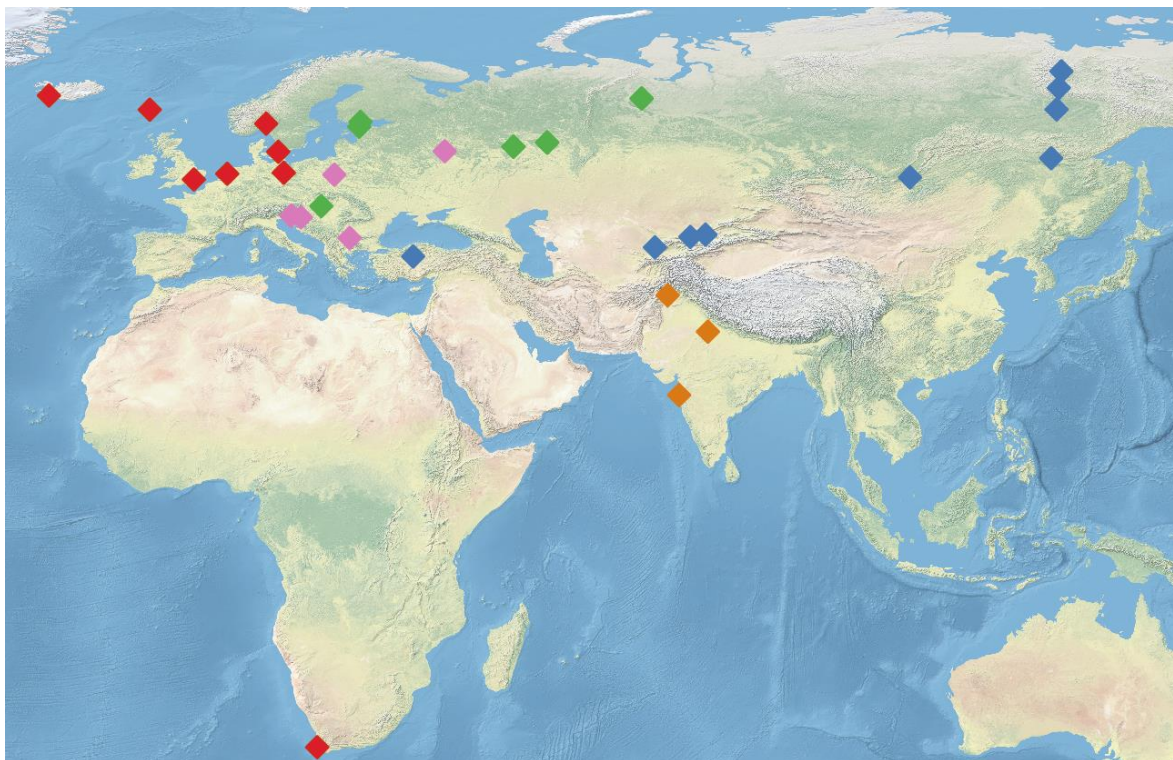
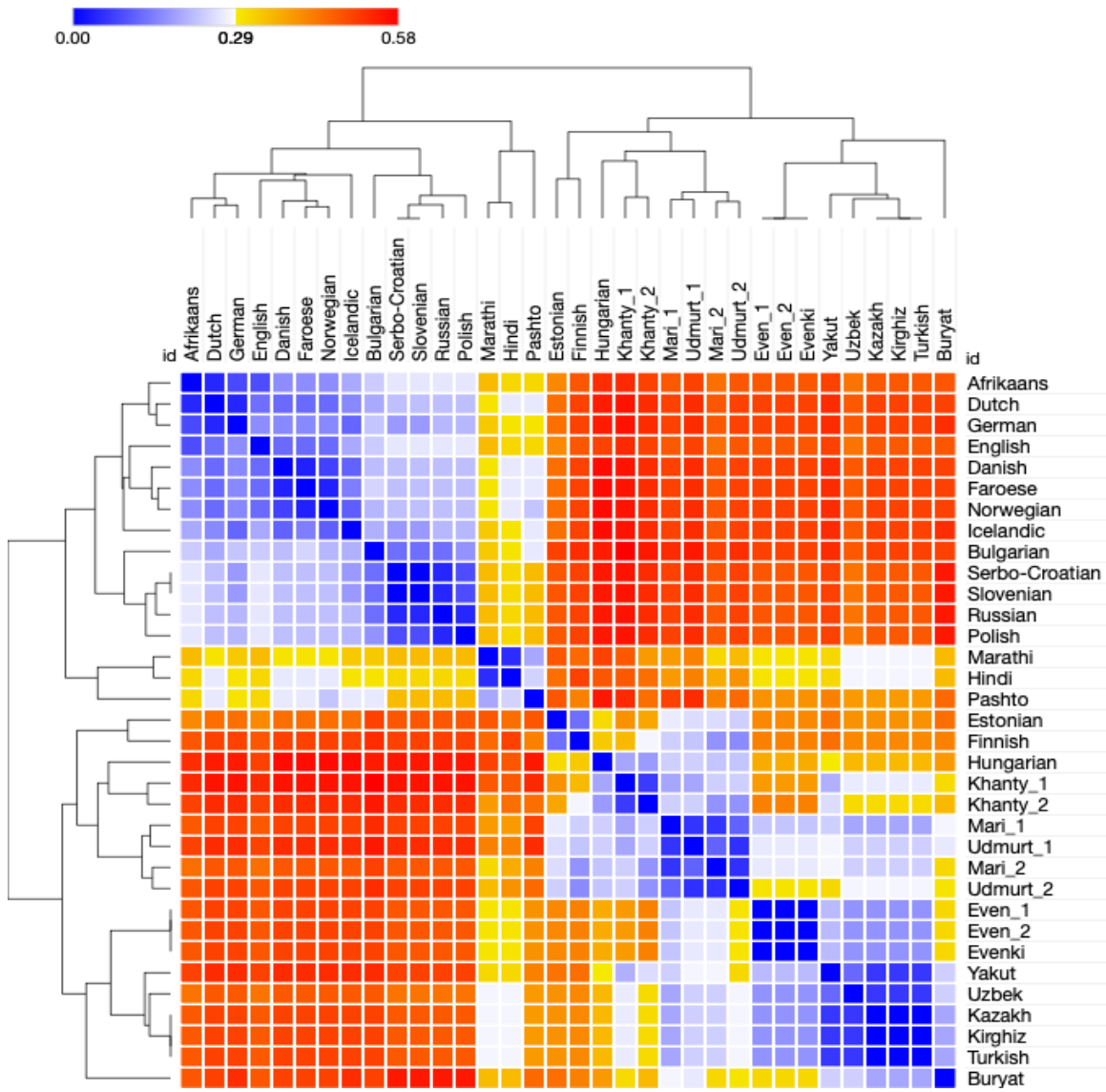
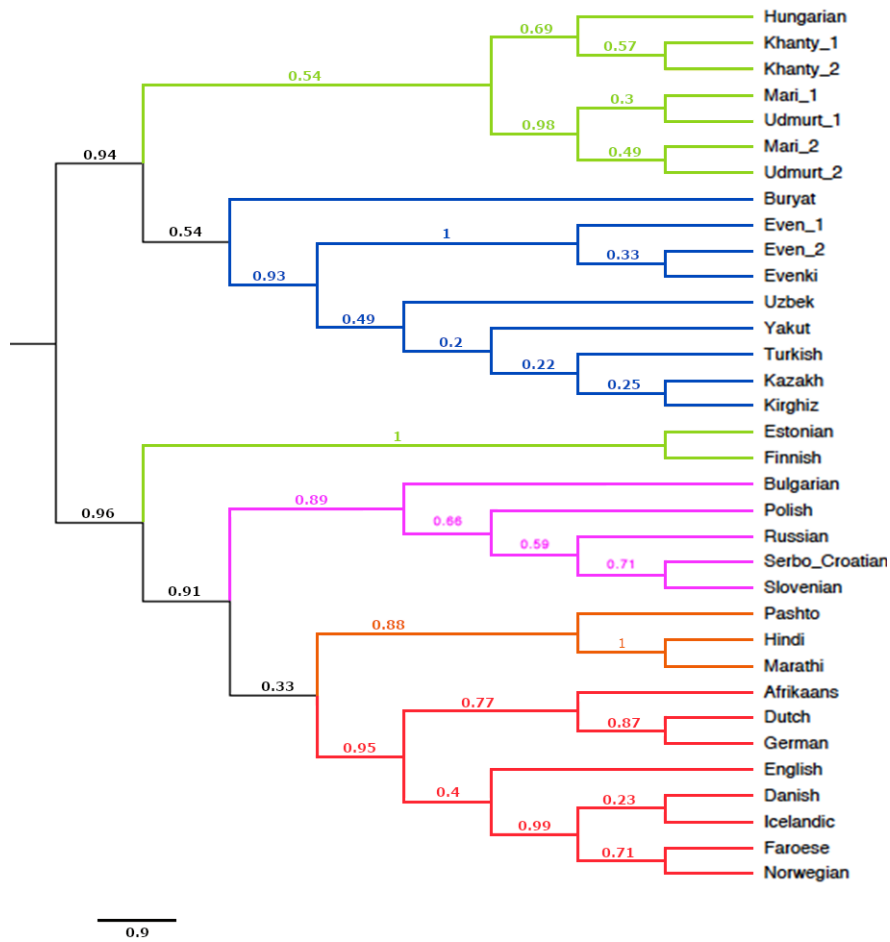


Supplementary Material.

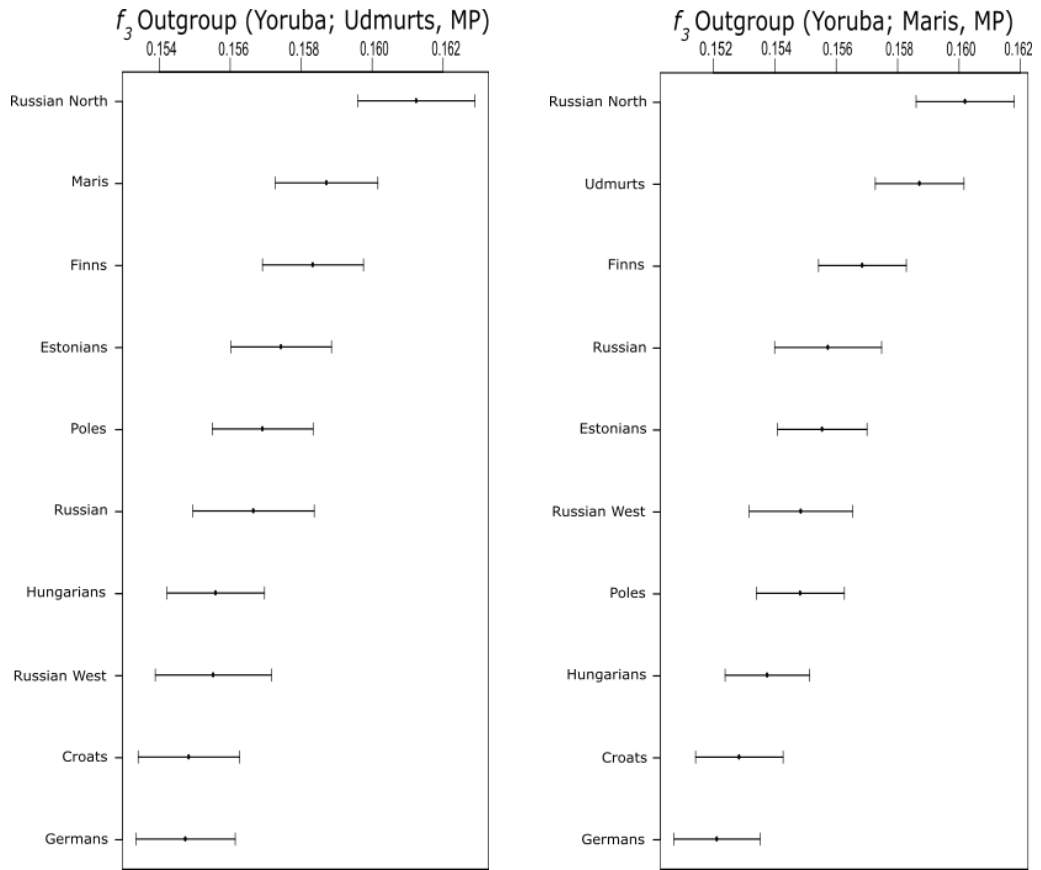
Supplementary Figure S1. Approximate geographical location of the 34 languages considered. Thirty-one geographical points; three FU languages, Mari, Udmurt and Khanty, are represented each by two diastatic variants spoken in the same location. Language groups coded as follows: Finno-Ugric (green); Altaic (blue); Germanic (red); Slavic (pink); Indo-Iranian (orange).



Supplementary Figure S3. Heatmap from the syntactic distances. Dark red represents maximum distance, dark blue minimum distance.



Supplementary Figure S4. Bayesian phylogeny (BEAST) from the syntactic dataset. Numbers on the nodes represent the posterior probability. Orange=Indo-Iranian IE, pink=Slavic IE, red=Germanic IE, Blue=AL, Green=FU.



Supplementary Figure S5. Outgroup f_3 -statistics analysis. Shared genetic drift between modern Pontic steppes populations and modern European populations (MP).

Supplementary Table S1. Whole-genome samples collected for the populations under study.

Sample Size	Sample ID	Populations	Country	Region	Coverage	Language Family	Reference
3	Est1, Est2, Est3	Estonian	Estonia	Europe	>40	Uralic	Pagani <i>et al.</i> 2016
3	Fin1, Fin2, Fin3	Finnish	Finland	Europe	>40	Uralic	Pagani <i>et al.</i> 2016
3	Rus1, RusPi1, RusPs2	Russian (North and West)	Russia	Europe	>40	Indo-European	Pagani <i>et al.</i> 2016
3	Pole1, Pole2, Pole3	Polish	Poland	Europe	>40	Indo-European	Pagani <i>et al.</i> 2016
3	Hun1, Hun2, Hun4	Hungarian	Hungary	Europe	>40	Uralic	Pagani <i>et al.</i> 2016
3	Ger1, Ger2, Ger3	German	Germany	Europe	>40	Indo-European	Pagani <i>et al.</i> 2016
3	croat11, croat13, croat12	Croatian	Bosnia-Herzegovina	Europe	>40	Indo-European	Pagani <i>et al.</i> 2016
3	Iran1, Iran2, Iran3	Iranian (Farsi)	Iran	West Asia	>40	Indo-European	Pagani <i>et al.</i> 2016
3	Mari1, Mari2, Mari3	Mari	Russia	Europe	>40	Uralic	Pagani <i>et al.</i> 2016
3	Udmrd1, Udmrd2, Udmrd3	Udmurt	Russia	Europe	>40	Uralic	Pagani <i>et al.</i> 2016
3	Khant1, Khant2, Khant3	Khanty	Russia	Siberia	>40	Uralic	Pagani <i>et al.</i> 2016
3	Evk2, Evk14, Evk16	Evenki	Russia	Siberia	>40	Altaic	Pagani <i>et al.</i> 2016
3	Bur2, Bur6, Bur11	Buryat	Russia	Siberia	>40	Altaic	Pagani <i>et al.</i> 2016
3	YakS4, YakK1, YakK3	Yakut	Russia	Siberia	>40	Altaic	Pagani <i>et al.</i> 2016
3	EvenM1, EvenM2, EvenM3	Even	Russia	Siberia	>40	Altaic	Pagani <i>et al.</i> 2016

Note: the three Russian individuals come from three different subsets.

Supplementary Table S2. Ancient DNA samples used in this study.

Sample ID	Archaeological Culture	Date	Country	Region	Contributor
I1100	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1102	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1099	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1103	Anatolia_Neolithic	6400-5600 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1101	Anatolia_Neolithic	6400-5600 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1097	Anatolia_Neolithic	6400-5600 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0744	Anatolia_Neolithic	6400-5600 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1579	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1581	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1096	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1580	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1098	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1585	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0708	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0745	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0746	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I1583	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0707	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0709	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0725	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0727	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0724	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0736	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0723	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015

I0726	Anatolia_Neolithic	6500-6200 calBCE	Turkey	Barcın	Mathieson <i>et al.</i> 2015
I0231	Yamnaya	2910-2875 calBCE	Russia	Ekaterinovka, Southern Steppe, Samara	Haak <i>et al.</i> 2015
I0357	Yamnaya	3090-2910 calBCE	Russia	Lopatino I, Sok River, Samara	Haak <i>et al.</i> 2015
I0370	Yamnaya	3500-2700 calBCE	Russia	Ishkinovka I, Eastern Orenburg, Pre-Ural steppe, Samara	Haak <i>et al.</i> 2015
I0429	Yamnaya	3339-2917 calBCE	Russia	Lopatino I, Sok River, Samara	Haak <i>et al.</i> 2015
I0438	Yamnaya	3021-2635 calBCE	Russia	Luzkhi I, Samara River, Samara	Haak <i>et al.</i> 2015
I0439	Yamnaya	3305-2925 calBCE	Russia	Lopatino I, Sok River, Samara	Haak <i>et al.</i> 2015
I0441	Yamnaya	3010-2622 calBCE	Russia	Kurmanaevka III, Buzuluk, Samara	Haak <i>et al.</i> 2015
I0443	Yamnaya	3335-2912 calBCE	Russia	Grachevka II, Sok_River, Samara	Haak <i>et al.</i> 2015
I0444	Yamnaya	3335-2881 calBCE	Russia	Kutuluk I, Kutuluk River, Samara	Haak <i>et al.</i> 2015
RISE386	Sintashta	2298-2045 calBCE	Russia	Bulanovo	Allentoft <i>et al.</i> 2015
RISE391	Sintashta	2120-1887 calBCE	Kazakhstan	Tanabergen II	Allentoft <i>et al.</i> 2015
RISE392	Sintashta	2126-1896 calBCE	Russia	Stepnoe VII	Allentoft <i>et al.</i> 2015
RISE394	Sintashta	1949-1754 calBCE	Russia	Bulanovo	Allentoft <i>et al.</i> 2015
RISE395	Sintashta	1960-1756 calBCE	Russia	Bol'shekaraganskii	Allentoft <i>et al.</i> 2015

Supplementary Table S3. Human Origins data on present-day humans used in this study.

Sample ID	Population	Country	Region	Contributor
Nov_005	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00514	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00513	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00509	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00512	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00504	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00507	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00511	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00510	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00508	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
ADR00515	Nganasan	Russia	Central Asia Siberia	Lazaridis <i>et al.</i> 2014
HGDP00774	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00775	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00776	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00777	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00779	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00780	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00781	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00782	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00783	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00784	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00785	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00786	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00811	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00812	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00813	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00814	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00815	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00817	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00818	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00819	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00820	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00821	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00822	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00971	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00972	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00973	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00974	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00975	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00976	Han	China	East Asia	Patterson <i>et al.</i> 2012

HGDP00977	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP01021	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP01023	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP01024	Han	China	East Asia	Patterson <i>et al.</i> 2012
HGDP00449	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00462	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00463	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00467	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00474	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00476	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00478	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00982	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00984	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP01081	Mbuti	Congo	Africa	Patterson <i>et al.</i> 2012
HGDP00995	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP00999	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01001	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01003	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01006	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01010	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01012	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01013	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01014	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01015	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01018	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
HGDP01019	Karitiana	Brazil	America	Patterson <i>et al.</i> 2012
U15	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U131	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U165	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U16	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U133	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U171	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U110	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U143	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U172	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U144	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U174	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U119	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U124	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U159	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U156	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U155	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
U116	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov

UI69	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
UI1	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
UI36	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
UI25	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
UI52	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
UI70	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
UI51	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
UI39	Ulchi	Russia	Central Asia Siberia	Rem Sukernik / Stanislav Dryomov
mixe0029	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0030	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0015	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0035	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0018	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0026	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0027	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0028	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0007	Mixe	Mexico	America	William Klitz / Cheryl Winkle
mixe0009	Mixe	Mexico	America	William Klitz / Cheryl Winkle

Supplementary Table S4. Statistics of the *qpAdm* models.

Test	Outgroup set	Nganasan	Yamnaya	Anatolia	chi-square
Khanty	Han, Mbuti, Karitiana, Ulchi and Mixe	0.521	0.479	0	10.056
Maris	Han, Mbuti, Karitiana, Ulchi and Mixe	0.281	0.465	0.254	10.493
Udmurts	Han, Mbuti, Karitiana, Ulchi and Mixe	0.261	0.611	0.128	9.032
Iranians	Han, Mbuti, Karitiana, Ulchi and Mixe	0.016	0.141	0.843	7.053
Finns	Han, Mbuti, Karitiana, Ulchi and Mixe	0.101	0.589	0.31	6.623
Estonians	Han, Mbuti, Karitiana, Ulchi and Mixe	0.04	0.568	0.391	8.095
Hungarians	Han, Mbuti, Karitiana, Ulchi and Mixe	0.032	0.412	0.556	8.398
Russian North	Han, Mbuti, Karitiana, Ulchi and Mixe	0.144	0.571	0.284	2.255
Russian	Han, Mbuti, Karitiana, Ulchi and Mixe	0.042	0.517	0.441	5.389
Russian West	Han, Mbuti, Karitiana, Ulchi and Mixe	0.035	0.526	0.440	0.819
Croats	Han, Mbuti, Karitiana, Ulchi and Mixe	0.042	0.303	0.655	4.373
Germans	Han, Mbuti, Karitiana, Ulchi and Mixe	0.027	0.373	0.6	5.999
Poles	Han, Mbuti, Karitiana, Ulchi and Mixe	0.023	0.561	0.416	2.634

