

# Supporting Information

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## SI Text

**1. Primate Samples.** Bonobos (*Pan paniscus*) (three males, one female) were measured at Lola Ya Bonobo Sanctuary (Kinsasha, Congo) by K.K.S.-W assisted by B.H. and H.P. Age range: 14–30 y. Samples were analyzed by Dale Schoeller (University of Wisconsin, Madison, WI).

Chimpanzees (*Pan troglodytes*) (five males, one female) were measured at Tchimpounga Sanctuary (Pointe Noire, Congo) by K.K.S.-W. assisted by B.H. and H.P. and Lincoln Park Zoo (two males, two females) by S.R.R., E.V.L., H.M.D., and H.P. Age range: 16–23 y. Note: for Tchimpounga chimpanzees, saliva samples were used rather than urine samples; saliva was collected using clean, dry cotton swabs following published protocols (1). Samples were analyzed by William Wong (Baylor University, Waco, TX) or Dale Schoeller.

Gorillas (*Gorilla gorilla*) (two males, three females) were measured at Lincoln Park Zoo by S.R.R., E.V.L., H.M.D., and H.P. Age range: 13.6–30.3 y. Both males were silverbacks. Samples were analyzed by William Wong.

The Allen's swamp monkey (*Allenopithecus nigroviridis*) (one adult male) was measured at the Lincoln Park Zoo by S.R.R. assisted by H.P. Samples were analyzed by Dale Schoeller.

Common marmosets (*Callithrix jacchus*) were measured at University of Zürich–Irchel (four adult males, one adult female) by K.I. and J.B. assisted by H.P. Samples were analyzed by H.P. using cavity ring down spectrometry (Picarro).

Diademed sifaka (*Propithecus diadema*) adults (two females, four males) were measured in a wild population in the Tsinjoarivo region of Madagascar; measurements were conducted by M.I. with the assistance of H.P. and D.A.R. The energetics protocol was added to an ongoing research project involving darting and collaring (2). Blood samples were taken from venous blood draws before and then 90 min after injection of the doubly labeled water (DLW) dose; these blood samples were used for pre- and post-dose enrichments. After the animal was released back into the wild, urine samples were collected ad libitum from observed urinations. Samples were analyzed by William Wong.

Ring-tailed lemurs (*Lemur catta*) (two adult males, three adult females) were measured at the Duke Lemur Center (DLC) (Durham, NC) by M.C.O. and K.M.M. Age range: 4.4–20.4 y. Blood samples were taken before and 180 min after injection of the DLW dose; blood was then recollected 2, 4, and 9 d later while the lemurs free ranged in their natural habitat enclosure at the DLC. Samples were analyzed by David Wagner (Metabolic Solutions Inc., Nashua, NH).

## 2. Analyses of Total Energy Expenditure and Basal Metabolic Rate.

For interspecific comparisons, relationships were evaluated using phylogenetic generalized least squares (PGLS) models (3) as well as traditional least squares linear models. The phylogenetic structure of the analyzed species was taken from the mammalian supertree of Bininda-Emonds et al. (4). Humans and ring-tailed lemurs were represented by two populations; we used data from human hunter-gatherers and wild populations of lemurs in analyses of total energy expenditure (TEE):Mass. We estimated PGLS model parameters using the Comparative Analyses of Phylogenetics and Evolution in R package (5, 6), estimating the parameters lambda and kappa simultaneously with a maximum-likelihood approach. Lambda was close to 1 in all models, indicating a strong phylogenetic structure in the model residuals overall, whereas kappa was greater than one in all models, indicating a stronger phylogenetic signal in model residuals among

closely related taxa than among more distantly related taxa than expected under a strict Brownian motion model of trait evolution. We also report the results of non-phylogenetic linear models to illustrate the differences between primates and nonprimates.

Slopes for the scaling of  $\log_{10}$  TEE with  $\log_{10}$  body mass do not differ significantly between primates and nonprimate eutherian mammals ( $n = 84$ , phylogenetic  $P = 0.182$ , non-phylogenetic  $P = 0.104$ ). The extent to which these slopes do differ is driven in large part by a single leverage point, the mouse lemur (*Microcebus murinus*). The mouse lemur is the smallest primate in this analysis (the next smallest primate is nearly an order of magnitude larger) and has a TEE value similar to other nonprimate mammals of similar size, unlike other primates which tend to have relatively low TEE values. Excluding this species, the slopes of primates and nonprimates are highly similar (phylogenetic  $P = 0.581$ , non-phylogenetic  $P = 0.519$ ). When phylogenetic analysis of covariance (ANCOVA) models are run assuming parallel slopes for primate and nonprimate eutherians, the difference in intercept between primates and nonprimates is significant using both phylogenetic ( $P = 0.015$ ) or non-phylogenetic models ( $P < 0.001$ ; Fig. 1).

In contrast, the basal metabolic rate (BMR) did not differ between primates and nonprimates (ANCOVA,  $n = 445$ , difference in slope  $P = 0.589$ , difference in intercept assuming parallel slopes  $P = 0.552$ ). All eutherian BMR data from AnAge database, Build 12 (7) was included in BMR analyses ( $n = 360$ ), as were an additional 85 species with published BMR values (8, 9). These findings for BMR are consistent with previous studies (10).

Comparing residual TEE and BMR revealed that these metabolic rates are positively correlated, although the relationship is not strong (Fig. S3). Phylogenetic and non-phylogenetic models show a significant relationship between residual BMR and TEE (phylogenetic  $P < 0.001$ , non-phylogenetic  $P = 0.010$ ,  $n = 10$  primates, 41 nonprimates), but residual TEE explains only 35–47% of the variation in residual BMR (phylogenetic  $r^2 = 0.348$ , non-phylogenetic  $r^2 = 0.466$ ). Notably, there is a grade shift in the TEE:BMR relationship, with primates having lower TEE for a given BMR (phylogenetic  $P = 0.098$ , non-phylogenetic  $P < 0.001$ ); the slopes do not differ for primates vs. nonprimates when phylogeny is taken into account (phylogenetic  $P = 0.996$ ).

**3. Captive vs. Wild TEE in Primates. Effects of activity.** To assess whether differences in activity could account for the low TEE evident in primates we estimated the amount of additional locomotor activity needed to increase primate TEE to that expected for a nonprimate eutherian mammal of similar mass. Published measurements of locomotor cost were available for four species in our primate TEE dataset (Table 1): humans (*Homo sapiens*), ring-tailed lemurs (*L. catta*), macaques (*Macaca radiata*), and chimpanzees (*P. troglodytes*). We did not include species in which the mean body mass in the locomotor study differed by >20% from the sample in our TEE dataset. We used locomotor measurements from *Macaca speciosa* for analyses of *M. radiata*. For each species, observed TEE was subtracted from estimated TEE, calculated from the nonprimate TEE:Mass regression (Fig. 1). We then divided this TEE deficit by the energy cost to travel a kilometer, to estimate the additional distance each species would need to travel daily to achieve their expected TEE. Results (Table S3) ranged from an additional 45 km/d for Hadza foragers to an additional 89 km/d for ring-tailed lemurs. This additional daily travel exceeds normal ranging distances by more than 1

order of magnitude for each species. Note that for humans we used the energy cost of running; walking costs are substantially lower for humans and would have resulted in even greater estimated distances.

**Comparing wild and captive TEE.** Few studies have directly compared TEE in wild and captive populations of the same species. In our own dataset, ring-tailed lemurs (*L. catta*) in captivity at the DLC had similar body mass but greater TEE compared with their wild counterparts (Table 1,  $P = 0.003$ ,  $t$  test). Among our chimpanzee sample, TEE for individuals at the Lincoln Park Zoo ( $n = 4$ ) trended higher than those at the seminatural rainforest Tchimpounga Sanctuary in Congo ( $n = 6$ ) in a general linear model controlling for mass, although the difference between these groups did not achieve statistical significance ( $P = 0.08$ ). These results are consistent with other studies showing similar levels of energy expenditure across wild and captive populations. Red kangaroos (*Macropus rufus*) and sheep (*Ovis aries*) have similar TEE whether free ranging or living in enclosed pens (11). TEE measured using DLW was similar in captivity and in the field in two species of tenrec (*Microgale dobsoni* and *Microgale talazaci*) (12). Deer mice (*Peromyscus maniculatus*) in the wild had similar TEE (13 kcal/d) to control (warm climate) mice (15 kcal/d), and both groups had similar residuals from the nonprimate Mass:TEE trendline (+37% wild, +23% captive) (ref. 13; Table S2). As noted in *Results and Discussion*, the similarity in captive and wild TEE is consistent with our statistical analyses of the primates in our dataset; ANCOVA controlling for mass revealed no difference in TEE between wild and captive populations [ANCOVA with Mass:  $F(1,16) = 0.43$ ,  $P = 0.52$ ].

Studies of food intake among wild populations also corroborate our findings of low primate TEE. Multiple full-day observations of food intake by adult primates in the wild, paired with laboratory nutritional analyses of the foods eaten, are available for spider monkeys (*Ateles chamek*) (14), chacma baboons (*Papio hamadryas ursinus*) (15), mountain gorillas (*Gorilla gorilla beringei*) (16), Bornean orangutans (*Pongo pygmaeus*) (17), and chimpanzees (*P. troglodytes*) (17). These studies lasted between 30 d and several months, and thus subjects were assumed to be weight stable, in energy equilibrium. In that case, average energy intake (corrected for the coefficient of digestibility; see below) is equivalent to average energy expenditure, TEE. For orangutans, which experience extreme periods of food shortage and surplus, only energy intake values recorded during periods of intermediate food availability (17) were used for analysis.

We plotted intake-based estimates of TEE for each wild population against adult body mass taken from a compilation of mass measurements for wild populations of these species (18), or, for chimpanzees and gorillas, from population-specific estimates of body mass (16, 19). For mountain gorillas, only adult males were included as the data for females was primarily collected on nursing mothers (16). For species with both male and female intake data, mean intake (sexes combined) was plotted against mean body mass (sexes combined). Body mass and intake-based estimates of TEE are shown in Table S4. As shown in Fig. S2, estimated TEE for these wild populations fall near the Mass:TEE trendline for our DLW dataset. Given the differences in methodology used to calculate energy throughput, mean percent expected TEE values based on food intake ( $55.8 \pm 19.8\%$ , range: 39.9–71.1%) were remarkably similar to those for our DLW dataset ( $49.9 \pm 17.6\%$ , range: 32.9–112.5%). Indeed, as has been noted by Conklin-Brittain et al. (17), estimates of energy intake in wild populations likely overestimate true energy throughput, as conversion factors for (energy per gram of food) are taken from easily digestible, low-fiber, domesticated human foods. Consequently, energy intake in wild primate populations is likely to be somewhat lower than the values in Table S4 suggest.

**4. Life History Models.** Charnov's basic life history production model (20) derives from the power-law production equation described in Eq. 1:

$$dM/dt = a \cdot M^c. \quad [S1]$$

This basic model remains widely used in life history studies (20–25) and predicts many large-scale patterns of life history variation among mammals.

An expanded model with the same power-law form was proposed by Kozłowski and Wiener (23). In this model, the rate of production is a function of both the rate of energy assimilation and the rate of respiration,

$$dM/dt = j \cdot M^k - v \cdot M^z, \quad [S2]$$

where  $j \cdot M^k$  is the rate of energy assimilation and  $v \cdot M^z$  is the rate of respiration; both are power functions of mass. These life history models differ in their derivation and in some predictions for life history variation. However, as discussed by Kozłowski and Wiener (23), Eq. S1 can be viewed as a special case of Eq. 2 in which  $k = z = c$ . Such equivalence is not unlikely given the ubiquity of quarter-power scaling in organismal metabolic rates (24). In this case,  $a = j - v$ , and Eq. 2 simplifies to Eq. 1.

West et al. (24) developed a model for growth that is similar to Eq. S2 in that maintenance energy expenditure is subtracted from total metabolic rate to give the rate of production,

$$dM/dt = q \cdot M^{0.75} - em, \quad [S3]$$

where  $em$  is the maintenance energy required for maintenance. However, as derived by Charnov (26), Eq. S3 can be rewritten as

$$dM/dt = q \cdot M^{0.75} (1 - u^{0.25}), \quad [S4]$$

where  $u$  is the ratio of body mass at weaning to adult mass. Because this ratio is largely invariant across mammals (20, 26), the term  $(1 - u^{0.25})$  is similarly invariant and can be written as a constant  $(1 - u^{0.25}) = g$  and Eq. S4 can be rewritten as Eq. S1 where  $a = q \cdot g$ . Thus, despite the theoretical differences underlying the derivation of Eqs. S1–S4, for the purposes of this study the form of Charnov's model, Eq. 1, is sufficient.

**5. Comparing Life History Variables, TEE, and BMR.** Life history and BMR data were taken from the AnAge database, Build 12 (7) and from various sources (27). For maximum lifespan data, only entries with “high” or “acceptable” data quality as noted in the AnAge database were included. Growth rate (grams per year) was calculated as (adult mass – newborn mass)/(age at adulthood). Reproduction (grams per year) was calculated as (newborn mass  $\times$  litter size)/(interbirth interval). Variables were  $\log_{10}$ -transformed before analysis. To compare variation in life history variables with variation in TEE and BMR, we calculated residuals for each trait using its regression against body mass. Both non-phylogenetic and phylogenetic regression models were examined for all comparisons.

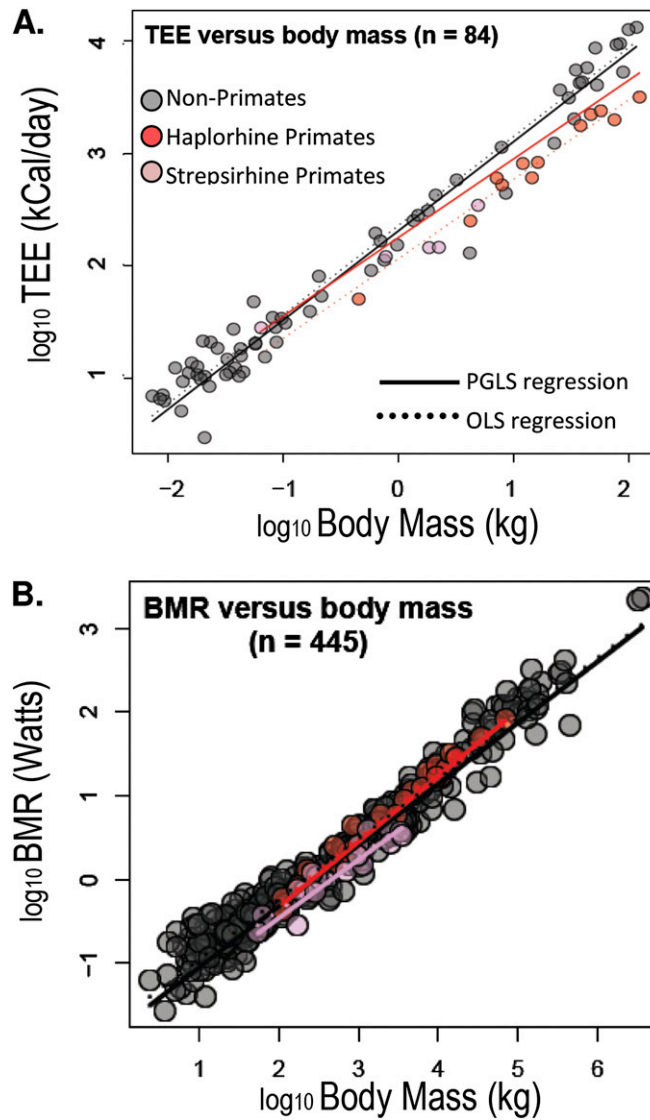
Statistical power for comparisons of TEE and life history traits was relatively low ( $n = 38$ – $57$  species, Fig. S4). Nonetheless, residual TEE was positively correlated with residual reproduction in both non-phylogenetic ( $P = 0.003$ ) and phylogenetic ( $P = 0.012$ ) models ( $n = 13$  primates, 48 nonprimates). In contrast, growth and TEE residuals were correlated in a non-phylogenetic model ( $P < 0.001$ ,  $n = 13$  primates, 50 nonprimates) but not in a phylogenetically controlled analysis ( $P = 0.35$ ). Maximum life span residuals were correlated with residuals of Mass/TEE (i.e., the inverse of cellular metabolic rate; see *Results and Discussion*) in non-phylogenetic analyses ( $P = 0.049$ ,  $n = 15$  primates, 49 nonprimates) but not in phylogenetically controlled analyses

( $P = 0.75$ ). The lack of correlation after phylogenetic correction may indicate grade shifts at higher taxonomic levels (e.g., Order), with life history variation within clades reflecting allocation rather than TEE.

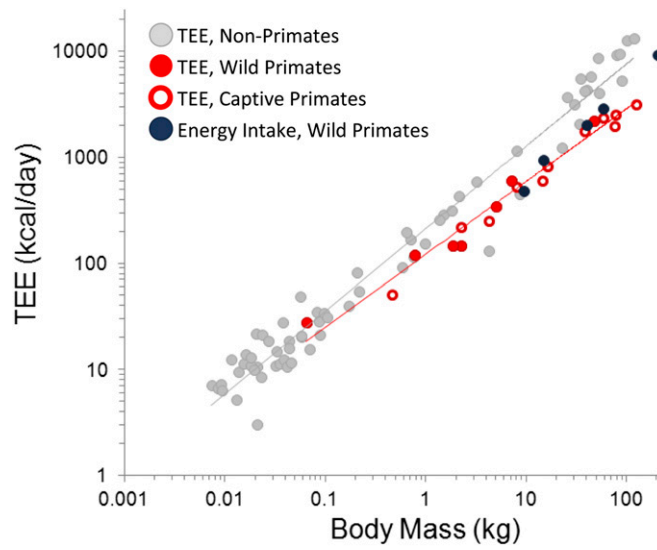
Statistical power for comparisons of BMR and life history traits was much greater ( $n = 175$ –318, Fig. S5). However, as with TEE, only comparisons of BMR and reproduction residuals were significant in both non-phylogenetic and phylogenetic models

(phylogenetic  $P = 0.006$ , non-phylogenetic  $P < 0.001$ ,  $n = 39$  primates, nonprimates  $n = 318$ ). Residual BMR and growth were not significantly correlated in (phylogenetic  $P = 0.189$ , non-phylogenetic  $P = 0.081$ ,  $n = 39$  primates, 311 nonprimates). Residual maximum lifespan was correlated with residual Mass/BMR in non-phylogenetic analyses ( $P < 0.001$ ,  $n = 40$  primates, 343 nonprimates) but not in phylogenetically controlled analysis ( $P = 0.114$ ).

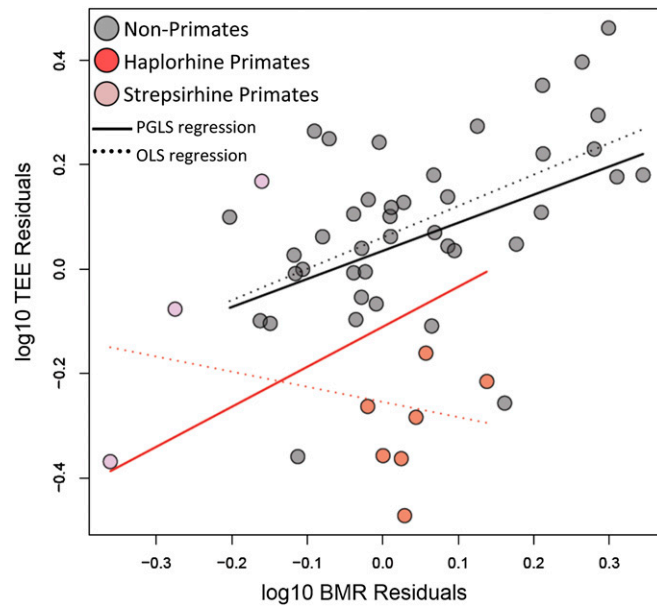
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**Fig. S1.** (A) Regressions of  $\log_{10}$  TEE on  $\log_{10}$  body mass using a phylogenetic model (solid line) and non-phylogenetic model (dotted line) for all species. Primate species are shown in red (dark red, haplorhines; light red, strepsirhines) and nonprimates in gray. (B) BMR vs. mass for primates (dark red, haplorhines; light red, strepsirhines) and other (gray) eutherian mammals. Solid line indicates phylogenetic model regression. Dotted line indicates traditional (non-phylogenetic) regression.



**Fig. S2.** Body mass plotted against TEE and intake-based TEE for nonprimates and primates. Red (primate) and gray (nonprimate) symbols as in Fig. 1; Open red symbols indicate captive primate populations; Dark blue circles indicate wild primate populations with intake-based estimates of TEE. Primate trendline (red line) calculated without intake-based TEE estimates (Table S4 and *SI Text*, section 3).



**Fig. S3.** Residual BMR vs. residual TEE. Solid lines are phylogenetic regressions (red, primates; black, nonprimates). Dotted lines are non-phylogenetic regressions. Circles: dark red, haplorhine primates; light red, strepsirhine primates; gray, nonprimates.

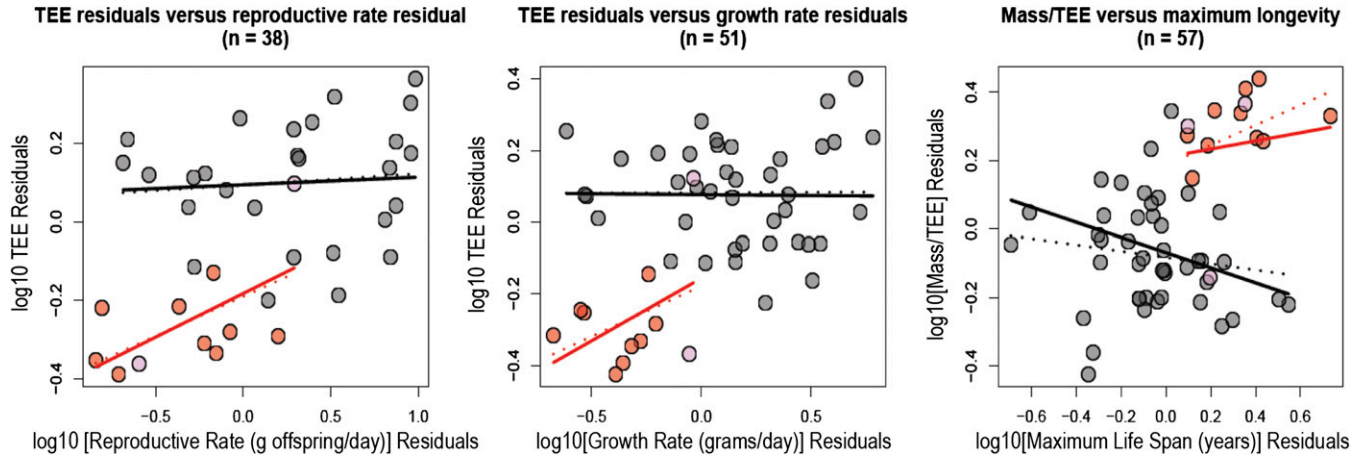


Fig. 54. Residual TEE vs. residual life history traits. Solid lines are phylogenetic regressions. Dotted lines are non-phylogenetic regressions. Red, primates; gray, nonprimates.

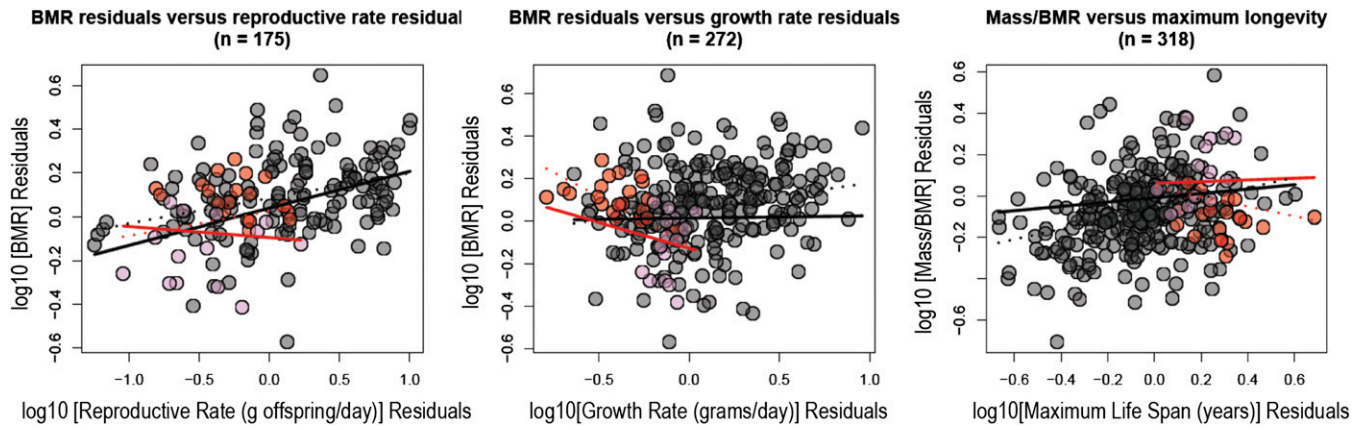


Fig. 55. Residual BMR vs. residual life history traits. Solid lines are phylogenetic regressions. Dotted lines are non-phylogenetic regressions. Red, primates; gray, nonprimates.

**Table S1. Additional information for primate TEE samples (Table 1)**

Species	Population	N	Mean age, y	Body mass			TEE			Notes
				Mean, kg	SD	Range	Mean, kcal/d	SD	Range	
<i>M. murinus</i>	Wild	18	Adult	0.064	0.011	0.049–0.098	28	11	7–50	From nontorpor animals
<i>Lepilemur ruficaudatus</i>	Wild	9	Adult	0.77	0.09	0.66–0.94	121	52	52–204	
<i>Eulemur</i> sp.	Wild	11	Adult	1.84	0.22	1.58–2.17	146	22	114–189	
<i>L. catta</i>	Wild	11	Adult	2.24	0.27	1.77–2.65	146	33	105–205	
<i>P. diadema</i>	Wild	6	Adult	4.90	0.54	3.90–5.40	346	73	228–434	
<i>Aloutta palliata</i>	Wild	5	Adult	7.12	1.42	5.80–9.43	602	118	460–787	
<i>Papio cynocephalus</i>	Wild	6	—	12.0	1.4	—	813	143	—	
<i>H. sapiens</i>	Hadza	30	37.0	46.6	6.98	34.0–58.2	2,212	537	1,459–3,363	
<i>C. jacchus</i>	Laboratory	6	Adult	0.47	0.07	0.39–0.56	52	7	43–59	University of Zurich
<i>L. catta</i>	Research station	5	Adult	2.21	0.08	2.13–2.30	217	44	164–274	DLC
<i>M. radiata</i>	Laboratory	5	8.9	4.20	0.60	—	251	30	—	“Lean” group; measured via calorimetry chamber
<i>A. nigroviridis</i>	Zoo	1	Adult	7.90	—	—	524	—	—	Lincoln Park Zoo
<i>M. mulata</i>	Laboratory	11	20.0	14.40	2.30	—	607	72	—	Control group
<i>Papio anubis</i>	Research station	8	Adult	16.18	1.85	13.20–18.75	832	205	550–1,231	
<i>P. paniscus</i>	Sanctuary	4	17.5	38.0	5.02	31.0–43.0	1,767	469	1,336–2,431	Lola ya Bonobo Sanctuary
<i>P. troglodytes</i>	Sanctuary and zoo	10	18.0	57.1	13.79	40.0–88.0	2,386	593	1,475–3,461	Tchimpounga Sanctuary and Lincoln Park Zoo
<i>H. sapiens</i>	Westerners	195	41.7	72.2	10.31	49.5–101.3	2,482	499	1,351–4,682	US and Europe
<i>P. pygmaeus</i>	Zoo	3	25.3	74.8	35.58	53.2–115.9	1,984	380	1,732–2,422	
<i>G. gorilla</i>	Zoo	5	21.4	123.7	71.28	65.8–220.0	3,160	1,222	1,826–5,006	Lincoln Park Zoo

Table S2. TEE for nonprimate eutherian mammals

Species	Group	Mass, kg	TEE, kcal/d	Refs.
<i>Antilocapra americana</i>	Artiodactyl	43.3	5,760.0	1
<i>Odocoileus hemionus</i>	Artiodactyl	39.1	4,302.1	1
<i>Oryx leucoryx</i>	Artiodactyl	89.0	5,277.4	2*
<i>O. aries</i>	Artiodactyl	52.7	4,046.3	3
<i>Capreolus capreolus</i>	Artiodactyl	22.5	1,230.5	4
<i>Pipistrellus pipistrellus</i>	Bat	0.007	7.0	1
<i>Plecotus auritus</i>	Bat	0.009	6.6	1
<i>Myotis lucifugus</i>	Bat	0.009	7.1	1
<i>Anoura caudifera</i>	Bat	0.012	12.4	1
<i>Macrotus californicus</i>	Bat	0.013	5.1	1
<i>Eptesicus fuscus</i>	Bat	0.021	10.4	1
<i>Phyllostomus hastatus</i>	Bat	0.081	34.9	1
<i>Bassariscus astutus</i>	Carnivora	0.75	112.8	1
<i>Vulpes cana</i>	Carnivora	0.97	153.4	1
<i>Vulpes macrotis</i>	Carnivora	1.48	282.0	1
<i>Vulpes velox</i>	Carnivora	2.10	425.4	1
<i>Proteles cristata</i>	Carnivora	8.54	442.2	1
<i>Lycaon pictus</i>	Carnivora	25.2	3,656.8	1
<i>Canis lupus</i>	Carnivora	37.3	4,230.4	1
<i>Suricata suricatta</i>	Carnivora	0.70	166.6	5 <sup>†</sup>
<i>Lontra canadensis</i>	Carnivora	7.84	1,132.4	6
<i>Canis familiaris</i>	Carnivora	33.5	2,024.3	7 <sup>‡</sup>
<i>Arctocephalus galapagoensis</i>	Pinnipeds	30.1	3,108.5	1
<i>Arctocephalus gazella</i>	Pinnipeds	34.6	5,497.1	1
<i>Callorhinus ursinus</i>	Pinnipeds	51.1	8,628.1	1
<i>Zalophus californianus</i>	Pinnipeds	78.0	9,225.6	1
<i>Neophoca cinerea</i>	Pinnipeds	83.5	9,440.7	1
<i>Phoca vitulina</i>	Pinnipeds	99.0	12,547.8	1
<i>Phocarcos hookeri</i>	Pinnipeds	116.4	13,147.8	8
<i>Lepus californicus</i>	Lagomorph	1.80	310.7	1
<i>Lepus americanus</i>	Lagomorph	1.35	252.8	9 <sup>§</sup>
<i>Bradypus variegatus</i>	Pilosa	4.15	130.3	1
<i>Gerbillus henleyi</i>	Rodent	0.009	6.3	1
<i>Peromyscus crinitus</i>	Rodent	0.013	9.4	1
<i>Mus musculus</i>	Rodent	0.015	11.3	1
<i>Clethrionomys rutilus</i>	Rodent	0.016	13.8	1
<i>Chaetodipus formosus</i>	Rodent	0.018	10.8	1
<i>Peromyscus maniculatus</i>	Rodent	0.018	12.8	1
<i>Peromyscus leucopus</i>	Rodent	0.019	9.9	1
<i>Microtus arvalis</i>	Rodent	0.020	21.5	1
<i>Eremitalpa namibensis</i>	Rodent	0.021	3.0	1
<i>Gerbillus allenbyi</i>	Rodent	0.023	8.5	1
<i>Clethrionomys glareolus</i>	Rodent	0.023	21.0	1
<i>Microtus agrestis</i>	Rodent	0.027	18.6	1
<i>Gerbillus pyramidum</i>	Rodent	0.032	10.8	1
<i>Pseudomys albocinereus</i>	Rodent	0.033	14.9	1
<i>Dipodomys merriami</i>	Rodent	0.034	11.4	1
<i>Microtus pennsylvanicus</i>	Rodent	0.037	27.5	1
<i>Acomys cahirinus</i>	Rodent	0.038	12.4	1
<i>Sekeetamys calurus</i>	Rodent	0.041	10.5	1
<i>Acomys russatus</i>	Rodent	0.045	11.4	1
<i>Lemmus trimucronatus</i>	Rodent	0.055	48.0	1
<i>Dipodomys microps</i>	Rodent	0.057	20.2	1
<i>Mastomys natalensis</i>	Rodent	0.057	20.7	1
<i>Meriones crassus</i>	Rodent	0.069	15.5	1
<i>Arvicola terrestris</i>	Rodent	0.086	28.4	1
<i>Ammospermophilus leucurus</i>	Rodent	0.087	21.0	1
<i>Tamias striatus</i>	Rodent	0.096	34.2	1
<i>Thomomys bottae</i>	Rodent	0.104	31.1	1
<i>Psammomys obesus</i>	Rodent	0.170	39.4	1



**Table S2. Cont.**

Species	Group	Mass, kg	TEE, kcal/d	Refs.
<i>Spermophilus saturatus</i>	Rodent	0.214	54.0	1
<i>Spermophilus parryii</i>	Rodent	0.630	195.3	1
<i>Tamiasciurus hudsonicus</i>	Rodent	0.203	81.0	10
<i>Xerus inauris</i>	Rodent	0.578	91.3	11
<i>Marmota flaviventris</i>	Rodent	3.19	580.8	1
<i>Peromyscus maniculatus</i> <sup>¶</sup>	Rodent	0.0252	14.9	12
<i>M. dobsoni</i>	Tenrec	0.043	18.4	1
<i>M. talazaci</i>	Tenrec	0.043	15.9	1

\*Spring values.

<sup>†</sup>Nonlactating females.

<sup>‡</sup>Mean of summer and winter.

<sup>§</sup>Mean of fall and winter.

<sup>¶</sup>Not included in comparisons of primates and nonprimates.

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**Table S3. The additional energy (TEE Deficit) and ranging distance to attain the TEE values expected for nonprimate placental mammals**

Species	TEE deficit, kcal/d	Locomotion cost, kcal·kg <sup>-1</sup> ·km <sup>-1</sup> *	Additional distance km·d <sup>-1†</sup>	Locomotion refs.*
<i>L. catta</i> (wild)	250	1.26	89	1
<i>H. sapiens</i> (Hadza)	1,981	0.94 <sup>‡</sup>	45	2
<i>M. radiata</i>	395	1.20	78	3
<i>P. troglodytes</i>	2,518	0.91	48	4

\*Locomotor cost data are from respirometry studies.

<sup>†</sup>Additional distance is the distance individuals in each population would need to travel each day, in addition to their habitual ranging, to account for the TEE Deficit and obtain the TEE expected for a nonprimate mammal. See *SI Text*, section 3.

<sup>‡</sup>Human locomotion cost is for running.

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**Table S4. Body mass and estimated TEE (based on food intake) for five wild populations of primates**

Species	Mass, kg	Estimated TEE, kcal/d	Percent expected*	Refs.
<i>Ateles chamek</i>	9.4	384	40	1
<i>P. hamadryas ursinus</i>	14.8	752	55	2
<i>G. gorilla beringei</i>	200	4652	71	3
<i>P. pygmaeus</i>	57.2	2293	59	4
<i>P. troglodytes</i>	40.0	1618	55	4

See *SI Text*, section 3 for details.

\*Percent expected values are calculated relative to the nonprimate Mass:TEE trendline as in Table 1.

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