

Method validation

Observer reliability:

A second observer repeated measurements of ten different individuals. Forearm measurements taken by the second observer correlated significantly with those obtained by the first observer (Spearman's rank correlation: $r_s = 0.9757576$, $P < 0.001$, $N = 10$ digitized images from ten different individuals) and measurements of both observers were not systematically biased (paired t-test: $t = -0.4275$, $df = 9$, $P = 0.6791$).

Repeated intra-observer measures of the same individual:

Repeated measures of forearm length from the same individual varied on average at a percentage standard deviation (SD %) of 2.0 % in bonobos and 1.5 % in chimpanzees, ranging from 0.5 % to 3.2 % in bonobos and from 0.4 % to 2.5 % in chimpanzees. The average difference for a forearm measure was 0.5 cm in bonobos and 0.3 cm in chimpanzees, with the maximum of 0.9 cm in bonobos and 0.7 cm in chimpanzees (Table S1).

Table S1: Species, sex, age at sampling (in years), forearm arm length as well as standard deviation (SD) and percentage of standard deviation (SD %) for seven bonobos and six chimpanzees with five repeated measurements for each individual.

Species	Sex	Age at sampling [years]	Average forearm length [cm]	SD	SD [%]
bonobo	f	29.8	32.80	0.5	1.6
bonobo	f	26.7	29.53	0.2	0.5
bonobo	f	10.2	29.18	0.9	3.2
bonobo	f	4.9	22.14	0.6	2.9
bonobo	m	29.1	38.69	0.4	1.0
bonobo	m	16.1	30.24	0.6	2.0
bonobo	m	8.3	22.30	0.6	2.7
chimpanzee	f	30.8	26.63	0.3	1.0
chimpanzee	f	25.4	26.98	0.7	2.5
chimpanzee	f	18.7	28.55	0.1	0.4
chimpanzee	m	22.9	19.17	0.3	1.2
chimpanzee	m	7.8	27.52	0.5	1.8
chimpanzee	m	5.3	23.50	0.4	1.9

Repeated inter-observer measures from the same digitized image:

The average difference of multiple measures from the same digitized image in bonobos was 0.4 cm with a SD of 1.6 %, ranging between 0.15 cm and 0.59 cm, and in chimpanzees the average was 0.3 cm with a SD of 1.2 %, ranging between 0.25 cm and 0.4 cm (Table S2).

Table S2: Species, sex, age at sampling (in years), average forearm arm length, as well as standard deviation (SD) and percentage of standard deviation (% SD) for five bonobos and five chimpanzees when measured five times.

Species	Sex	Age at sampling [years]	Average forearm length [cm]	SD	SD [%]
bonobo	f	21.3	27.27	0.15	0.57
bonobo	f	7.1	24.67	0.59	2.39
bonobo	m	22.1	27.95	0.30	1.07
bonobo	m	10.5	28.53	0.50	1.74
bonobo	m	5.4	25.63	0.57	2.24
chimpanzee	f	40.5	25.43	0.26	1.03
chimpanzee	f	28.5	27.40	0.25	0.92
chimpanzee	m	34.9	31.04	0.38	1.23
chimpanzee	m	17.1	31.57	0.40	1.26
chimpanzee	m	9.6	26.95	0.39	1.44

Comparing direct measures and measures from digitized images:

Comparing measures of forearm length of chimpanzees (N = 6) taken with a tape during anesthesia with measures of the same individuals from the digitized images, the differences in forearm length ranged between 0.25 cm (in a 15-year-old male) and 0.87 cm (in a 15-year-old female). Overall, the average difference between these two measures was not significant different (average difference: 0.45 cm, $t = 0.3374$, $df = 5$, $P = 0.7495$) (Table S3).

Table S3: Forearm measures of six individuals obtained during anesthesia and from digitized images of subjects inserting their arm into the tube.

Sex	Age at sampling [years]	Arm length anesthesia [cm]	Arm length tube [cm]	Difference [cm]
f	10	31.00	31.29	0.29
f	15	28.20	27.33	0.87
f	22	29.50	30.00	0.5
m	10	26.30	25.83	0.47
m	15	31.50	31.25	0.25
m	17	30.80	31.15	0.35