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Supporting Online Material for

Aging in the Natural World: Comparative Data Reveal Similar Mortality Patterns Across Primates

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Published 11 March 2011, *Science* **331**, 1325 (2011)
DOI: 10.1126/science.1201571

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Additional Methods

Study Species

Sex-specific life tables including age-specific vectors of deaths and censored individuals were constructed with individual census data that had been collected for seven species of primate. These studies are ongoing longitudinal field studies of individually known animals; life history data are collected for all animals in each study population. Specifically, each study contributed census data, which included births, deaths, immigrations, and permanent disappearances of known individuals (*S1*). The studies are summarized in Table 1. Detailed accounts of each study and the counts of deaths, censored individuals, and entries can be found in the mortality tables below.

For most individuals in each study population, individual ages were known to within a fraction of a year. Exceptions occurred for individuals that were present at the initiation of each study or that immigrated into the study population during the course of the study. Ages for these animals were estimated based on physical characteristics and known aging patterns in these populations. For example, for a female whose initial observation was "adult with a dependent offspring" with no other available information, her age would be estimated as the minimum adult age for that study. Additional contextual information was used for assigning a maximum age. Because the purpose of this report is to assess heterogeneity in age-specific vital rates, we conducted a sensitivity analysis of the impact of uncertainty in age estimates for this small fraction of animals with estimated age. In general, this uncertainty manifests in the assignment of a species-specific maximum lifespan, which is not a focus of this report. Our conclusions are therefore robust to the uncertainty in magnitude of aging rate, young-to-middle-aged adult mortality estimates, and overall shape of survival curves. In addition, the error in age estimates are also likely to be comparable for males and females, and therefore are not likely to impact the result of our analyses of intra- or interspecific sex differences.

Mortality Table Construction

Age-specific survival and instantaneous mortality risk were computed with the actuarial method of estimating vital rates. This method uses the number entering an age class and the number exiting the age class; the difference between the two is due to deaths and to disappearances that are not known to be deaths (right-censored observations). For three species – baboons, capuchins, and sifaka – the predominant dispersing sex (males in all these cases) was highly censored; the fate of individuals that left their natal social group was undetermined, and mortality associated with dispersal was often not separable from successful emigration to a new group. For these three sets of males, we used the age-structure of the population to impute deaths occurring in that age-class (*S2*), reasoning that the numbers of new immigrant males reflected the habitat-specific probability of successful dispersal. Finally, for males in two of these three species - capuchins and baboons – these age-structure ratios were further adjusted for observed growth in the population size. We made adjustments by correcting the age-structure estimates using the observed correlation between age-structure and age-specific survival for the females of these two species (*S2*). These estimated deaths are reported in the life tables along with survival curves.

Estimation and Analysis of Initial Adult Mortality (*IMR*) and Rate of Aging (*RoA*)

Distributions of deaths and censored observations were analyzed for each species with accelerating failure time analysis in the Program WinModest (*S3*), as described in (*S4*). Briefly, maximum likelihood estimates of the Gompertz model of accelerating mortality were fit to the death distributions (see main text). Once models were fit, a likelihood ratio test was used to identify significant variation in the Gompertz parameters (*IMR* and *RoA*) among species for each sex. For each pair of species, a fully parameterized case (i.e., independently estimated *IMR* and *RoA*) was compared by likelihood ratio tests to models that assume equivalent *IMR*, equivalent *RoA*, or equivalent *IMR* and *RoA* (Table S2).

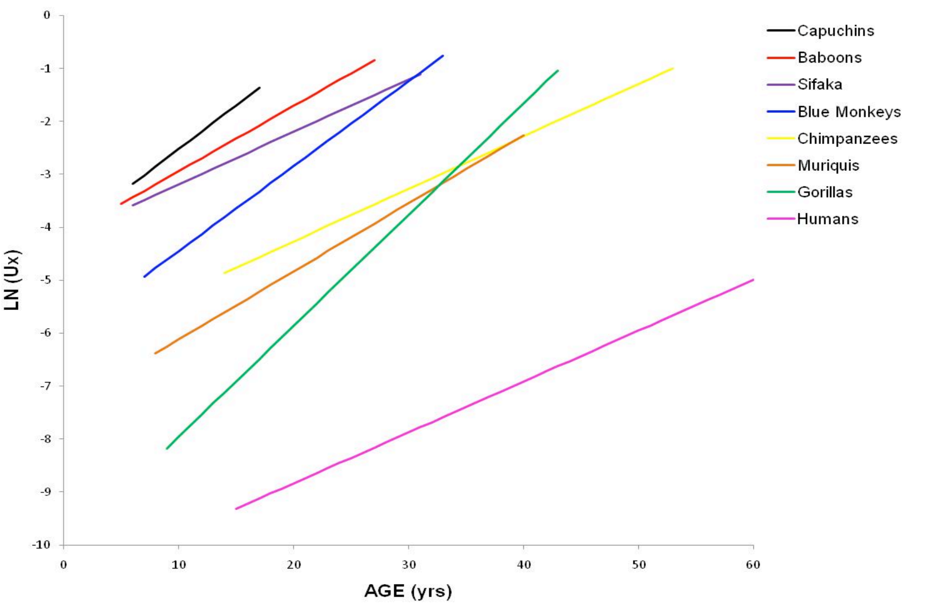
Species information, Mortality Tables, and Survival Curves

Figures S2 through S8 and Tables S4 through S10 contain detailed information for each primate species (see also Table 1 in main text) as well mortality data and survival curves. For the males of three species two additional columns are included in the mortality table: (1) Deaths* are the imputed deaths based on age-structure of males; in the case of baboon and capuchin males, the estimated numbers of deaths are adjusted for population growth rate, where population growth rate was measured for females and assumed to be the same for males. (2) Censors* indicate the censored individuals used in the final estimation of survival and mortality; this does not apply to the cases where we used the age structure to estimate number of deaths (baboons, capuchins, sifaka). For all species, ages are based on age-estimates described in methods and are therefore a combination of known-age and estimated-age individuals. Plots are point estimates of age-specific survival (L_x) their standard errors (lines).

Figures

Figure S1. Gompertz models of accelerating probability of death with age.

Females (top) and males (bottom) are fit for the distribution of deaths and right-censored observations within each age class, and plotted as the natural logarithm of the age-specific hazard [Ln(u_x) = Ln(*IMR*) + *(RoA)**x]. Gompertz parameter *a* (*IMR*) is fit at age of adulthood, which was defined as mean age of first live birth (females) or mean age of first likely or known paternity (males).



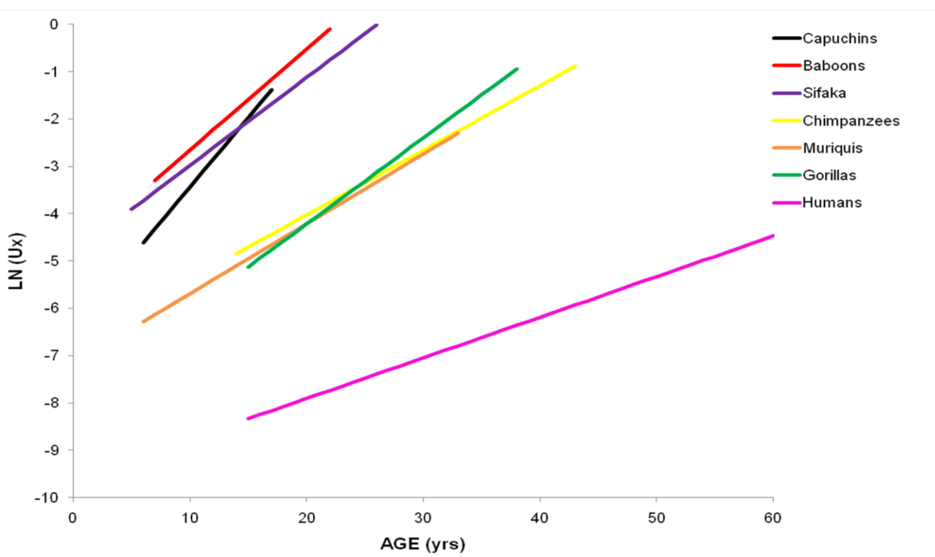


Figure S2. Sifaka survival curves

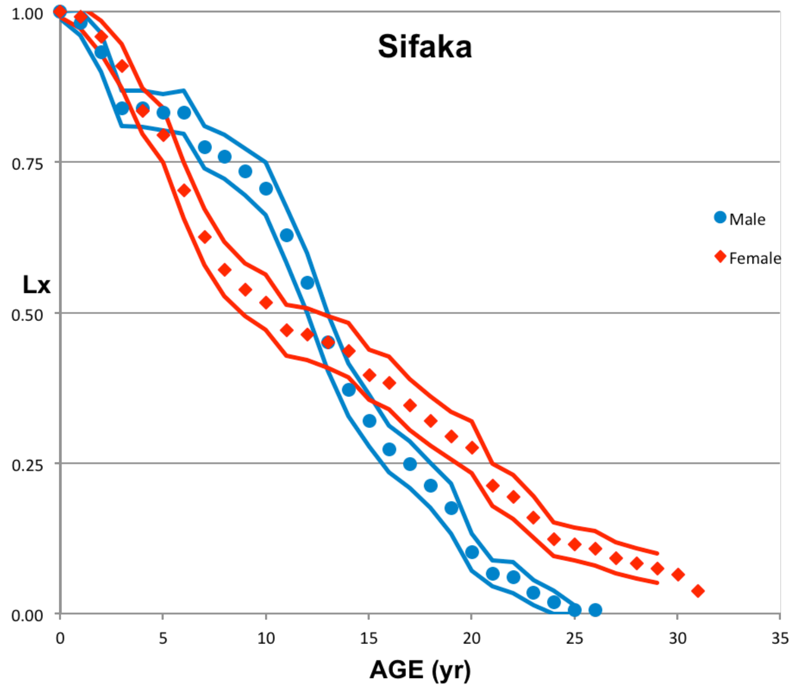


Figure S3. Muriqui survival curves

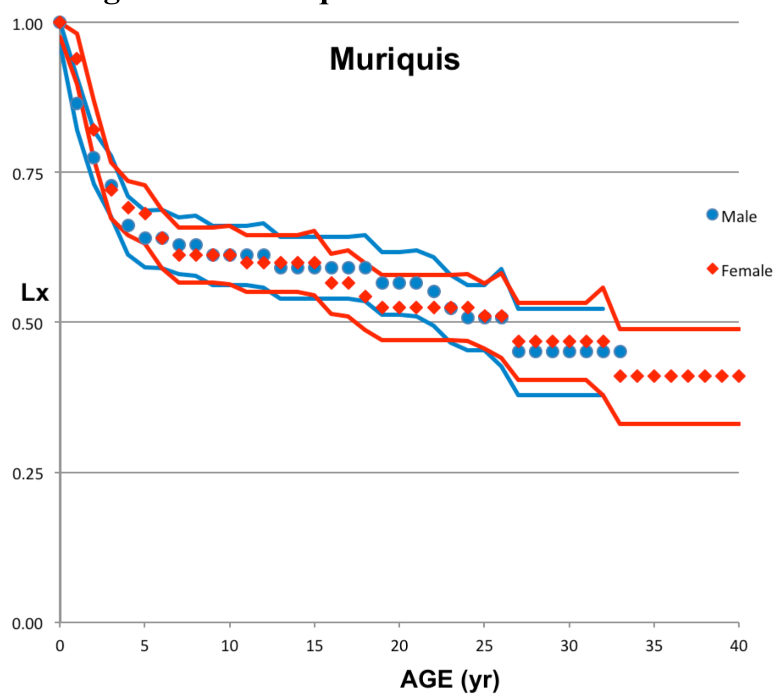


Figure S4. Capuchin survival curves

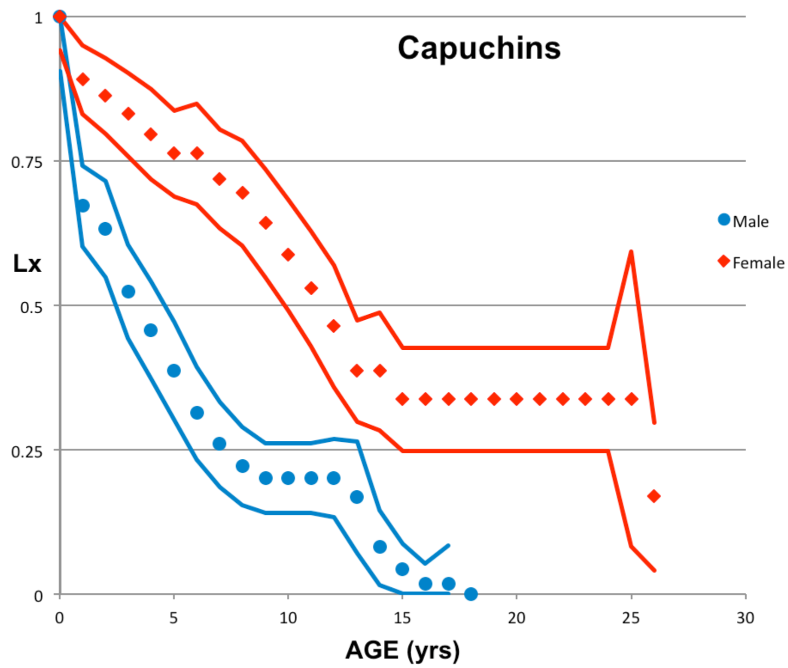


Figure S5. Baboon survival curves

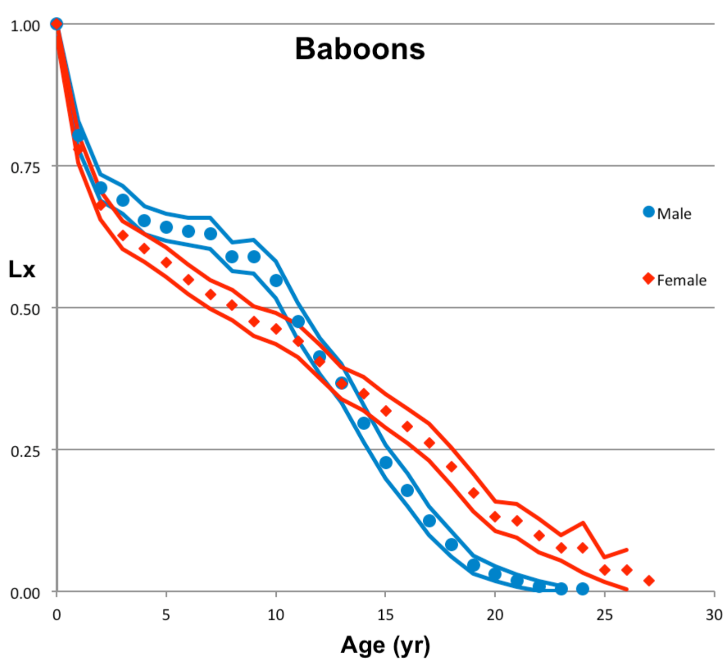


Figure S6. Blue monkey survival curves

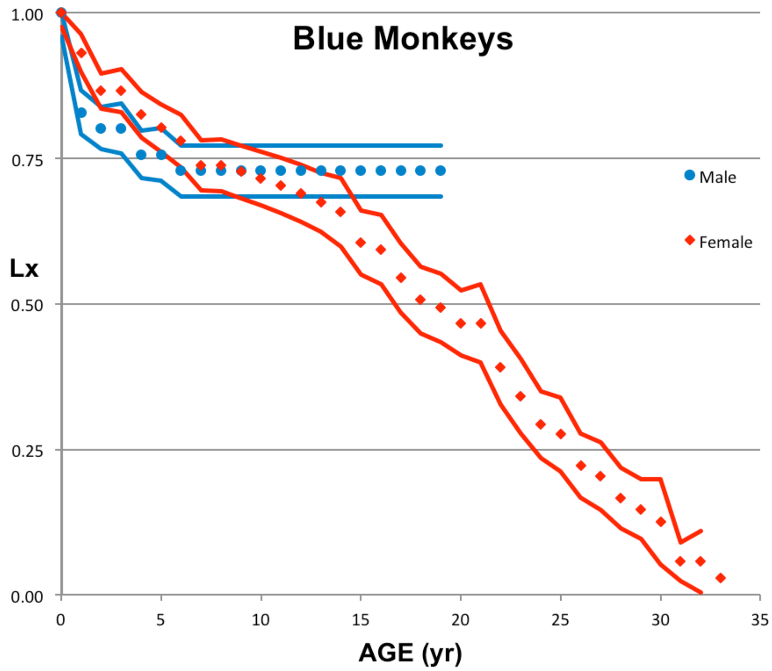


Figure S7. Chimpanzee survival curves

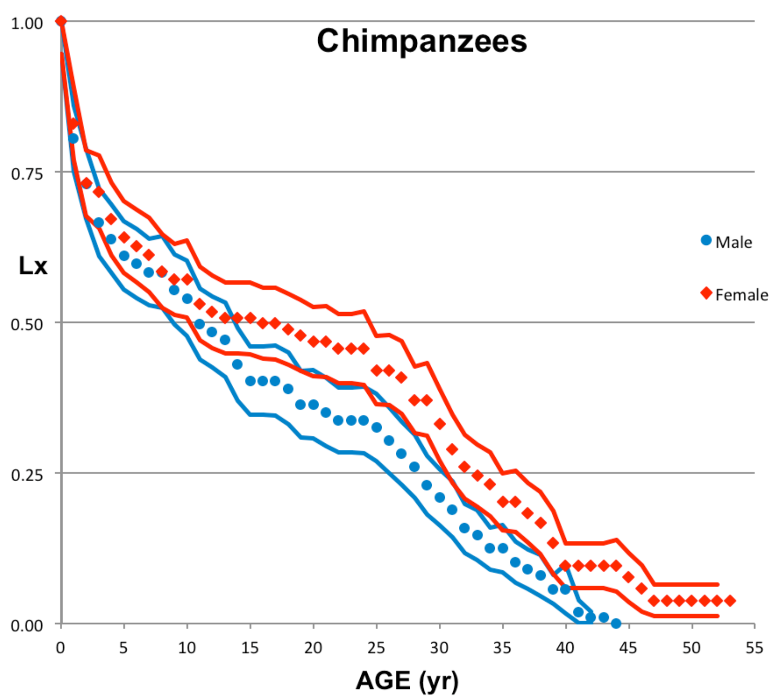
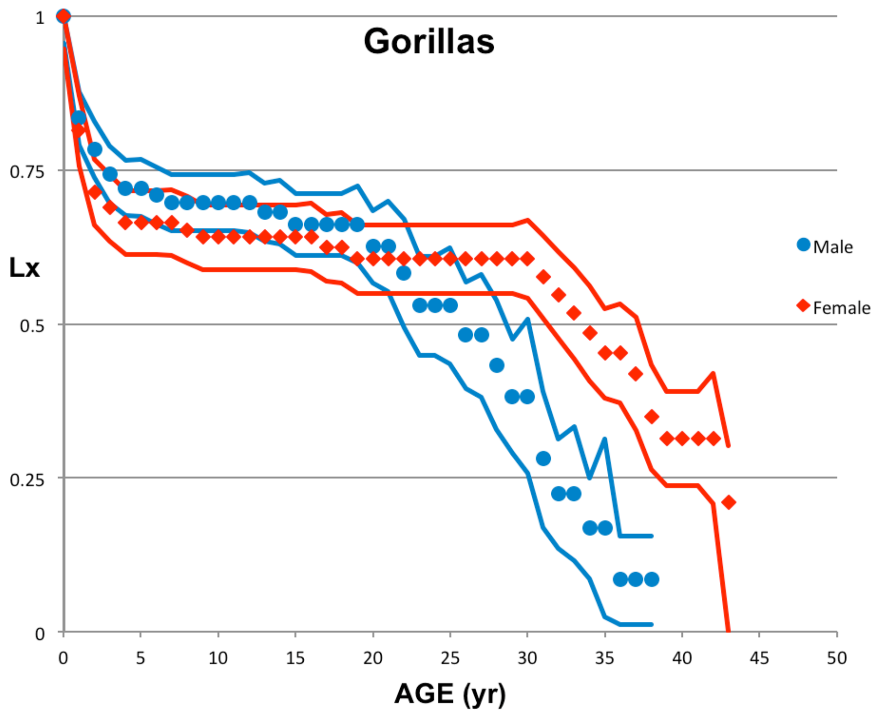


Figure S8. Gorilla survival curves



Tables

Table S1. Model comparisons for Gompertz versus other models.

Model comparison via Maximum Likelihood performed in program WinModest (*S3*).

Females

Species	**Gompertz**	**Gompertz-Makeham**	**Logistic**	**Logistic-Makeham**	**Best**
[1]Sifaka	-343.5	-341.6	-343.6	-341.6	GM
Muriquis	-52.26	-50.86	-52.26	-50.86	G
Capuchins	-44.13	-44.13	-42.78	42.78	G
Baboons	-397.5	-397.4	-397.5	-397.4	G
Blues	-161.9	161.9	-161.6	161.6	G
Gorillas	-57.33	-56.95	-57.33	-56.95	G
Chimpanzees	-138.4	-138.4	-136.6	-136.5	G

Males

Species	**Gompertz**	**Gompertz-Makeham**	**Logistic**	**Logistic-Makeham**	**Best**
Sifaka	-418.9	-418.9	-417.1	-417.1	G
Muriquis	-60.54	-59.79	-60.54	-59.79	G
[2]Capuchins	-55.10	-53.00	-55.10	-53.00	GM
Baboons	-435.9	-435.9	-434.1	-434.1	G
Gorillas	-40.65	-40.65	-40.04	-40.04	G
Chimpanzees	-139.0	-138.6	-139.0	-138.6	G

[1]The sifaka female data had a large number of deaths in the 20 – 21 age-interval that were associated with uncertainty in age-assignment (see Additional Methods), thus we chose to proceed with the Gompertz model fit because it has one less parameter than the Gompertz-Makeham three-parameter model.

[2]The capuchin male death data were estimated from age 4 – 19 based on the age-structure of males in the population (see Additional Methods), thus the least parameterized model (Gompertz) was chosen for aging estimation.

Table S2. Differences between species in *IMR* and *RoA*.
c^2 test statistics for significant differences in Initial Mortality Rate (*IMR*) and rate-of-aging (*RoA*) in adult females (above the diagonal) and males (below the diagonal) for each species pair. Bold values indicate significance at the a = 0.05 level (critical cutoff c^2 = 3.65). Values in each cell are c^2 test statistic for: (top) equivalent *IMR* with different *RoA*; (middle) equivalent *RoA* with different *IMR*; (bottom) equivalent *IMR* and equivalent *RoA*. These tests are represented graphically in Figure 2.

	Sifaka	Muriqui	Capuchin	Baboon	Blue Monkey	Chimpanzee	Gorilla	Human
Sifaka		**22.8** 0.54 **83.3**	0.51 0.50 **4.97**	0.01 1.03 **4.20**	**12.88** **5.37** **15.9**	**11.31** 0 **39.93**	**14.0** **9.20** **85.6**	**389** 0.03 **930**
Muriqui	**15.2** 0.67 **152**		**14.3** 0.14 **38.8**	**24.5** 0.02 **106**	**4.00** 0.55 **41.5**	**4.36** 0.52 **9.90**	2.30 2.54 2.54	**11.7** 0.76 **51.0**
Capuchin	1.22 1.43 1.44	2.99 2.19 **32.1**		0.45 0.20 3.36	**6.94** 0 **18.8**	**6.41** 0.49 **22.3**	**25.1** 0.22 **50.5**	**62.3** 0.56 **143**
Baboon	**6.11** 1.11 **49.4**	**28.6** 1.84 **247**	**4.81** 0.78 **11.7**		**14.3** 1.79 **29.2**	**12.6** 0.98 **58.25**	**43.9** **5.15** **105.9**	**482** 2.3 **1,133**
Blue Monkey	NA	NA	NA	NA		0.02 **5.13** **18.5**	**13.4** 1.46 **48.0**	**90.5** **9.13** **392**
Chimpanzee	**4.80** 3.0 **72.4**	3.39 0.05 **17.3**	0.09 2.96 **12.9**	**14.7** **6.29** **146**	NA		**14.0** **9.0** **15.6**	**86.7** 0.03 **242**
Gorilla	3.26 0 **22.2**	1.26 0.27 **13.4**	0.28 1.2 **8.98**	**8.40** 0.39 **71.9**	NA	0.11 0.70 1.49		1.10 **12.6** **103**
Human	**312** **35.6** **123**	**6.10** 2.08 **49.2**	**19.5** **5.57** **123**	**474** **39.4** **1,618**	NA	**44.4** **5.16** **262**	**12.1** **3.90** **77.2**	

Table S3. Differences between males and females in *IMR* and *RoA*.

c^2 test statistics for significant differences in Initial Mortality Rate (*IMR*) and rate-of-aging (*RoA*) between adult females and males within each species. Bold values indicate significance (i.e., rejection) at the $a = 0.05$ level (critical cutoff $c^2 = 3.65$). Values in each cell are c^2 test statistic for: (top) equivalent *IMR* with different *RoA*; (middle) equivalent *RoA* with different *IMR*; (bottom) equivalent *IMR* and equivalent *RoA*.

In all species except muriqui, we rejected the hypothesis that males and females have both equivalent *IMR* and *RoA*. For capuchins and gorillas, the difference is due to *IMR*. For sifaka, baboons, and likely chimpanzees, the difference is due to RoA. For humans, the difference between males and females is due to both *IMR* and *RoA*.

	Male vs. Female
Sifaka	1.45 **14.4** **31.1**
Muriqui	0.01 0.11 0.92
Capuchin	**3.10**[1] 1.04 **4.26**
Baboon	1.17 **11.3** **71.1**
Blue Monkey	NA
Chimpanzee	0 1.78[2] **9.21**
Gorilla	**6.31** 0.22 **23.0**

[1] $P = 0.07$
[2] $P = 0.18$

Table S4a. Species details for sifaka

Location	Beza Mahafaly Special Reserve, Madagascar (BMSR); UTM Zone 38 South, 0465285E, 7401087N
Substrate	Riverine gallery/xerophytic forest
Mean adult female body mass	2.76 +/- 0.36 kg (*S5*)
Mean adult male body mass	2.84 +/- 0.34 kg (*S5*)
Sexual dimorphism	Adult sifaka at BMSR are sexually monomorphic in body mass and canine size, averaging 2.8 kg, although considerable seasonal variation in body mass occurs in both sexes (*S6*). Males that exhibit longer, stronger legs and an intermediate body size reproduce more successfully; thus traits related to arboreal chasing are more important for male fitness than those related to fighting, a likely explanation for monomorphism in this species (*S7*).
Gestation Time	164 days (*S8*)
Description	Sifaka at BMSR live in multi-male, multi-female social groups, averaging 5-6 individuals (range 2-16), and characterized by female philopatry and social dominance over males, and strong reproductive seasonality, 96% of births occurring during the late-June through late August austral winter (*S9*). Mating is polygamous, characterized by high rates of male reproductive competition during the breeding season, moderate reproductive skew, and consequently, increased variation in paternity certainty (*S6*).
Interventions	The population does not receive/obtain food supplementation or medical intervention.

Table S4b. Sifaka Mortality Table

Sifaka enter the census at approximately 1-year of age. See section on "Species information, Mortality Tables, and Survival Curves" for information on Deaths* and Censors*.

		Female:			Male:				
BeginYr	EndYr	Deaths	Censors	Entries	Deaths	Censors	Entries	Deaths*	Censors*
0	1	1	0	110	3	0	124	3	0
1	2	4	0	11	8	0	9	8	0
2	3	6	7	6	15	5	11	15	5
3	4	9	9	6	1	17	18	0	0
4	5	5	2	8	1	10	18	1	0
5	6	13	6	17	2	12	11	0	0
6	7	11	7	7	5	14	21	9	0
7	8	8	3	10	0	20	13	3	0
8	9	5	8	4	1	11	13	4	0
9	10	3	5	6	1	11	8	5	0
10	11	7	1	5	2	14	9	12	0
11	12	1	2	4	2	20	7	13	0
12	13	2	7	2	6	13	6	16	0
13	14	2	5	5	3	16	5	13	0
14	15	6	5	5	3	7	2	8	0
15	16	2	6	5	0	11	4	8	0
16	17	5	0	0	5	8	2	4	0
17	18	4	0	4	8	0	5	6	0
18	19	4	2	4	4	3	4	6	0
19	20	3	0	1	12	1	0	12	0
20	21	10	2	1	5	0	1	6	0
21	22	3	2	1	0	1	0	1	0
22	23	5	1	0	3	1	0	4	0
23	24	5	2	0	2	1	0	3	0
24	25	1	0	0	2	0	0	2	0
25	26	1	0	0	0	0	0	0	0
26	27	2	1	0	1	0	0	1	0
27	28	1	0	0	NA	NA	NA	NA	NA
28	29	1	1	0	NA	NA	NA	NA	NA
29	30	1	0	0	NA	NA	NA	NA	NA
30	31	3	0	0	NA	NA	NA	NA	NA
31	32	1	0	0	NA	NA	NA	NA	NA

Table S5a. Species details for muriquis

Location	Reserve Particular Património Natural-Feliciano Miguel Abdala, Minas Gerais, Brazil; UTM Zone 24 South, 0204769E, 7815801N
Substrate	Forest
Mean adult female body mass	8.33 kg (*S10*)
Mean adult male body mass	9.42 kg (*S10*)
Sexual dimorphism	Northern muriquis are sexually monomorphic in both body size and canine size (*S10*)**.**
Gestation Time	216 days (*S11*)
Description	Northern muriquis live in egalitarian societies in which males are philopatric and females typically disperse from their natal groups (*S12*). Births can occur year-round, but are concentrated during the dry winter months, with a peak from June-August (*S13*).
Interventions	The muriquis have never been provisioned or observed to raid cultivated crops. All research has been non-invasive and there has only been one case of active intervention, when a 4-month old infant was rescued from the forest floor and returned to her mother the next morning (*S14,* S*15*).

Table S5b. Muriqui mortality table

		Female:			Male:		
BeginYr	EndYr	Deaths	Censors	Entries	Deaths	Censors	Entries
0	1	7	21	125	16	14	125
1	2	13	5	8	10	10	6
2	3	11	11	9	5	11	7
3	4	3	7	2	6	12	0
4	5	1	4	5	2	3	8
5	6	5	8	21	0	7	8
6	7	3	10	2	1	5	0
7	8	0	9	0	0	12	0
8	9	0	4	2	1	4	1
9	10	0	6	0	0	4	0
10	11	1	6	2	0	7	1
11	12	0	3	5	0	4	6
12	13	0	5	1	1	2	2
13	14	0	3	0	0	2	0
14	15	0	2	1	0	1	2
15	16	2	2	1	0	1	0
16	17	0	6	1	0	2	1
17	18	1	3	1	0	3	0
18	19	1	1	6	2	0	25
19	20	0	2	8	0	2	0
20	21	0	2	10	0	1	0
21	22	0	0	1	1	1	0
22	23	0	1	0	2	0	0
23	24	0	1	0	1	6	0
24	25	1	7	0	0	20	0
25	26	0	17	0	0	0	0
26	27	1	8	0	1	2	0
27	28	0	0	1	0	0	0
28	29	0	0	0	0	0	0
29	30	0	0	0	0	0	0
30	31	0	0	0	0	1	0
31	32	0	0	0	0	4	0
32	33	1	0	0	0	0	0
33	34	0	1	0	2	0	0
34	35	0	0	0	NA	NA	NA
35	36	0	0	0	NA	NA	NA
36	37	0	3	0	NA	NA	NA
37	38	0	1	0	NA	NA	NA
38	39	0	0	0	NA	NA	NA
39	40	0	0	0	NA	NA	NA
40	41	2	0	0	NA	NA	NA

Table S6a. Species details for capuchins

Location	Área de Conservación Guanacaste, Sector Santa Rosa, Costa Rica; UTM Zone 16 North, 0651070E, 1198520N
Substrate	Tropical dry forest
Mean adult female body mass	2.28 kg
Mean adult male body mass	3.23 kg
Sexual dimorphism	Adult females weigh on average 71% of male weight (*S16*). At least one study reports that adult male canines are larger than female canines and attributes this mainly to high degree of intermale competition (*S17*).
Gestation Time	162 days
Description	White-faced capuchins live in small (mean = 17) multi-male, multi-female breeding groups with an adult sex ratio approaching 1:1. Although all adult males in the group are seen to mate, the alpha male fathers most of the infants. Aggressive takeovers of breeding groups by invading coalitions of males occur about every 4 years, usually early in the dry season (February) during which time infants are often wounded, sometimes fatally. Most females conceive during the wet season (mid-May to mid-December) and give birth late in the subsequent dry season (mid-December to mid-May), so this is a moderately seasonal species.
Interventions	No provisioning or health interventions take place.

Table S6b. Capuchin mortality table

See section on "Species information, Mortality Tables, and Survival Curves" for information on Deaths* and Censors*.

		Female:			Male:				
BeginYr	EndYr	Deaths	Censors	Entries	Deaths	Censors	Entries	Deaths*	Censors*
0	1	4	3	38	18	5	56	18	5
1	2	1	3	2	2	2	2	2	2
2	3	1	3	0	5	2	0	5	2
3	4	1	2	0	3	0	4	3	0
4	5	1	3	3	2	3	1	3	0
5	6	0	3	0	0	4	2	3	0
6	7	1	1	0	1	5	1	2	0
7	8	1	0	13	0	2	2	2	0
8	9	2	2	0	0	4	1	1	0
9	10	2	2	0	0	2	2	0	0
10	11	2	3	2	0	6	11	0	0
11	12	2	2	0	0	4	11	0	0
12	13	2	2	0	0	1	3	2	0
13	14	0	0	0	0	7	0	3	0
14	15	1	2	0	0	6	0	1	0
15	16	0	0	0	0	3	1	2	0
16	17	0	0	0	0	6	0	1	0
17	18	0	2	0	0	1	0	1	0
18	19	0	0	0	0	3	0	1	0
19	20	0	2	0	0	0	0	NA	NA
20	21	0	0	0	0	0	0	NA	NA
21	22	0	0	0	0	0	0	NA	NA
22	23	0	0	0	0	0	0	NA	NA
23	24	0	0	0	0	0	0	NA	NA
24	25	0	0	0	0	1	0	NA	NA
25	26	1	0	0	NA	NA	NA	NA	NA
26	27	0	1	0	NA	NA	NA	NA	NA

Table S7a. Species details for baboons

Location	Amboseli National Park and surrounding areas, Kenya; UTM Zone 37 South, 0308933E, 9704836N
Substrate	Savanna
Mean adult female body mass	12.8 kg
Mean adult male body mass	24.4 kg
Sexual dimorphism	Adult males are approximately twice as large as females in body mass, somewhat less in linear dimensions and more in canines.
Gestation Time	178 days
Description	Amboseli baboons live in stable social groups that are composed of multiple adults of both sexes, and each social group travels together as a unit. Home ranges overlap between neighboring groups; baboons do not engage in territorial defense. Baboons exhibit very little mating and birth seasonality (*S18*).
Interventions	The study population does not receive/obtain food supplementation or medical intervention.

Table S7b. Baboon mortality table

See section on "Species information, Mortality Tables, and Survival Curves" for information on Deaths* and Censors*.

		Female:			Male:				
BeginYr	EndYr	Deaths	Censors	Entries	Deaths	Censors	Entries	Deaths*	Censors*
0	1	100	30	469	87	33	421	87	33
1	2	42	22	3	38	22	5	38	22
2	3	21	21	4	8	14	2	8	14
3	4	9	13	5	13	24	3	13	24
4	5	9	8	4	4	18	10	4	18
5	6	11	9	2	2	18	6	2	18
6	7	9	9	1	1	17	2	1	17
7	8	6	9	1	2	29	17	10	0
8	9	9	9	3	1	32	23	0	0
9	10	4	12	2	0	19	28	10	0
10	11	6	11	0	0	26	13	18	0
11	12	9	10	0	1	24	8	15	0
12	13	9	5	1	1	19	8	12	0
13	14	4	7	0	1	19	9	18	0
14	15	6	5	0	1	21	4	17	0
15	16	5	4	0	1	10	0	13	0
16	17	5	2	0	1	12	0	14	0
17	18	7	3	0	0	13	0	11	0
18	19	7	3	0	2	8	0	10	0
19	20	6	1	0	0	7	0	5	0
20	21	1	1	0	1	2	0	4	0
21	22	3	3	0	0	4	0	3	0
22	23	2	2	0	0	2	0	1	0
23	24	0	2	0	0	0	0	0	0
24	25	2	0	0	1	0	0	1	0
25	26	0	0	0	NA	NA	NA	NA	NA
26	27	1	0	0	NA	NA	NA	NA	NA
27	28	1	0	0	NA	NA	NA	NA	NA

Table S8a. Species details for blue monkeys

Location	Kakamega Forest, Kenya; UTM Zone 36 North, 0707563E, 0026099N
Substrate	Rain forest
Mean adult female body mass	4.2 kg *(S19)*
Mean adult male body mass	6.8 kg *(S19)*
Sexual dimorphism	Adult males are approximately 1.6 times as large as females in body mass.
Gestation Time	176 days ± 14 days (*S20*)
Description	The modal social structure for blue monkeys at Kakamega is one-male multi-female groups, although multiple males may be present during the breeding season and occasionally longer. Over 90% of births occur during a 7 month period from November to May; 65% of births occur in the 3-month period of January-March inclusive (*S21*).
Interventions	There has been no direct intervention, but monkeys in some groups have had access (since about 1997) to areas of human habitation where they eat from non-native horticultural trees and occasionally steal human food. We suspect that this has led to approximately 10 deaths by human sources in recent years.

Table S8b. Blue monkey mortality table

		Female:			Male:		
BeginYr	EndYr	Deaths	Censors	Entries	Deaths	Censors	Entries
0	1	9	8	134	21	9	127
1	2	8	10	2	3	12	0
2	3	0	12	0	0	8	1
3	4	4	10	0	4	8	0
4	5	2	5	1	0	4	0
5	6	2	8	7	2	9	0
6	7	4	9	13	0	14	0
7	8	0	4	9	0	17	0
8	9	1	4	0	0	6	0
9	10	1	5	0	0	3	0
10	11	1	5	2	0	2	0
11	12	1	9	0	0	2	0
12	13	1	2	0	0	2	0
13	14	1	6	0	0	1	0
14	15	3	3	3	0	0	0
15	16	1	2	20	0	0	0
16	17	4	3	0	0	0	0
17	18	3	0	0	0	0	0
18	19	1	4	0	0	0	0
19	20	2	1	3	0	1	0
20	21	0	3	0	NA	NA	NA
21	22	5	3	0	NA	NA	NA
22	23	3	0	0	NA	NA	NA
23	24	3	0	0	NA	NA	NA
24	25	1	1	0	NA	NA	NA
25	26	3	1	0	NA	NA	NA
26	27	1	0	0	NA	NA	NA
27	28	2	0	0	NA	NA	NA
28	29	1	1	0	NA	NA	NA
29	30	1	0	0	NA	NA	NA
30	31	3	1	0	NA	NA	NA
31	32	0	0	0	NA	NA	NA
32	33	1	0	0	NA	NA	NA
33	34	1	0	0	NA	NA	NA

Table S9a. Species details for chimpanzees

Location	Gombe National Park, Tanzania; UTM Zone 35 South, 0791983E, 9481592N
Substrate	Riverine forest, woodland and grassland
Mean adult female body mass	31.3 kg
Mean adult male body mass	39 kg
Sexual dimorphism	The ratio of male body mass to female body mass varies with age and averages 1.25 between ages 15 and 30 yrs (*S22*).
Gestation Time	176 days ± 14 days (*S20*)
Description	Chimpanzees live in permanent multi-female, multi-male social groups called communities, which are fission-fusion social units. Males are philopatric and at least half of the females at Gombe transfer to a new community before breeding. They show no seasonality in births.
Interventions	The Gombe chimpanzees were provisioned with bananas daily from 1964-67 in one community and 1990-96 in another community, and subsequently at low levels until 2000 when provisioning ceased completely (*S24*). Veterinary interventions have been made occasionally throughout the study, especially in the case of human induced disease and injuries (*S24*).

Table S9b. Chimpanzee mortality table

		Female**:**			Male:		
BeginYr	EndYr	Deaths	Censors	Entries	Deaths	Censors	Entries
0	1	12	1	71	16	0	82
1	2	7	2	2	6	3	0
2	3	1	4	1	5	3	1
3	4	3	3	2	2	3	1
4	5	2	3	3	2	2	1
5	6	1	0	2	1	1	2
6	7	1	0	1	1	1	1
7	8	2	1	4	0	5	2
8	9	1	4	2	2	2	2
9	10	0	1	2	1	1	2
10	11	3	4	3	3	1	1
11	12	1	2	3	1	1	5

12	13	1	1	14	1	2	0
13	14	0	3	5	3	0	1
14	15	0	0	6	2	1	0
15	16	1	2	2	0	1	0
16	17	0	3	0	0	1	2
17	18	1	4	1	1	0	2
18	19	1	2	1	2	0	0
19	20	1	3	1	0	2	2
20	21	0	3	0	1	0	0
21	22	1	1	1	1	0	0
22	23	0	4	5	0	1	1
23	24	0	2	0	0	0	2
24	25	3	3	0	1	0	0
25	26	0	4	2	2	1	3
26	27	1	0	4	2	1	2
27	28	3	2	0	2	0	0
28	29	0	2	1	3	0	1
29	30	3	1	0	2	1	1
30	31	3	2	1	2	0	1
31	32	2	1	0	3	2	0
32	33	1	0	1	1	1	1
33	34	1	0	0	2	0	0
34	35	2	0	0	0	0	0
35	36	0	3	0	2	0	0
36	37	1	0	0	1	1	0
37	38	1	0	1	1	1	2
38	39	2	2	1	2	0	0
39	40	2	0	0	0	0	0
40	41	0	0	0	4	0	1
41	42	0	0	0	1	0	0
42	43	0	0	0	0	0	0
43	44	0	1	1	1	0	0
44	45	1	0	0	NA	NA	NA
45	46	1	0	0	NA	NA	NA
46	47	1	0	0	NA	NA	NA
47	48	0	0	0	NA	NA	NA
48	49	0	0	0	NA	NA	NA
49	50	0	0	0	NA	NA	NA
50	51	0	1	0	NA	NA	NA
51	52	0	0	0	NA	NA	NA
52	53	0	0	0	NA	NA	NA
53	54	1	0	0	NA	NA	NA

Table S10a. Species details for gorillas

Location	Volcanoes National Park, Rwanda; UTM Zone 35 South, 0778196 E, 9847322N
Substrate	High altitude (2000 m to 4100m) forest
Mean adult female body mass	95 kg
Mean adult male body mass	160 kg
Sexual dimorphism	Male body mass is 1.5 times that of females. Males also possess several morphological features associated with fighting (e.g. larger canine teeth and sagittal crest), which females lack (*S25*).
Gestation Time	258 days (*S26*)
Description	The social structure of mountain gorillas includes single- and multi-male, multi-female groups as well as all-male groups. Average group size is roughly 10 individuals (*S27*), although in the last few decades the research groups have grown to up to six times that amount. Mountain gorillas mate and give birth throughout the year (*S28,* S*29*).
Interventions	The research population of mountain gorillas has never been provisioned but has had veterinary care since the mid 1980s. Such care is focused on human-induced illnesses and injuries, including snare removals, antibiotic injections, and vaccinations (see *S30*).

Table S10b. Gorilla mortality table

		Female:			Male:		
BeginYr	EndYr	Deaths	Censors	Entries	Deaths	Censors	Entries
0	1	15	3	82	17	4	104
1	2	8	0	1	5	3	2
2	3	2	0	1	4	4	1
3	4	2	1	1	2	4	0
4	5	0	1	1	0	3	0
5	6	0	5	2	1	4	2
6	7	0	3	6	1	2	2
7	8	1	7	4	0	2	3
8	9	1	1	5	0	8	2
9	10	0	9	3	0	1	1

10	11	0	2	2	0	6	2
11	12	0	1	2	0	1	1
12	13	0	6	0	1	3	0
13	14	0	1	0	0	7	0
14	15	0	4	1	1	8	0
15	16	0	3	2	0	4	1
16	17	1	2	2	0	4	3
17	18	0	3	1	0	2	0
18	19	1	1	0	0	3	0
19	20	0	1	0	1	1	0
20	21	0	0	1	0	2	1
21	22	0	1	0	1	3	0
22	23	0	2	0	1	2	0
23	24	0	2	0	0	0	1
24	25	0	3	0	0	0	0
25	26	0	3	1	1	0	1
26	27	0	0	1	0	0	0
27	28	0	1	2	1	0	0
28	29	0	4	0	1	1	0
29	30	0	1	1	0	0	0
30	31	1	0	1	2	1	1
31	32	1	0	0	1	0	0
32	33	1	2	0	0	0	0
33	34	1	0	0	1	0	0
34	35	1	0	0	0	1	0
35	36	0	0	0	1	0	0
36	37	1	1	0	0	0	0
37	38	2	0	0	0	0	0
38	39	1	0	0	0	1	0
39	40	0	0	0	NA	NA	NA
40	41	0	0	1	NA	NA	NA
41	42	0	1	0	NA	NA	NA
42	43	3	0	0	NA	NA	NA
43	44	2	0	0	NA	NA	NA

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