Supplementary Materials for

Kin-based cultural transmission of tool use in wild chimpanzees

Noemie Lamon, Christof Neumann, Thibaud Gruber, Klaus Zuberbühler

The PDF file includes:

- table S1. Results of the generalized linear mixed model in the field experiment, with individual NT included as a potential demonstrator for moss-sponging.
- table S2. Results of the generalized linear mixed model in the field experiment, with individual NT included as a potential demonstrator for leaf-sponging (that is, if her moss-sponging event during an unrelated experiment is not taken into account).
- table S3. Individuals with a known sponging technique and their affiliation.
- fig. S1. General view of the clay pit located between the exposed roots of two adjacent trees (*Cynometra alexandri* and *Mimusops bagshawei*) consisting of two cavities.
- fig. S2. Closeup view of the two cavities.
- fig. S3. Histogram of parameter estimates for the factor moss-sponger in matriline.
- fig. S4. Histogram of parameter estimates for the factor average association with moss-spongers.
- Legends for movies S1 and S2

Other Supplementary Material for this manuscript includes the following:
(available at advances.sciencemag.org/cgi/content/full/3/4/e1602750/DC1)

- movie S1 (.mp4 format). Manufacture of a moss-sponge.
- movie S2 (.mp4 format). Manufacture of a moss-sponge and a leaf-sponge.

SUPPLEMENTARY MATERIALS

table S1. Results of the generalized linear mixed model in the field experiment, with individual NT included as a potential demonstrator for moss-sponging.

Fixed effects (predictors)	β	Std. Error	z-value	p-value
Intercept	-2.214	0.120	-18.469	0.000
Potential demonstrator technique	-0.055	0.098	-	-
Association index	-0.008	0.012	-	-
Moss-sponger in family	1.346	0.105	12.793	0.000
Subject age*	0.196	0.045	4.340	0.000
Subject sex*	-0.875	0.138	-6.327	0.000
Interaction potential demonstrator technique x association index	-0.027	0.093	-0.290	0.772

The null model against which the full model was tested included the random effects and the control predictors subject age and sex: likelihood ratio test, $\chi^2 = 242.64$, df = 4, p = 0.000. Control predictors are marked with *. Z and p values for main effects comprised in interactions are omitted.

table S2. Results of the generalized linear mixed model in the field experiment, with individual NT included as a potential demonstrator for leaf-sponging (that is, if her moss-sponging event during an unrelated experiment is not taken into account).

Fixed effects (predictors)	β	Std. Error	z-value	p-value
Intercept	-2.210	0.118	-18.665	0.000
Potential demonstrator technique	-0.065	0.097	-	-
Association index	-0.008	0.070	-	-
Moss-sponger in family	1.346	0.105	12.795	0.000
Subject age*	0.196	0.045	4.340	0.000
Subject sex*	-0.875	0.138	-6.331	0.000
Interaction potential demonstrator technique x association index	-0.028	0.092	-0.302	0.763

The null model against which the full model was tested included the random effects and the control predictors subject age and sex: likelihood ratio test, $\chi^2 = 242.78$, df = 4, p = 0.000. Control predictors are marked with *. Z and p values for main effects comprised in interactions are omitted.

table S3. Individuals with a known sponging technique and their affiliation.

| ID	Sex	Mother	Father	Sponging technique
KI	f	KG	BK	Moss
RM	f	RH	BK	Leaf
AN	f	NA	CH	Leaf
PS	m	PL	CH	Moss
MI	f	MK	DN	Moss
RS	f	RH	DN	Moss
HW	m	HT	JM	Moss
HL	f	HT	JM	Moss
MS	m	NB	MG	Leaf
NK	m	RH	MG	Moss
ZG	m	ZM	MG	Leaf
HR	f	HT	NK	Moss
HY	f	HT	NK	Moss
KH	f	KU	NK	Moss
KB	f	KW	NK	Moss
MB	m	ML	NK	Leaf
JS	m	JN	ZF	Moss
KC	m	KL	ZF	Leaf
KP	f	KG	ZF	Leaf
RF	f	RH	ZF	Moss
ZD	m	ZN	ZF	Leaf

NA means data not available

fig. S1. General view of the clay pit located between the exposed roots of two adjacent trees (*Cynometra alexandri* and *Mimusops bagshawei*) consisting of two cavities. The red arrows show the two water-filled cavities in which the chimpanzees sponge to get the mineral-rich water. Photo credit: Noemie Lamon, University of Neuchâtel, Department of Comparative Cognition, Neuchâtel, Switzerland.

fig. S2. Closeup view of the two cavities. I) shows the cavity on the left on fig. S1a, including the obstructing roots, which prevent chimpanzees from drinking directly from the hole. **II**) shows the cavity on the right on fig. S1a, with less obstructing roots allowing direct drinking. The grey colour of the soil results from the high concentration of clay it contains. The clay minerals are dissolved in the water, increasing considerably the mineral content of the water[2] consumed by the chimpanzees. Photo credit: Noemie Lamon, University of Neuchâtel, Department of Comparative Cognition, Neuchâtel, Switzerland.
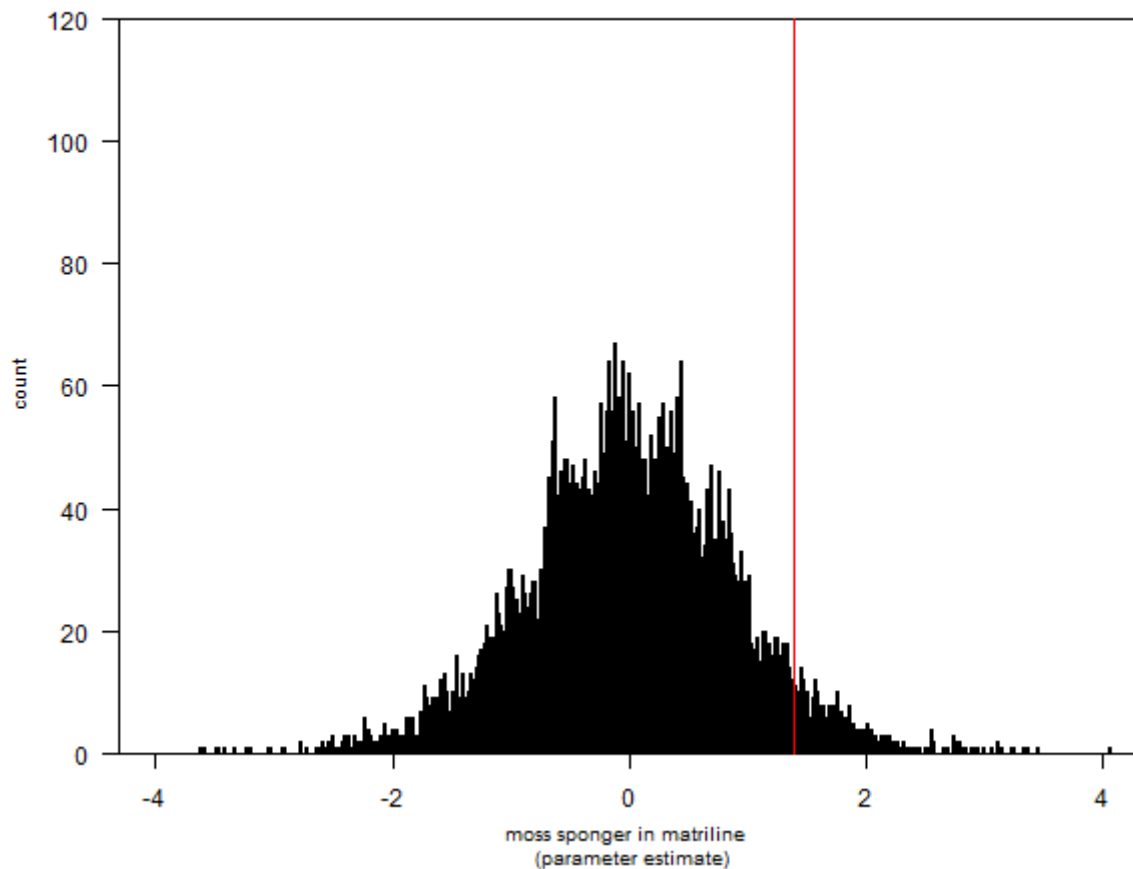
fig. S3. Histogram of parameter estimates for the factor moss-sponger in matriline. The histogram consists of 10,000 parameter estimates from models where the distribution of leaf-spongers and moss-spongers was randomized. The red line represents the observed estimate calculated from the observed distribution of leaf-spongers and moss-spongers in the group (1.38), which is larger than expected by chance (p = 0.048). Photo credit: Noemie Lamon, University of Neuchâtel, Department of Comparative Cognition, Neuchâtel, Switzerland.
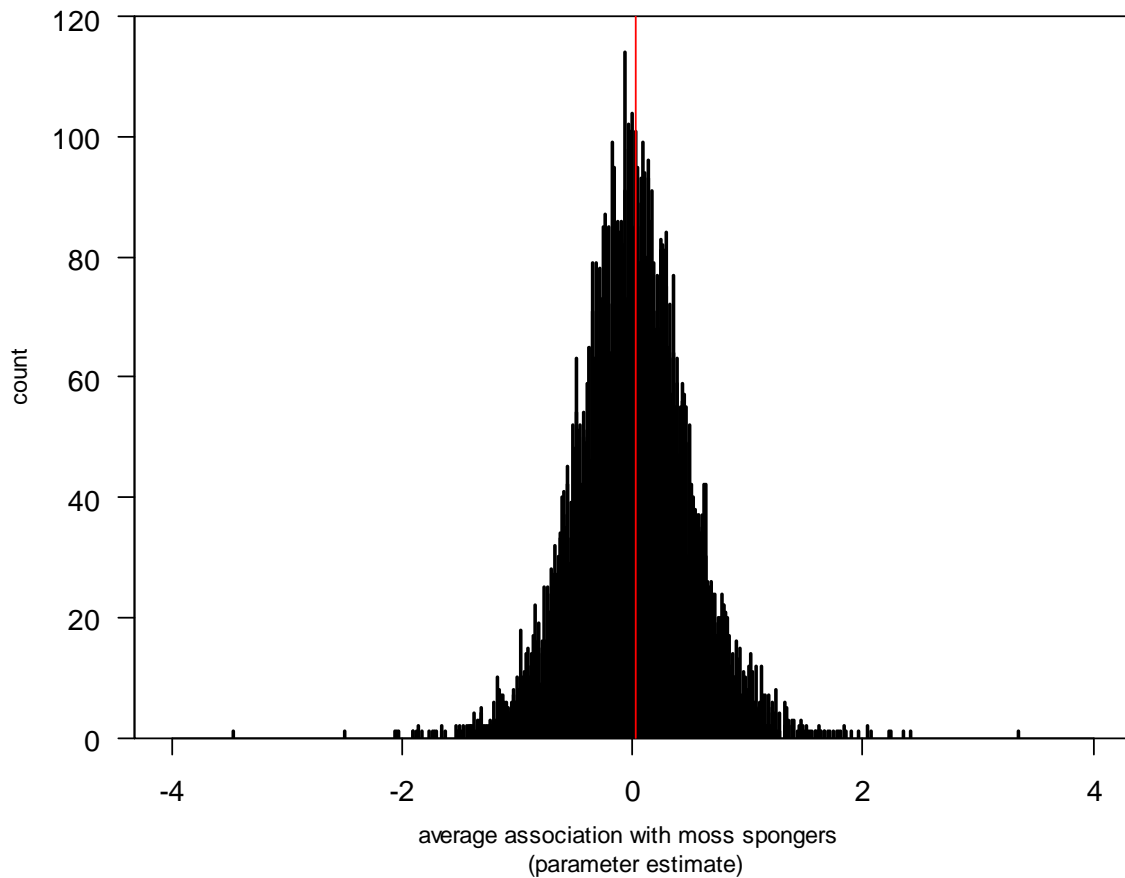
fig. S4. Histogram of parameter estimates for the factor average association with moss-spongers. The histogram consists of 10,000 parameter estimates from models where the distribution of leaf-spongers and moss-spongers was randomized. The red line represents the observed estimate calculated from the observed distribution of leaf-spongers and moss-spongers in the group (0.022), which is not different from what would be expected by chance (p=0.4940). Photo credit: Noemie Lamon, University of Neuchâtel, Department of Comparative Cognition, Neuchâtel, Switzerland.

movie S1. Manufacture of a moss-sponge. MK gathers some provided moss placed in a tree and manufactures a moss-sponge in her mouth before spontaneously giving it to her daughter MI. This video illustrates one of the possible underlying processes at play during kin-biased transmission, namely the transfer of tool to a potential naïve individual.

movie S2. Manufacture of a moss-sponge and a leaf-sponge. HT walks few meters to pick moss hanging in the tree and manufactures a moss-sponge in her mouth. Her daughter, HR, decides to pick leaves and manufactures a leaf-sponge in her mouth.