)	3.1	0.18
Body (log) + % Fruit + Social System	10.5	0.00

Table S86

Diet & Mating System Models (spp. n = 70)		
Brain (log) ~ Body (log) + Diet + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.382††	**0.0**	**1.00**
Kappa = 0.319	16.9	<0.001
All Branch Lengths = 1	22.4	<0.001
Delta = 3.000	22.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0622**	**<2e-16**
Diet	**0.0011**	**<0.0001**
Mating System	0.0002	0.18
Residuals	0.0001	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.60
Body (log) + Diet	0.8	0.40

Body (log) + Diet + Mating System	10.0	0.00

Table S87

% Fruit & Mating System Models (spp. n = 47)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.891	**0.0**	**0.44**
Kappa = 0.779	0.8	0.29
Delta = 1.220	1.1	0.26
All Branch Lengths = 1	7.5	0.01
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0478**	**<2e-16**
% Fruit	**0.0014**	**0.01**
Mating System	0.0002	0.39
Residuals	0.0002	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.81
Body (log)	3.1	0.18
Body (log) + % Fruit + Mating System	8.3	0.01

Table S88

Diet Models (spp. n = 70)		
Brain (log) ~ Body (log) + Diet		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.628	**0.0**	**1.00**
Kappa = 0.341	14.5	<0.001
All Branch Lengths = 1	21.0	<0.001
Delta = 3.000	22.6	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0050**	**<2e-16**
Diet	**0.0008**	**<0.01**
Residuals	0.0001	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log)	0.0	0.60
Body (log) + Diet	0.8	0.40
Multiple Comparisons	**Estimate**	**P value¶**
Frugivores v. Folivores	**0.112**	**<0.001**
Frugivore/Folivores v. Folivores	0.082	0.012
Omnivores v. Folivores	0.093	0.013
Frugivore/Folivores v. Frugivores	-0.030	0.139

Omnivores v. Frugivores	-0.019	0.473
Omnivores v. Frugivore/Folivores	0.011	0.704

Table S89

% Fruit Models (spp. n = 47)		
Brain (log) ~ Body (log) + % Fruit		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.931	**0.0**	**0.40**
Delta = 0.769	0.6	0.30
Kappa = 0.879	0.6	0.29
All Branch Lengths = 1	8.4	0.01
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0486**	**<2e-16**
% Fruit	**0.0015**	**0.01**
Residuals	0.0002	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.82
Body (log)	3.1	0.18

3.2.2. ANOVA results when order in which diet and sociality variables are entered into the model is switched

Table S90

Diet & Group Size Models (spp. n = 70)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0548**	**<2e-16**
Group (log)	0.0000	0.88
Diet	**0.0008**	**<0.01**
Residuals	0.0001	

Table S91

% Fruit & Group Size Models (spp. n = 47)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0482**	**<2e-16**

Group (log)	0.0000	0.98
% Fruit	**0.0015**	**0.01**
Residuals	0.0002	

Table S92

Diet & Social System Models (spp. n = 70)		
Brain (log) ~ Body (log) + Diet + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0617**	**<2e-16**
Social System	**0.0003**	**0.03**
Diet	**0.0009**	**<0.001**
Residuals	0.0001	

Table S93

% Fruit & Social System Models (spp. n = 47)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0478**	**<2e-16**
Social System	0.0001	0.79
% Fruit	**0.0014**	**0.01**
Residuals	0.0002	

Table S94

Diet & Mating System Models (spp. n = 70)		
Brain (log) ~ Body (log) + Diet + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0622**	**<2e-16**
Mating System	**0.0005**	**<0.01**
Diet	**0.0007**	**<0.001**
Residuals	0.0001	

Table S95

% Fruit & Mating System Models (spp. n = 47)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.0478**	**<2e-16**
Mating System	0.0001	0.60
% Fruit	**0.0016**	**0.01**
Residuals	0.0002	

3.2.3. Results using Perelman and colleagues consensus phylogeny

Table S96

Diet & Group Size Models (spp. n = 47)		
Brain (log) ~ Body (log) + Diet + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.605	**0.0**	**0.97**
Kappa = 0.000	7.1	0.03
All Branch Lengths = 1	10.0	0.01
Delta = 3.000	30.7	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**73.090**	**<2e-16**
Diet	**1.471**	**<0.01**
Group (log)	0.036	0.72
Residuals	0.275	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + Diet	0.0	0.50
Body (log)	0.4	0.42
Body (log) + Diet + Group (log)	3.7	0.08

Table S97

% Fruit & Group Size Models (spp. n = 29)		
Brain (log) ~ Body (log) + % Fruit + Group (log)		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.791	**0.0**	**0.42**
All Branch Lengths = 1	0.6	0.32
Kappa = 0.432	2.1	0.15
Delta = 2.497	2.5	0.12
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**64.257**	**<2e-16**
% Fruit	**2.525**	**0.02**
Group (log)	0.262	0.42
Residuals	0.395	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.66
Body (log) + % Fruit + Group (log)	2.6	0.18

Body (log)	2.8	0.16

Table S98

Diet & Social System Models (spp. n = 47)		
Brain (log) ~ Body (log) + Diet + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.140††	**0.0**	**1.00**
Kappa = 0.000	12.0	<0.01
All Branch Lengths = 1	15.4	<0.001
Delta = 3.000	38.3	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**98.433**	**<2e-16**
Diet	**2.012**	**<0.00001**
Social System	**0.812**	**<0.01**
Residuals	0.159	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + Diet	0.0	0.50
Body (log)	0.4	0.42
Body (log) + Diet + Social System	3.7	0.08

Table S99

% Fruit & Social System Models (spp. n = 29)		
Brain (log) ~ Body (log) + % Fruit + Social System		
Branch Length Comparisons*	**dBIC†**	**Weight**
All Branch Lengths = 1	**0.0**	**0.56**
Lambda = 0.404††	1.4	0.28
Delta = 3.000	3.5	0.10
Kappa = 0.157	4.4	0.06
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1603**	**<2e-16**
% Fruit	**0.0078**	**0.01**
Social System	0.0011	0.36
Residuals	0.0010	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.89
Body (log)	4.5	0.09
Body (log) + % Fruit + Social System	7.5	0.02

Table S100

Diet & Mating System Models (spp. n = 47)		
Brain (log) ~ Body (log) + Diet + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.134††	**0.0**	**1.00**
Kappa = 0.000	12.1	0.00
All Branch Lengths = 1	15.2	<0.001
Delta = 3.000	38.9	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**99.201**	**<2e-16**
Diet	**2.205**	**<0.00001**
Mating System	**0.831**	**<0.01**
Residuals	0.158	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + Diet	0.0	0.50
Body (log)	0.4	0.42
Body (log) + Diet + Mating System	3.6	0.08

Table S101

% Fruit & Mating System Models (spp. n = 29)		
Brain (log) ~ Body (log) + % Fruit + Mating System		
Branch Length Comparisons*	**dBIC†**	**Weight**
All Branch Lengths = 1	**0.0**	**0.45**
Delta = 3.000	1.3	0.23
Lambda = 0.363††	1.3	0.23
Kappa = 0.371	3.3	0.09
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1603**	**<2e-16**
% Fruit	**0.0078**	**0.01**
Mating System	0.0012	0.31
Residuals	0.0009	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.88
Body (log)	4.5	0.09
Body (log) + % Fruit + Mating System	7.0	0.03

Table S102

Diet Models (spp. n = 47)		
Brain (log) ~ Body (log) + Diet		
Branch Length Comparisons*	**dBIC†**	**Weight**
Lambda = 0.616	**0.0**	**0.97**

Kappa = 0.000	7.1	0.03
All Branch Lengths = 1	10.5	0.01
Delta = 3.000	32.4	<0.001
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**72.9750**	**<2e-16**
Diet	**1.4660**	**<0.01**
Residuals	0.2730	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + Diet	0.0	0.54
Body (log)	0.4	0.46
Multiple Comparisons	**Estimate**	**P value¶**
Frugivores v. Folivores	**0.112**	**<0.001**
Frugivore/Folivores v. Folivores	0.069	0.064
Omnivores v. Folivores	0.087	0.063
Frugivore/Folivores v. Frugivores	-0.043	0.095
Omnivores v. Frugivores	-0.025	0.497
Omnivores v. Frugivore/Folivores	0.018	0.674

Table S103

% Fruit Models (spp. n = 29)		
Brain (log) ~ Body (log) + % Fruit		
Branch Length Comparisons*	**dBIC†**	**Weight**
All Branch Lengths = 1	**0.0**	**0.36**
Lambda = 0.807	0.1	0.34
Kappa = 0.454	1.6	0.16
Delta = 2.341	1.9	0.14
Sequential SS ANOVA‡	**Mean Sq§**	**P value**
Body (log)	**0.1603**	**<2e-16**
% Fruit	**0.0078**	**0.01**
Residuals	0.0010	
Model Comparisons‖	**dBIC†**	**Weight**
Body (log) + % Fruit	0.0	0.90
Body (log)	4.5	0.10

4. Post-hoc analyses

Table S104

Body Size & % Fruit Models between Social Systems

Pair (spp. n = 15)	Estimate	Lower CI	Upper CI
Intercept	(1.05)	(1.39)	(0.71)
Body (log)	**0.81**	**0.70**	**0.92**
% Fruit	(0.00)	(0.11)	0.11
Polygynadry (spp. n = 45)	**Estimate**	**Lower CI**	**Upper CI**
Intercept	(0.24)	(0.62)	0.15
Body (log)	**0.56**	**0.46**	**0.65**
% Fruit	0.00	(0.09)	0.10

Table S105

Body Size & Diet Models between Social Systems			
Pair (spp. n = 26)	**Estimate**	**Lower CI**	**Upper CI**
Intercept	(1.03)	(1.45)	(0.62)
Body (log)	**0.77**	**0.66**	**0.89**
Frugivores v. Folivores	0.06	(0.05)	0.18
Frug/Folivores v. Folivores	0.04	(0.07)	0.15
Omnivores v. Folivores	0.02	(0.09)	0.14
Polygynadry (spp. n = 62)	**Estimate**	**Lower CI**	**Upper CI**
Intercept	(0.40)	(0.71)	(0.09)
Body (log)	**0.57**	**0.50**	**0.65**
Frugivores v. Folivores	0.20	0.13	0.28
Frug/Folivores v. Folivores	0.21	0.14	0.29
Omnivores v. Folivores	0.20	0.13	0.28

Table S106

Body Size Models between Diet Categories			
Frugivores (spp. n=49)	**Estimate**	**Lower CI**	**Upper CI**
Body (log)			

	0.72	0.66	0.78
Folivores (spp. n=24)	**Estimate**	**Lower CI**	**Upper CI**
Body (log)	0.61	0.49	0.73
Frug/Folivores (spp. n=11)	**Estimate**	**Lower CI**	**Upper CI**
Body (log)	0.76	0.54	0.97
Omnivores (spp. n=22)	**Estimate**	**Lower CI**	**Upper CI**
Body (log)	0.73	0.60	0.85

Table S107

Comparison	Taxon	Diet	Brain	% Incr	Body	% Incr	GS	Social System
1	*Ateles belzebuth*	Frug/Fol	118.58	133%	6409	1%	16.40	MMMF
	Alouatta palliata	Fol	50.91		6359		15.55	MMMF
2	*Ateles fusciceps*	Frug	114.59	116%	8034	-10%	5.00	MMMF
	Alouatta pigra	Fol	52.97		8940		5.93	MMMF
3	*Symphalangus syndactylus*	Fol	128.89	12%	9246	36%	3.86	Pair
	Bunopithecus hoolock	Frug	114.66		6787		3.35	Pair

Supplementary Text

Although mating system appears to explain brain size variation when it is entered into the model before percent frugivory for the full dataset when using the 10k Trees phylogeny (Table S10), dBIC values provide strong evidence that the reduced model including only body size and percent frugivory provides relatively better model fit (Table S3). Similarly, although polygynandrous species appear to have larger brains than polyandrous species when entered into the model with perfect frugivory in the Bayesian phylogenetic mixed model analysis (Table S36), DIC values indicate the model including only body size and percent frugivory provides relatively better model fit (mean DIC values: full = -355.7 vs. reduced = -370.7).

Although mating system appears to explain brain size variation when included in the model with percent frugivory using the 10k Trees consensus phylogeny for female-only data (Tables S43,S51), comparisons of intercept estimates (corrected for the number of comparisons: alpha = 0.005) indicate only polygynandrous species have significantly larger relative brain size than polyandrous species (estimate difference = 0.23; p = 0.0048); however, the latter category only includes four species. Furthermore, mating system is not a significant term when the Perelman and colleagues consensus phylogeny is used (Table S57). It is also possible that this result reflects an increase in female body size, without a corresponding increase in brain size, as a result of an evolutionary transition from monogamy to polygynandry (Fig. S2) and increase in female-female competition.

Although social system and mating system appear to explain additional brain size variation among anthropoid primates when using the 10k Trees consensus phylogeny (Tables S62-S65,S70-S73), closer examination of these models indicates that the regression slopes for the relationship between brain and body size differ between the relevant system categories (Tables S104-S105). This violates an assumption of tests comparing intercepts between factor levels (e.g. ANCOVA). Furthermore, the significant effect for social and mating system does not hold when the same dataset is analyzed using a different phylogeny (Tables S76-S79), although this difference could be related to the slight decrease in species sample size. Heterogeneity of regression slopes does not affect diet categories (Table S106), however, and the relevant results are bolstered by the significant positive effect of the continuous variable percent frugivory throughout all analyses.

Although social and mating system appear to explain additional brain size variation among catarrhines when entered into the model before dietary category using the 10k Trees consensus phylogeny (Tables S92,S94), dBIC values provide strong evidence that the reduced models including only body size or body size and diet category provide relatively better model fit (Tables S84,S86). Furthermore, these variables do not explain additional variation when entered in the model with percent frugivory in any order (Tables S85,S87,S93,S95). Although social and mating system appear to explain additional brain size variation among catarrhines when entered into the model with diet category and using the Perelman and colleagues phylogeny (Tables S98,S100), this may be due to the fact that there are only five pair-bonded/monogamous species (gibbons) included in this subset. Furthermore, these terms are not significant when entered into the model with percent frugivory (Tables S99,S101).

Supplementary References

92. Lahti, D. C. *et al*. Relaxed selection in the wild. *Trends Ecol. Evol.* **24**, 487-496 (2009).