Supplementary material S1

from "Tolerant and intolerant macaques show different levels of structural complexity in their vocal communication"

Table 1. Information about groups and subjects.[1]

Groups	Dates of group foundation and study	Composition of groups	Name and age in years of females[2]
rhesus macaque group Ma	founded in 2004, studied in Jul–Oct 2016	10 adult females, 3 adult males, 22 immatures[3]	*Pip* (14), *But* (13), *Isa* (11), *Nil* (10), *Hoe* (10), *Wie* (9), *Lok* (7), *Aus* (6), *Mon* (5), *Pan* (5)
rhesus macaque group Mb	founded in 2004, studied in Jul–Oct 2016	6 adult females, 1 adult male, 24 immatures	*Tro* (13), *Plo* (12), *Hat* (10), *Jah* (8), *Kwe* (7), *Ymi* (6)
Tonkean macaque group Tb	founded in 1978, studied in Feb–May 2016	4 adult females, 6 adult males, 5 immatures	*Gil* (27), *Gai* (9), *Giu* (9), *Lis* (5)
Tonkean macaque group Tc	founded in 2005, studied in Sept–Dec 2014	4 adult females, 4 adult males, 8 immatures	*Pal* (13), *Sop* (11), *Pam* (8), *Pap* (6)
Tonkean macaque group Td	founded in 2007, studied in Mar–May 2015	3 adult females, 5 adult males, 7 immatures	*Sib* (12), *Tet* (11), *Tan* (11)
Tonkean macaque group Te	founded in 2009, studied in Sept–Dec 2014	2 adult females, 2 adult males, 3 immatures	*Nin* (15), *Nif* (9)
Japanese macaque group Fw	founded in 1974, studied in Mar–Aug 2005	13 adult females, 4 adult males, 10 immatures	*Has* (10), *Min* (6), *Mia* (5), *Nir* (6), *Rek* (14), *Rum* (17), *Mil* (9), *Bel* (5), *Lar* (5), *Som* (18), *Sar* (8), *Jes* (7), *Ren* (20)
Japanese macaque group Ft	founded in 1970/1971, studied in Mar–Jul 2005	16 adult females, 6 adult males, 24 immatures	*Ame* (25), *Iwa* (11), *Kak* (8), Kin (15), Kam (5), Kur (9), *Mor* (22), Shi (10), Sha (8), *Tan* (24), *Tak* (17), *Tsu* (21), *Umi* (19), *Ume* (8), *Yam* (13), *Yuk* (21)
Crested macaque group Nr1	wild population, studied between Sept 2010 & Feb 2011	28 identifiable adult females	*Ani*, Adi, Bea, Bas, *Cin*, Dor, Ern, Fen, *Glo*, *Hel*, Isa, *Jos*, Kat, *Leo*, *Min*, *Nur*, Oli, Pol, Qut, *Ros*, *Sup*, *Tut*, Eli, Vod, Wi, Big, Yan, Zoe
Crested macaque group Npb	wild population, studied between Sept 2010 & Feb 2011	23 identifiable adult females	*Agn*, *Bia*, *Cic*, Dea, *Eva*, Fio, Geu, Her, Iye, Jan, *Kri*, Lid, Nao, Oma, *Ram*, *Ste*, *Jam*, Mal, Zor, Pap, Val, Tem, Upi

[1]Arlet ME, Jubin R, Masataka N, Lemasson A. 2015 Grooming-at-a-distance by exchanging calls in non-human primates. *Biol. Lett.* **11**, 20150711 – De Marco A, Rebout N, Massiot E, Sanna A, Sterck EHM, Langermans JAM, Cozzolino R, Thierry B, Lemasson A. 2019 Differential patterns of vocal similarity in tolerant and intolerant macaques. *Behaviour* **156**, 1–25 – Micheletta J, Engelhardt A, Matthews L, Agil M, Waller BM. 2013 Multicomponent and multimodal lipsmacking in crested macaques (*Macaca nigra*). *Am. J. Primatol.* **75**, 763–773 – Takahashi T, Higashino A, Takagi K, Kamanaka Y, Abe M, Morimoto M, Kang KH, Goto S, Suzuki J, Hamada Y, Kageyama T. 2006 Characterization of obesity in Japanese monkeys (*Macaca fuscata*) in a pedigreed colony. *J. Med. Primatol.* **35**, 30–37.

[2]Age at the beginning of data collection. The names of the sampled females are in italics.

[3]Individuals at least 5 years of age.

Table 2. Acoustic distances: results of linear discriminant analyses for pairwise distances between species in each social context.

Pairwise comparisons	Agonistic context		Affiliative context		Neutral context	
	distance	*p*	distance	*p*	distance	*p*
Japanese vs. rhesus macaque	718	0.001	85.7	0.077	211	< 0.001
Japanese vs. Tonkean macaque	206	0.167	247	< 0.001	106	0.025
Japanese vs. crested macaque	1006	< 0.001	669	< 0.001	565	< 0.001
rhesus vs. Tonkean macaque	513	< 0.001	161	0.033	105	< 0.001
rhesus vs. crested macaque	1727	< 0.001	584	< 0.001	776	< 0.001
Tonkean vs. crested macaque	1211	< 0.001	422	< 0.001	670	< 0.001

Table 3. Vocal diversity and flexibility: results of post-hoc pairwise comparisons between species in each social context.

Pairwise comparisons	Agonistic context				Affiliative context				Neutral context			
	estimate	*SE*	*t*	*p*	estimate	*SE*	*t*	*p*	estimate	*SE*	*t*	*p*
Vocal diversity: mean optimal number of clusters												
Japanese vs. rhesus macaque	+ 0.008	0.089	+ 0.09	0.999	- 0.483	0.089	- 5.41	< 0.001	- 0.710	0.080	- 8.88	< 0.001
Japanese vs. Tonkean macaque	- 0.344	0.082	- 4.19	< 0.001	- 0.666	0.086	- 7.71	< 0.001	- 0.435	0.084	- 5.17	< 0.001
Japanese vs. crested macaque	- 0.247	0.084	- 2.95	0.017	- 0.725	0.086	- 8.47	< 0.001	- 0.289	0.087	- 3.33	0.005
rhesus vs. Tonkean macaque	- 0.352	0.082	- 4.28	< 0.001	- 0.183	0.075	- 2.45	0.068	+ 0.275	0.070	+ 3.94	< 0.001
rhesus vs. crested macaque	- 0.255	0.084	- 3.04	0.013	- 0.242	0.074	- 3.28	0.006	+ 0.421	0.073	+ 5.78	< 0.001
Tonkean vs. crested macaque	+ 0.097	0.077	+ 1.26	0.586	- 0.059	0.070	- 0.84	0.835	+ 0.146	0.077	+ 1.89	0.232
Vocal flexibility: mean entropy value												
Japanese vs. rhesus macaque	+ 0.006	0.002	+ 4.02	< 0.001	+ 0.020	0.002	+ 8.78	< 0.001	- 0.008	0.001	- 6.30	< 0.001
Japanese vs. Tonkean macaque	- 0.097	0.002	- 61.4	< 0.001	- 0.034	0.002	- 14.8	< 0.001	+ 0.046	0.001	+ 36.1	< 0.001
Japanese vs. crested macaque	- 0.053	0.002	- 33.2	< 0.001	- 0.070	0.002	- 30.2	< 0.001	+ 0.010	0.001	+ 7.73	< 0.001
rhesus vs. Tonkean macaque	- 0.104	0.002	- 65.4	< 0.001	- 0.054	0.002	- 23.6	< 0.001	+ 0.054	0.001	+ 42.4	< 0.001
rhesus vs. crested macaque	- 0.059	0.002	- 37.3	< 0.001	- 0.090	0.002	- 39.0	< 0.001	+ 0.018	0.001	+ 14.0	< 0.001
Tonkean vs. crested macaque	+ 0.045	0.002	+ 28.2	< 0.001	- 0.036	0.002	- 15.4	< 0.001	- 0.036	0.001	- 28.4	< 0.001

Table 4. Distribution of call types per cluster for each species and social context.

Context and species	Cluster No[1]	Bark	Hard grunt	Scream	Screech	Rattle	Gecker	Chuckle	Growl	Girney	Soft grunt	Affiliat-ive call	Coo	Food call	Unclass-ified[2]
Agonistic context															
Japanese macaque	1	7	0	25	0	2	0	3	3	0	0	0	3	2	8
Japanese macaque	2	0	0	17	0	1	0	0	0	0	0	0	0	1	7
rhesus macaque	1	58	0	5	0	0	1	0	18	0	0	0	0	0	0
rhesus macaque	2	8	0	19	0	0	1	4	0	0	0	0	0	0	4
Tonkean macaque	1	1	8	9	3	1	3	9	0	0	2	0	1	0	14
Tonkean macaque	2	2	4	1	0	22	9	28	0	0	4	0	5	0	19
Tonkean macaque	3	5	12	7	11	13	3	29	0	0	5	0	10	0	30
crested macaque	1	0	5	1	0	5	4	42	0	0	0	0	1	0	13
crested macaque	2	3	8	38	0	2	0	13	0	0	1	0	2	0	13
crested macaque	3	0	2	38	0	1	0	4	0	0	0	0	0	0	5
Affiliative context															
Japanese macaque	1	0	0	0	0	0	0	0	10	15	1	0	29	0	4
Japanese macaque	2	0	0	0	0	0	0	0	2	4	0	0	26	2	1
rhesus macaque	1	0	0	0	0	0	0	0	2	1	0	0	0	0	1
rhesus macaque	2	0	0	0	0	0	0	0	1	0	0	0	0	3	0
rhesus macaque	3	0	0	0	0	0	0	0	40	5	0	3	1	0	2
Tonkean macaque	1	0	4	0	0	1	0	0	0	0	84	5	39	0	5
Tonkean macaque	2	0	2	2	0	0	0	0	0	2	14	0	2	0	0
Tonkean macaque	3	0	0	0	0	0	0	0	0	0	28	0	36	0	2
crested macaque	1	0	0	0	0	0	0	0	0	4	15	0	22	0	5
crested macaque	2	0	0	0	0	0	0	8	0	0	15	0	13	0	2
crested macaque	3	0	0	0	0	0	0	0	0	5	32	2	37	0	15
crested macaque	4	0	0	0	0	0	0	4	0	0	58	3	37	0	20
Neutral context															
Japanese macaque	1	0	0	0	0	0	0	0	0	6	0	0	121	73	0
Japanese macaque	2	0	0	6	0	0	0	0	0	0	0	0	15	34	0
rhesus macaque	1	7	0	0	0	0	0	0	130	0	0	10	6	0	2
rhesus macaque	2	9	0	1	0	0	0	0	12	0	0	0	31	38	1
rhesus macaque	3	0	0	0	0	0	0	0	0	0	0	0	35	5	0
rhesus macaque	4	25	0	0	0	0	1	0	52	0	0	0	51	41	4
Tonkean macaque	1	0	0	0	1	0	0	1	0	0	21	0	67	0	3
Tonkean macaque	2	0	0	2	0	1	0	9	0	0	9	0	1	0	2
Tonkean macaque	3	0	0	0	0	0	0	0	0	0	2	0	81	2	0
crested macaque	1	2	1	0	0	0	0	2	0	0	0	0	43	0	8
crested macaque	2	1	7	0	0	0	0	11	0	0	0	0	84	0	18
crested macaque	3	0	1	0	0	0	0	0	0	0	0	0	13	0	0

[1]Numbers correspond to the *n* different clusters identified by the clustering method.

[2]Calls that could not be assigned to recognized call types.

References on the call types recognized in macaques

Green S. 1975 Variation of vocal pattern with social situation in the Japanese monkey (*Macaca fuscata*): a field study. In: LA Rosenblum (ed), *Primate behavior: developments in field and laboratory research*, Vol 4. Academic Press, New York, NY, pp 1–102

Lewis SA. 1985 *The vocal repertoire of the Celebes black ape (Macaca nigra)*. PhD thesis, University of Georgia, Athens, GA

Lindburg DG. 1971 The rhesus monkey in North India: an ecological and behavioral study. In LA Rosenblum (ed), *Primate behavior: developments in field* and laboratory research, Vol 2. Academic Press, New York, NY, pp 1–106

Masataka N, Thierry B. 1993 Vocal communication of Tonkean macaques in confined environments. *Primates* **34**, 169–182

Panggur MR. 2013 *Vocal communication of wild crested macaques (Macaca nigra).* MS thesis, Bogor Agriculture, Bogor University.

Peters EH. 1983 *Vocal communication in an introduced colony of feral rhesus monkeys (Macaca mulatta).* PhD thesis, University of Florida, Gainesville, FL

Rowell TE, Hinde RA. 1962 Vocal communication by the rhesus monkey (*Macaca mulatta*). *Proc. Zool. Soc. Lond.* **138**, 279–294.