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# Supporting Online Material for

## Phonemic Diversity Supports Serial Founder Effect Model of Language Expansion from Africa

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## 1. Materials and Methods

### *1.1 Language Data*

Data on phoneme inventory size were taken from the *World Atlas of Language Structures* (WALS - available online at http://www.wals.info/) (*S1*-*S4*) together with information on each language's taxonomic affiliation (family, subfamily and genus) and geographic location (longitude and latitude). WALS contains information on three elements of phonemic diversity – vowel (*S2*), consonant (*S3*) and tone (*S4*) diversity – in a total of 567 languages. Due to uncertainty in ascertaining exact inventory counts across languages, the WALS data are binned into ranges for vowel (small [2-4], medium [5-6], large [7-14]), consonant (small [6-14], moderately small [15-18], average [19-25], moderately large [26-33], large [34+]) and tone (no tone, simple tone and complex tone) diversity. Uncertainty associated with these diversity assignments is only expected to weaken any clinal relationship with geography. WALS values for the three items were standardized (subtracting the mean value and then dividing the difference by the standard deviation) so that they were on comparable scales (mean = 0, standard deviation = 1). The standardized scores were then averaged to produce a measure of total phonemic diversity in each language (Table S1).

Since population demography is thought to affect phonemic diversity, WALS data were combined with estimates of speaker population size and geographic distribution as recorded in Ethnologue (*S5*), using ISO-639-3 reference codes listed for each language in the WALS dataset and checking references by hand. Language area ($km^2$) was calculated based on digitized language maps (available from Global Mapping International http://www.gmi.org) under a Robinson projection using the ArcGIS v9.1 software package. Population density was calculated as the number of speakers divided by language area. As population size, language area and population density were all positively skewed, $\log_{10}$ of these values was used as the predictor variable for the reported regressions.

Any language listed as a creole or sign language was excluded from analysis, as were all extinct languages (with population zero), leaving a total sample size of 504 languages (Table S1). Raising the population size threshold to exclude endangered languages with population sizes of less than 50 did not appreciably change the results presented in the paper.

*1.2 Modelling a serial founder effect*

A serial founder effect model of phonemic diversity was used to infer the most likely origin of modern languages, following an approach outlined in studies of human genetic and phenotypic diversity (*S6*). Under this model, during population expansion, small founder groups are expected to carry less phonemic diversity than their larger parent populations. A series of founder events should produce a gradient of decreasing phonemic diversity with increasing distance from the origin. Hence, the point of language origin is predicted to show the strongest negative correlation between phonemic diversity and distance from the origin. This approach does not attempt to infer particular phylogenetic relationships between languages, nor does it require that the probability of encountering a particular phoneme changes with distance from the origin (although it might), only that on average phonemic diversity in languages will decline.

A series of multiple regressions using distance from the origin to predict phonemic diversity were carried out in *R* (*S7*) for 2560 potential origin locations around the globe, corresponding to the locations of all the languages in the WALS database. This sampling strategy covers the entire range of human colonization, with the advantage that areas that were not colonized (e.g. oceans, deserts and the poles) are not sampled and resolution is higher in more heavily populated areas. Since $\log_{10}$ of population size was found to be an important predictor of phonemic diversity (*S8*), to control for regional variation in speaker population size, unless otherwise stated, log population size was also included as a predictor in the regressions reported.

Great circle distances (following the curvature of the earth) between the putative origins and each of the 504 languages for which there was phoneme information were calculated using the Haversine function (*S9*). So that the distances used more

accurately represented plausible migration scenarios (e.g. excluding the possibility of crossing the Indian Ocean or traversing the poles), any distances between continents were constrained to pass through a set of five key waypoints (*S10*), corresponding to approximate migration corridors between continents (Table S4; Figure S8).

To identify the set of putative origin locations that best fit the observed distribution of phonemic diversity under a serial founder effect model, model fit was evaluated using the Bayesian Information Criterion (BIC) (*S11*). Following the genetic studies (*S6*), models within four BIC units of the best fit model were taken to have "considerable support" (*S11*) and this threshold was used to infer the most likely region of language origin.

*1.3 Alternatives to the single origin model*

To investigate the possibility of multiple language origins, distance from a second origin location was added as a predictor to the model incorporating population size and distance from the best-fit origin in Africa. Any second language origin that has contributed significantly to extant phonemic diversity should produce a cline in residual phonemic diversity after correcting for population size and distance from the best-fit origin in Africa. As above, model fit was evaluated using BIC.

Even under language monogenesis, it is possible that the observed global cline in phonemic diversity is the result of expansions following the last glacial maximum (LGM) into northern Eurasia, the Americas and the remote Pacific, rather than a single expansion from Africa. To test this explanation, the 504 languages in the WALS sample were categorized according to whether they are located in areas likely to have been colonized (or recolonized) after the LGM. This included Eurasia north of 40 degrees latitude (*S12*), all of the Americas and all islands in the Pacific and Indian Ocean first settled during the Austronesian expansion (Table S1). These more recently colonized regions have lower average phonemic diversity than the rest of the world ($t=-6.597$, $df=503$, $p<0.001$). To test whether this can explain the global cline in phonemic diversity from Africa, colonization after the LGM was added as a binary factor to a regression incorporating population size and distance from Africa - only population size and distance from Africa were significant predictors ($r_{distance}=-0.401$,

$p<0.001$; $r_{population}=0.152$, $p=0.001$; $r_{LGM}=0.032$, $p=0.419$). Population size and distance from Africa are also significant predictors of phonemic diversity in a regression with areas colonized after the LGM excluded ($r_{distance}=-0.511$, $p<0.001$; $r_{population}=0.253$, $p<0.001$). Distance from Africa remains a significant predictor in the family level analysis ($r_{distance}=-0.328$, $p<0.028$) and hierarchical linear model ($\beta_{distance}=-3.872 - -2.525 \times 10^{-5}$ [95% HPD], $p<0.001$).

*1.4 Accounting for non-independence within language families*

Following studies examining the founder effect in human genetic and phenotypic diversity (*S6*), the initial analyses were carried out using linear regressions. However, like our genes, languages contain a legacy of their evolutionary past. Failure to allow for such phylogenetic non-independence can lead to overestimating degrees of freedom and an increase in type I errors (*S13*). The issue of non-independence between related languages was dealt with in three ways. First, analyses were repeated at the language family level, taking means of the variables of interest across all 50 families comprising more than one language (Table S2). For those variables that had been logged, the mean of the logged value was used. Distances were calculated from each putative origin to the centroid location of each language family. Model fit was evaluated using *BIC*. This approach reduces degrees of freedom by only considering variation between language families, weighting each language family equally.

Second, WALS classifies languages at three taxonomic levels – family, sub-family and genus. The effect sizes observed here on the global sample of languages mean we do not expect to reliably detect a serial founder effect separately within each of the language families in WALS. Instead, the initial individual language analyses were repeated on the full data set using a hierarchical linear regression framework to model dependencies at each taxonomic level. This approach applies a variance structure to the data that accounts for relatedness between languages at each level. Analyses were carried out in *R* (*S7*) using the *lmer* function in the *lme4* package (*S14*). P values and credibility intervals on model coefficients ($\beta$) were estimated using Markov Chain Monte Carlo sampling implemented in the *pvals.fnc* function as part of the *LanguageR* package (*S15*). Reported model fit was evaluated using BIC, although the

same results applied using residual maximum likelihood (REML) (*S16*). Models relating phonemic diversity to population size and distance from the best-fit origin in Africa (together and separately) were run with and without interaction effects across family groups. Adding an interaction effect did not significantly improve model fit as measured by BIC and REML, indicating that the patterns reported here reflect consistent trends within families that hold across the globe.

Finally, as in ref. (*S6*), the founder effect regressions were repeated with Mantel and partial Mantel tests, an approach to investigating correlations between distance matrices that uses a permutation test to avoid assumptions about the independence of data points and the statistical distributions underlying variables. Mantel tests were carried out on the full language dataset in *Arlequin 3.1* (*S17*), using differences in distance from the origin and log population size to predict differences in phonemic diversity. The results from the Mantel tests were in line with results obtained under the linear models and are reported in Table S3.

*1.5 Controlling for modern demography*

To control for possible geographic variation in demography, in addition to speaker population size, I examined the effect of three other demographic factors that could plausibly influence phonemic diversity - geographic area ($km^2$), population density (speaker population per $km^2$) and local language diversity (languages within a fixed radius). Geographic area and population density may influence the diversification of languages into dialect groups with different phoneme inventories. Population density may also be a proxy for effective population size – the number of speakers an individual actually comes into contact with. Local language density gives an indication of the number of other languages that speakers of the target language are exposed to and so may affect rates of borrowing of phonemes. Local language diversity was calculated based on the total number of languages listed within a 500km, 1000km, 2000km and 3000km radius of each of the 504 sampled languages. The number of languages within 1000km showed the strongest correlation with phonemic diversity and was used to generate the reported results.

First, all of the demographic variables were included in a regression predicting phonemic diversity together with speaker population size and distance from the best-fit origin in Africa. Second, a combination of forwards and backwards stepwise regression based on BIC, as implemented in the *step* function in *R* (*S7*), was used to identify the key predictors of phoneme inventory size at the individual language and language-family levels. At the individual language level, the best model includes distance from Africa ($r_{distance}$=-0.429, p<0.001), log of population size ($r_{population}$=0.181, p<0.001) and geographic area ($r_{area}$=-0.107, p=0.016). At the family level, the best model includes distance from Africa ($r_{distance}$=-0.401, p<0.001) and log of population size ($r_{population}$=0.300, p<0.036).

*1.6 Variation in phonemic diversity within and between language families*

Claims about the deep history of human language are frequently criticized because languages are thought to change too rapidly and too unpredictably to allow ancestral inferences beyond ~10kya (*S18*). However, recent work has shown that elements of language, such as commonly used words (*S19*) and some phonemes (*S20*) can be highly stable, some persisting for tens of millennia (*S19*). Variation in phoneme inventory size within versus between families gives insight into rates of change in phonemic diversity through time. If phonemic diversity were highly unstable, variation within families should be high, and language family should explain little or none of the variance in phonemic diversity around the globe. Conversely, relative stability should preserve phoneme inventory size across a family, making language family a good predictor of phonemic diversity globally. In a general linear model, language family as a factor explains 50% of the variance in phonemic diversity (adjusted r-squared=0.502, df=49, p<0.001) and 48% of the variance in phonemic diversity across the largest 10 families (adjusted r-squared=0.476, df=9, p<0.001). This level of conservation within major language families indicates that robust statistical patterns in global phonemic diversity can persist for many millennia and could plausibly reflect a time scale on the order of the African exodus.

## 2. Supplementary Description and Discussion

### *2.1 Phonemic diversity and the serial founder effect*

We expect the number of phonemes present in a language today to reflect past phoneme inventory size, combined with complex group dynamic processes driving relative rates of merging, splitting and borrowing of phonemes (*S21- S24*). Many factors are likely to influence the rates at which these processes occur (*S23, S24*), and their relative rates will determine the trajectory of phonemic diversity in a language through time.

In population genetics, the founder effect describes the loss of genetic diversity that occurs when a small group breaks off from a larger parent population to found a new population. This occurs when variants from the parent population are not passed on to the new descendent population or are lost during the subsequent population bottleneck due to high rates of drift. Following a bottleneck, genetic diversity will increase again as mutation and migration introduce new variants into the growing population. The same scenario can apply to phonemic diversity if founder populations sometimes sample only a subset of phonemes from the parent population (e.g., from a dialect of the parent language) or are likely to lose phonemes during the subsequent population bottleneck. Splitting and borrowing may still generate new phonemes, but as in the genetic case, the balance will have been temporarily shifted toward diversity loss.

The loss of phonemic diversity following a population bottleneck is predicted under a range of cultural transmission models (*S21, S25- S29*). This effect is expected to operate on top of any immediate reduction of phonemic diversity due to sampling only part of the dialect variation from the parent population. For example, Henrich (*S25*) uses the Price equation (*S30, S31*) and social learning literature to derive a model of cultural transmission in which learners preferentially copy cultural variants from the most prestigious or skilful individuals. When copying is highly accurate this will produce an ever-increasing cultural repertoire. However, if copying involves error, such that some elements are lost in transmission between individuals, then, across a range of parameter values, smaller groups tend to have fewer cultural variants. Although applied in the context of the cumulative evolution of material

culture, Henrich makes explicit the model's relevance to the evolution of other socially transmitted traits, including phonemes - where individuals copy phoneme distinctions made by the most proficient speakers (with some loss), small population size will reduce phoneme diversity. De Boer (*S26, S27*) models the evolution of vowel inventories using a different approach, in which individuals copy any members of their group with some error, and finds the same population size effect. A linguistic founder effect also emerges naturally from recent Darwinian approaches to language change, which treat phonemic variants like competing alleles in a population of utterances (*S21, S29*). Communication constraints may play an additional role. Increased shared information in small close-knit communities is thought to increase the tolerance for reduced contrastive possibilities associated with smaller phoneme inventories (*S28*). Simulations of language evolution also predict that rates of change will be faster in small populations, slowing as populations grow (*S32*), which may act to preserve the effects of any historical bottlenecks[1].

The analyses presented here (Fig. S1) and previous research using a different data set and coding scheme (*S8*) confirm that languages with smaller speaker populations do indeed have smaller phoneme inventories, consistent with a linguistic founder effect. Empirical findings now also support the existence of a cultural founder effect in modern human material culture (*S25, S33*), Acheulean handaxes (*S34*), Polynesian canoe designs (*S35*) and chaffinch song (*S36*). Recent phylogenetic evidence suggests a linguistic founder effect has operated to produce punctuated bursts of evolution during the formation of new languages (*S37*).

One prediction that arises if phoneme distinctions are more likely to be lost in small founder populations is that a succession of founder events during range expansion should produce a progressive reduction in phonemic diversity with increasing distance from the point of origin, paralleling the serial founder effect in population genetics (*S38*). Under this model, populations at the periphery of an expansion into new territory will have undergone more founder events more recently and over greater distances than populations nearer the origin. Over the course of an expansion,

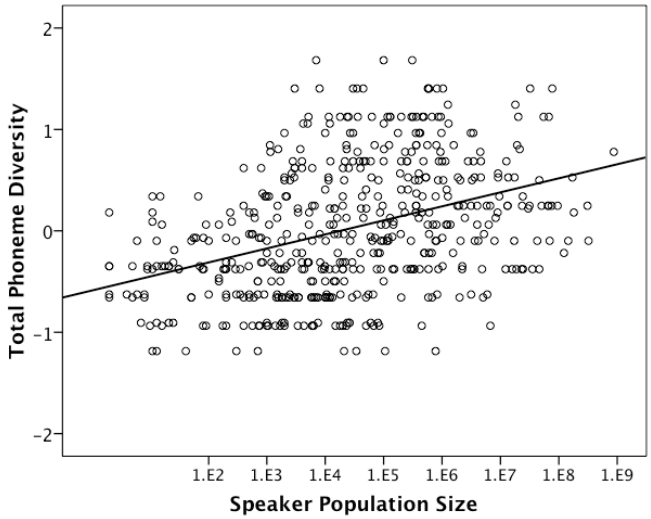
[1] Note that faster rates of change in small populations do not entail greater within-population phonemic diversity. Whilst new distinctions can spread to fixation more quickly in small populations, existing distinctions are more easily lost.

peripheral languages will therefore have experienced an increased likelihood of phoneme loss compared to their relatives nearer the origin. Later localized population movements after the initial expansion could also influence patterns of diversity. Whilst this may add noise to the data, as in the genetic case, populations at the periphery are still expected to carry the legacy of more founder events and hence have fewer phonemes. The impact of more recent founder events on any global trend is limited by the smaller distances involved and the potential to borrow phonemes when moving into already colonized areas (the linguistic analogue to gene flow). By contrast, on a global scale, contact-induced borrowing following expansion may help to maintain a cline, since neighbouring populations at similar points in the expansion (e.g., in Africa versus in Australia) are more likely to encounter similar phonemes and levels of diversity. As with the human genetic and phenotypic data, despite more recent population movements, we therefore expect a large-scale expansion from a single origin to generate a global cline in phonemic diversity, decreasing with increasing distance from the origin.

The serial founder effect model of human genetic and phenotypic diversity has been an important line of evidence supporting a primary African origin to modern humans (*S6, S38- S42*). Here I use the same approach to examine the fit of a serial founder effect model to global variation in phonemic diversity, searching the globe for the putative origin location that produces the strongest relationship between phoneme inventory size and geographic distance. This approach does not assume any particular origin location or any clinal patterning in phonemic diversity. Rather, model support at each origin location is evaluated against support for all other putative origin locations and against the null hypothesis that there is no relationship between phonemic diversity and distance from the origin. No clear relationship between the number of phonemes in a language and geography would suggest either that modern languages are the result of polygenesis (many independent language lineage origins) or that any possible founder effect is too weak to produce a detectable expansion signal in the data. Alternatively, an appreciable linguistic founder effect operating over the course of a major expansion of languages is expected to produce a geographic cline in phonemic diversity, decreasing from the point of language origin.

It is worth noting that fitting a serial founder effect model to phoneme inventory data describes an inherently stochastic (probabilistic) process and does not entail that phonemic diversity is entirely determined by population size via a serial founder effect. Distance from the best-fit origin in Africa and population size are shown to be significant predictors of phonemic diversity, explaining approximately 30% of global variation, but other socio-linguistic processes (*S23, S24*) and more recent population movements clearly also play a role. Neither of these factors are expected to systematically bias results to produce the observed global cline in phonemic diversity.

**A**




**B**

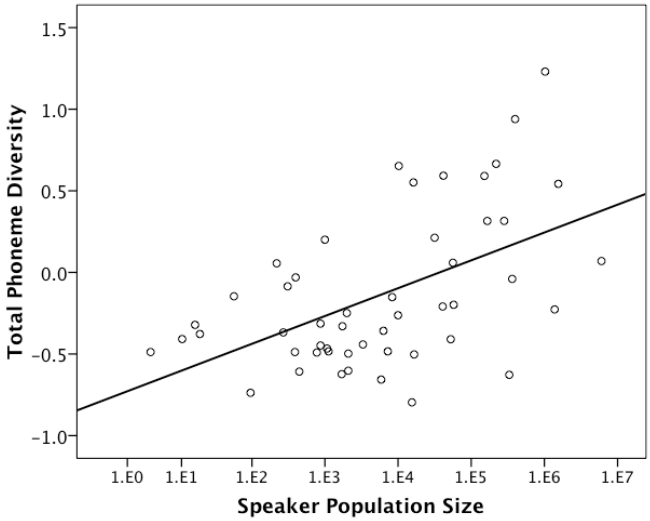



**Fig. S1**. Relationship between log population size and phonemic diversity. (**A**) plot of log speaker population size against total phonemic diversity in 504 languages sampled from WALS, showing fitted regression line (linear regression - r=0.385, df=503, p<0.001; hierarchical linear model β=0.0338-0.0985 [95% HPD], p=0.009). The same relationship holds when the analysis is restricted to languages with speaker populations of 5000 or less, a range in line with speaker populations of modern hunter-gatherers (*S5*) and likely to have characterised much of human prehistory (linear regression - r=-0.250, n=172, p<0.001; hierarchical linear model β=0.0312-0.1969 [95% HPD], p=0.025). (**B**) plot of mean log population size against mean total phonemic diversity for 50 language families with N>1, showing fitted regression line (r=0.468, df=49, p<0.001).

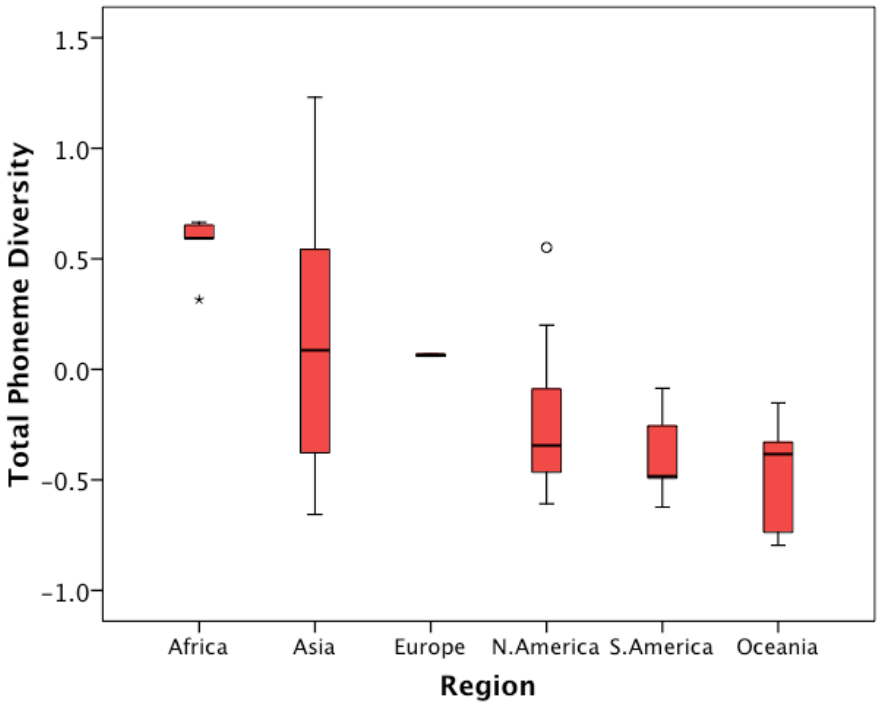



**Fig. S2**. Boxplot of language family mean phonemic diversity. Consistent with the individual-level plot (Fig. 1B), regions show substantial variation in phonemic diversity ($\chi^2$=18.8, df=5, p=0.002), with the highest diversity in Africa and lowest diversity in Oceania and South America.

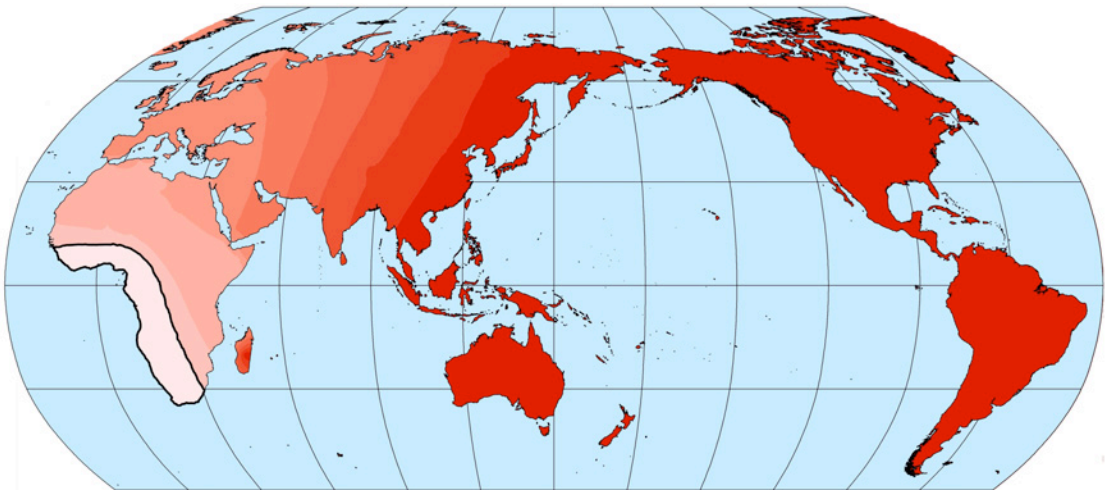


**Fig. S3**. Likely area of language origin under a founder effect model of phonemic diversity without controlling for population size, inferred from individual languages. Lighter shading implies a stronger inverse relationship between phonemic diversity and distance from the origin and better fit of the model, as measured by Bayesian Information Criterion (BIC). The most likely region of origin, comprising those locations within four BIC units of the best-fit origin location, is the area of lightest shading outlined in bold.

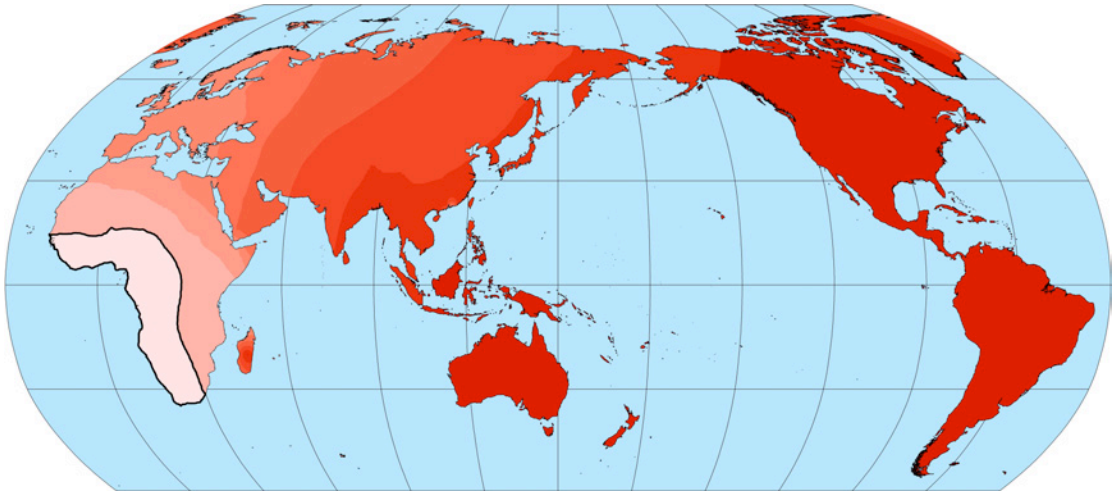


**Fig. S4**. Likely area of language origin under a founder effect model of phonemic diversity controlling for population size, inferred from individual languages using a hierarchical linear model that accounts for dependencies at the family, subfamily and genus levels. Lighter shading implies a stronger inverse relationship between phonemic diversity and distance from the origin and better fit of the model, as measured by Bayesian Information Criterion (BIC). The most likely region of origin, comprising those locations within four BIC units of the best-fit origin location, is the area of lightest shading outlined in bold. The effect of distance from origin in the best-fit model remains highly significant ($\beta$=-3.94 – -1.94 x $10^{-5}$ [95% HPD], p=<0.001).

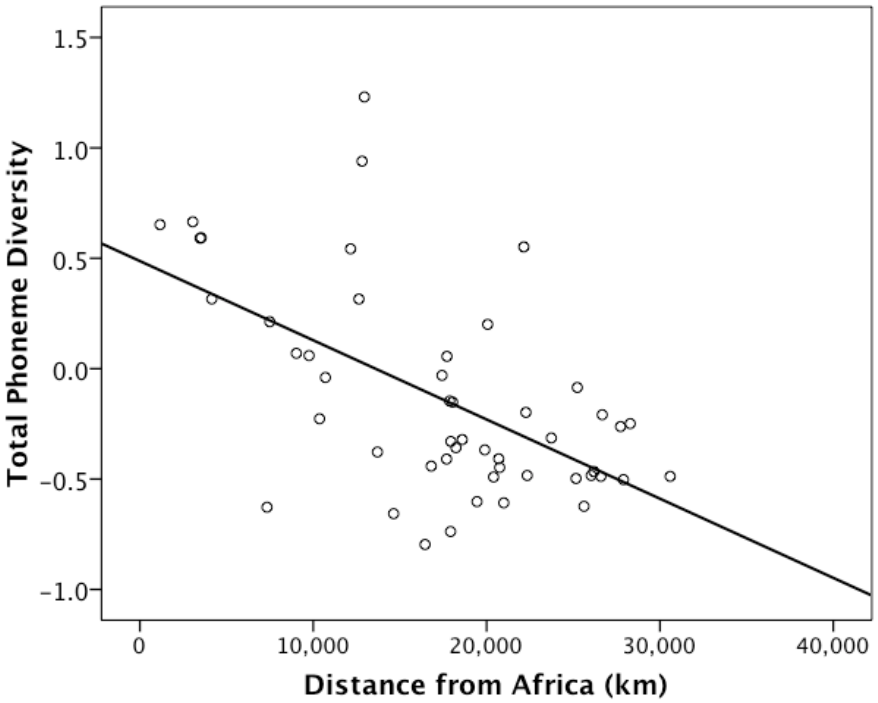



**Fig. S5**. Plot of distance from the best fit origin in Africa to the centroid location of each language family with N>1 against mean language family phonemic diversity. Distance from Africa alone explains 33.3% of the variation in phonemic diversity (fitted line; r=0.577, n=50, p<0.001) and 16.1% of the variation after controlling for modern speaker population size ($r_{distance}$=-0.401, n=50, p=0.004; $r_{population}$=0.300, n=50, p<0.001; R=0.627, $F_{2,49}$=15.190, p<0.001).

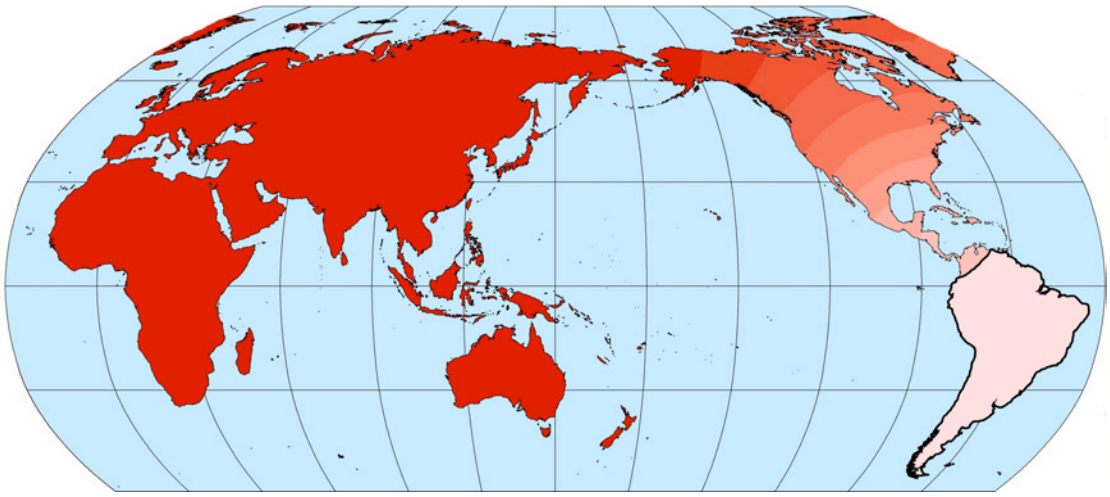


**Fig. S6**. The region of best fit for a founder effect model allowing a second origin location, after removing those cases where distance from the second origin and phonemic diversity are not inversely correlated. Lighter shading implies a better fit of the model, as measured by BIC, assuming an inverse linear relationship between phonemic diversity and distance from the secondary origin. The overall set of best-fit locations do not yield a significant inverse relationship between distance from the secondary origin and phonemic diversity after controlling for population size and distance from Africa. The language-family and hierarchical linear models showed no support for a secondary origin location – adding a second origin did not improve the fit of either model as measured by BIC and all putative second origin locations were within four BIC units.

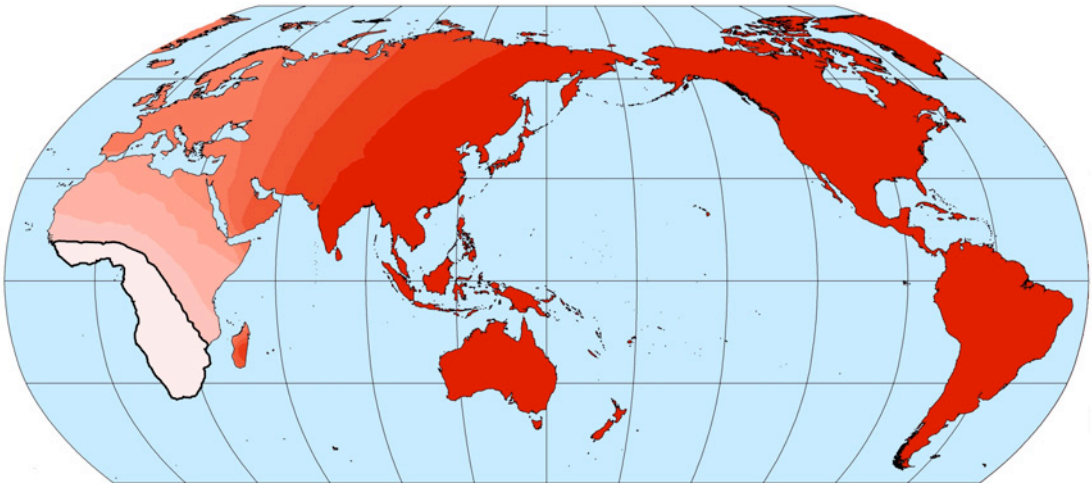


**Fig. S7**. Likely area of language origin under a founder effect model of phonemic diversity, controlling for population size, population density, language area and local language diversity (number of other languages within 1000km). Lighter shading implies a better fit of the model, as measured by BIC. The most likely region of origin, comprising those locations within four BIC units of the best-fit origin location, is the area of lightest shading outlined in bold.

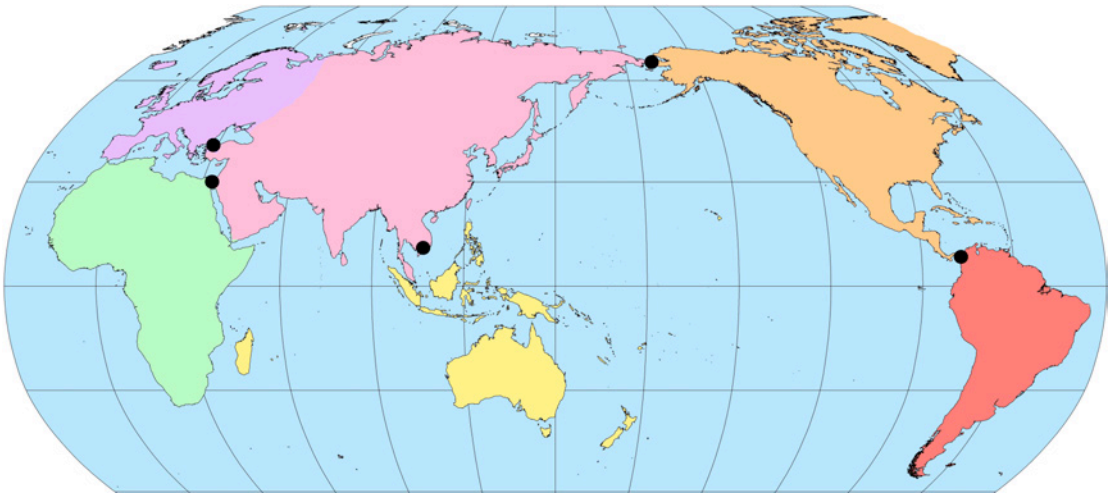


**Fig. S8**. World map showing location of waypoints used in distance calculations. Great circle distances between points on different continents (coloured) were constrained to pass through five key waypoints so that distance measures more accurately reflected plausible migration scenarios.

**Supplementary Information for Atkinson, Q. D. (In prep) Phonemic diversity supports serial founder effect model of language spread from Africa.**

**Supplementary Table S1** - Data table for sample of 504 languages from the World Atlas of Langauge Structures (WALS; http://wals.info/) showing family affiliation, location, vowel*, consonant† and tone‡ diversity, total phoneme diversity and population size§.

* Normalized vowel diversity based on WALS feature #2 "Vowel Quality Inventories"

† Normalized consonant diversity based on WALS feature #1 "Consonant Inventories"

‡ Normalized tone diversity based on WALS feature #13 "Tone"

§Population size information was taken from - Gordon, Raymond G., Jr. (ed.), Ethnologue: Languages of the World, Fifteenth edition. Dallas, Tex.: SIL International. Online version: http://www.ethnologue.com/ (2005).

| Language Name | WALS code | Family | Latitude | Longitude | Normalized Vowel Diversity* | Normalized Consonant Diversity† | Normalized Tone Diversity‡ | Total Normalized Phoneme Diversity | ISO codes | Estimated Speaker Pop. Size§ | Distance from best fit origin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Abkhaz | abk | Northwest Caucasian | 43.08 | 41 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | abk | 105952 | 5856.362 |
| Acoma | aco | Keresan | 34.92 | -107.58 | -0.4846364 | -0.7169629 | 1.86204304 | 0.220147906 | kjq | 3391 | 18601.19 |
| Andoke | adk | Andoke | -0.67 | -72 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | ano | 619 | 23780.16 |
| Aleut (Eastern) | aea | Eskimo-Aleut | 54.75 | -164 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | ale | 490 | 14629.42 |
| Arabic (Egyptian) | aeg | Afro-Asiatic | 30 | 31 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | arz | 46321000 | 4153.443 |
| Aghem | agh | Niger-Congo | 6.67 | 10 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | agq | 26727 | 881.8563 |
| Ahtna | aht | Na-Dene | 62 | -145 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | aht | 80 | 14623.91 |
| Aikan?° | aik | Arawakan | -12.67 | -60.67 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | tba | 90 | 25594.8 |
| Ainu | ain | Ainu | 43 | 143 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | ain | 15 | 13493.04 |
| Akan | akn | Niger-Congo | 6.5 | -1.25 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | aka | 8300000 | 1470.907 |
| Akawaio | akw | Cariban | 6 | -59.5 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | ake | 5000 | 24637.7 |
| Alamblak | ala | Sepik | -4.67 | 143.33 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | amp | 1527 | 16591.58 |
| Albanian | alb | Indo-European | 41 | 20 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | aln als | 5823075 | 6143.505 |
| Alladian | ald | Niger-Congo | 5.17 | -4.33 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | ald | 23000 | 1692.825 |
| Alawa | alw | Australian | -15.17 | 134.25 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | alh | 17 | 16364.65 |
| Amele | ame | Trans-New Guinea | -5.25 | 145.58 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | aey | 5300 | 16846.07 |
| Amharic | amh | Afro-Asiatic | 10 | 38 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | amh | 17417913 | 3391.289 |
| Amo | amo | Niger-Congo | 10.33 | 8.67 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | amo | 12263 | 1290.098 |
| Arrernte (Mparntwe) | amp | Australian | -24 | 136 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | aer | 2175 | 17174.91 |
| Amuesha | amu | Arawakan | -10.5 | -75.42 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | ame | 9831 | 24708.83 |
| Amuzgo | amz | Oto-Manguean | 16.83 | -98 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | amu | 23000 | 20824.28 |
| Araona | ana | Tacanan | -12.33 | -67.75 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | aro | 81 | 25142.92 |
| Angas | anc | Afro-Asiatic | 9.5 | 9.5 | 1.3900889 | -1.5544112 | 1.86204304 | 0.565906908 | anc | 400000 | 1194.595 |
| //Ani | ani | Khoisan | -18.92 | 21.92 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | hnh | 1000 | 2384.497 |
| Angaatiha | ant | Trans-New Guinea | -7.22 | 146.25 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | agm | 2100 | 17001.11 |
| Ao | ao | Sino-Tibetan | 26.58 | 94.67 | -0.4846364 | -1.5544112 | 1.86204304 | -0.05900154 | njo | 141000 | 10314.41 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Apinay?© | api | Macro-Ge | -5.5 | -48 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | apn | 800 | 26237.66 |
| Apurin?£ | apu | Arawakan | -9 | -67 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | apu | 2000 | 24858.32 |
| Arabela | arb | Zaparoan | -2 | -75.17 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | arl | 50 | 23781.04 |
| Archi | arc | Nakh-Daghestanian | 42 | 46.83 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | aqc | 1000 | 6097.646 |
| Armenian (Eastern) | arm | Indo-European | 40 | 45 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | hye | 6723840 | 5840.478 |
| Arapesh | arp | Torricelli | -3.47 | 143.17 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | aon ape | 20865 | 16523.81 |
| Asmat | asm | Trans-New Guinea | -5.5 | 138.5 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | tml | 290 | 16146.7 |
| Atayal | ata | Austronesian | 24.5 | 121.33 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | tay | 84330 | 12854.41 |
| Avar | ava | Nakh-Daghestanian | 42.5 | 46.5 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | ava | 600959 | 6111.7 |
| Awngi | awn | Afro-Asiatic | 10.83 | 36.67 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | awn | 356980 | 3289.198 |
| Awa Pit | awp | Barbacoan | 1.5 | -78.25 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | kwi | 21000 | 23367.25 |
| Aymara | aym | Aymaran | -17 | -69 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | ayc ayr | 2227642 | 25571.11 |
| Azerbaijani | aze | Altaic | 40.5 | 48.5 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | azb azj | 31423529 | 6117.956 |
| Bagirmi | bag | Nilo-Saharan | 11.67 | 16 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | bmi | 44761 | 1605.154 |
| Bai | bai | Sino-Tibetan | 26 | 100 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | bca | 800000 | 10834.68 |
| Bajau | baj | Austronesian | -4.33 | 123 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | bdl | 90000 | 14645.09 |
| Bambara | bam | Niger-Congo | 12.5 | -7.5 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | bam | 2786385 | 2418.978 |
| Bawm | baw | Sino-Tibetan | 22.5 | 92.25 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | bgr | 13793 | 10245.05 |
| Bobo Fing | bbf | Niger-Congo | 11.83 | -4.42 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | bbo bwq | 365091 | 2115.293 |
| Bella Coola | bco | Salishan | 52.5 | -126.67 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | blc | 20 | 16137.59 |
| Beembe | bee | Niger-Congo | -3.92 | 14.08 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | beq | 3200 | 588.6359 |
| Beja | bej | Afro-Asiatic | 18 | 36 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | bej | 1178000 | 3602.099 |
| Bengali | ben | Indo-European | 24 | 90 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | ben | 171070202 | 9970.793 |
| Berta | ber | Nilo-Saharan | 10.33 | 34.67 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | wti | 146799 | 3066.326 |
| B?©t?© | bet | Niger-Congo | 6.25 | -6.25 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | bev | 130000 | 1935.879 |
| Birom | bir | Niger-Congo | 9.67 | 8.83 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | bom | 300000 | 1215.749 |
| Bisa | bis | Niger-Congo | 11.5 | -0.5 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | bib | 581900 | 1796.459 |
| Bakair?? | bki | Cariban | -14 | -55 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | bkq | 570 | 26123.49 |
| Batak (Karo) | bkr | Austronesian | 3.25 | 98.25 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | btx | 600000 | 11791.44 |
| Berber (Middle Atlas) | bma | Afro-Asiatic | 33 | -5 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | tzm | 3150000 | 4098.419 |
| Baining | bng | Baining-Taulil | -4.58 | 152 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | byx | 6350 | 17483.1 |
| Barasano (Northern) | bno | Tucanoan | 0.33 | -70.25 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | bao | 700 | 23811.14 |
| Bodo | bod | Sino-Tibetan | 26.83 | 92 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | brx | 603301 | 10054.89 |
| Bariba | brb | Niger-Congo | 10 | 2.5 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | bba | 560000 | 1470.541 |
| Bardi | brd | Australian | -16.58 | 122.92 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | bcj | 20 | 15678.92 |
| Breton | bre | Indo-European | 48 | -3 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | bre | 532722 | 8020.355 |
| Brahui | brh | Dravidian | 28.5 | 67 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | brh | 2210000 | 7633.551 |
| Burmese | brm | Sino-Tibetan | 21 | 96 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | mya | 32301581 | 10666.4 |
| Bororo | brr | Macro-Ge | -16 | -57 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | bor | 850 | 26133.02 |
| Bru (Western) | brw | Austro-Asiatic | 16.75 | 104.75 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | brv | 20000 | 11699.31 |
| Bashkir | bsk | Altaic | 53 | 58 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | bak | 1871383 | 7516.704 |
| Basque | bsq | Basque | 43 | -3 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | eus | 588108 | 8024.965 |
| Batak (Toba) | bto | Austronesian | 2.5 | 99 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | bbc | 2000000 | 11905.76 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Burarra | bua | Australian | -12.25 | 134.58 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | bvr | 400 | 16186.07 |
| Bulgarian | bul | Indo-European | 42.5 | 25 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | bul | 8954811 | 5760.137 |
| Burushaski | bur | Burushaski | 36.5 | 74.5 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | bsk | 87049 | 8225.202 |
| Bandjalang (Yugumbir) | byu | Australian | -27.92 | 153 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | bdy | 10 | 18758.94 |
| Cacua | cac | Cacua-Nukak | 1.08 | -70 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | cbv | 150 | 23771.88 |
| Caddo | cad | Caddoan | 33.33 | -93.5 | -1.2345266 | 0.12048546 | 0.54663194 | -0.189136395 | cad | 25 | 19389.69 |
| Cahuilla | cah | Uto-Aztecan | 33.5 | -116.25 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | chl | 7 | 18359.56 |
| Cams?° | cam | Cams?° | 1.17 | -77 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | kbh | 4022 | 23401.18 |
| Carib | car | Cariban | 5.5 | -56 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | car | 10226 | 25028.63 |
| Campa (Axininca) | cax | Arawakan | -12 | -74 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | cni | 23750 | 24896.08 |
| Chickasaw | cck | Muskogean | 34 | -88 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | cic | 1000 | 19571.84 |
| Cocopa | ccp | Hokan | 32.33 | -115 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | coc | 350 | 18528.64 |
| Chamorro | cha | Austronesian | 13.45 | 144.75 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | cha | 76705 | 16303.07 |
| Cherokee | che | Iroquoian | 35.5 | -83.5 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | chr | 15000 | 19625.88 |
| Chukchi | chk | Chukotko-Kamchatkan | 67 | -173 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | ckt | 10000 | 13188.8 |
| Chipewyan | chp | Na-Dene | 59 | -106 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | chp | 4000 | 16557 |
| Chinantec (Quiotepec) | chq | Oto-Manguean | 17.58 | -96.67 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | chq | 8000 | 20808.09 |
| Chulup?? | chu | Matacoan | -23.5 | -60.5 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | cag | 18200 | 26597.79 |
| Chuvash | chv | Altaic | 55.5 | 47.5 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | chv | 1834394 | 7272.561 |
| Cham (Western) | chw | Austronesian | 12 | 105.5 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | cja | 253100 | 12011.21 |
| CiLuba | cil | Niger-Congo | -6 | 22 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | lua | 6300000 | 1482.99 |
| Canela-Krah?¥ | ckr | Macro-Ge | -6 | -45 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | ram xra | 2620 | 26563.74 |
| Chinantec (Lealao) | cle | Oto-Manguean | 17.33 | -95.92 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | cle | 2000 | 20866.87 |
| Comanche | cmn | Uto-Aztecan | 33.5 | -101.5 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | com | 200 | 19011.85 |
| Cantonese | cnt | Sino-Tibetan | 23 | 113 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | yue | 54810598 | 12172.55 |
| Coos (Hanis) | coo | Oregon Coast | 43.5 | -124.17 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | csz | 1 | 17054.48 |
| Cree (Plains) | cre | Algic | 54 | -110 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | crk | 34100 | 16764.96 |
| Chatino (Sierra Occidental | cso | Oto-Manguean | 16.25 | -97.33 | -0.4846364 | -0.7169629 | 1.86204304 | 0.220147906 | ctp | 12000 | 20912.69 |
| Chin (Tiddim) | cti | Sino-Tibetan | 23.33 | 93.67 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | ctd | 344100 | 10346.32 |
| Catalan | ctl | Indo-European | 41.75 | 2 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | cat | 6667328 | 7632.806 |
| Cubeo | cub | Tucanoan | 1.33 | -70.5 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | cub | 6150 | 23712.46 |
| Dadibi | dad | Teberan-Pawaian | -6.55 | 144.58 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | mps | 10000 | 16802.56 |
| Dahalo | dah | Afro-Asiatic | -2.33 | 40.5 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | dal | 400 | 3445.195 |
| Dan | dan | Niger-Congo | 7.5 | -8 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | daf | 951600 | 2169.916 |
| Darai | dar | Indo-European | 24 | 84 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | dry | 10210 | 9398.07 |
| Daju (Dar Fur) | ddf | Nilo-Saharan | 12.25 | 25.25 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | daj | 143053 | 2295.878 |
| Dera | der | Senagi | -3.58 | 141 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | kbv | 1687 | 16306.48 |
| Deti | det | Khoisan | -20.5 | 24.5 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | shg | 6000 | 2688.293 |
| Dagbani | dgb | Niger-Congo | 9.58 | -0.5 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | dag | 800000 | 1634.933 |
| Dagur | dgr | Altaic | 48 | 124 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | dta | 96085 | 11937.46 |
| Diegue?±o (Mesa Grande) | die | Hokan | 32.67 | -116.17 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | dih | 295 | 18444.9 |
| Dinka | din | Nilo-Saharan | 8.5 | 28 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | dip | 320000 | 2317.959 |
| Diola-Fogny | dio | Niger-Congo | 13 | -16 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | dyo | 358276 | 3226.359 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Dizi | diz | Afro-Asiatic | 6.17 | 36.5 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | mdx | 21075 | 3106.859 |
| Djapu | djp | Australian | -12.67 | 136 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | duj | 500 | 16336.86 |
| Dani (Lower Grand Valley) | dni | Trans-New Guinea | -4.33 | 138.83 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | dni | 20000 | 16121.84 |
| Dangal?©at (Western) | dnw | Afro-Asiatic | 12.17 | 18.33 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | daa | 45000 | 1781.452 |
| Doyayo | doy | Niger-Congo | 8.67 | 13.08 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | dow | 18000 | 1171.497 |
| Drehu | dre | Austronesian | -21 | 167.25 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | dhv | 11338 | 19683.04 |
| Dogon (Toro So) | dts | Niger-Congo | 14.5 | -3.33 | 1.3900889 | -0.7169629 | 0.54663194 | 0.406585987 | dts | 50000 | 2248.478 |
| Dumo | dum | Skou | -2.68 | 141.3 | 1.3900889 | -1.5544112 | 1.86204304 | 0.565906908 | vam | 2667 | 16298.52 |
| Dyirbal | dyi | Australian | -17.83 | 145.58 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | dbl | 40 | 17506.48 |
| Efik | efi | Niger-Congo | 4.92 | 8.5 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | efi | 400000 | 694.5711 |
| Ejagham | eja | Niger-Congo | 5.42 | 8.67 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | etu | 116675 | 746.9072 |
| Ekari | eka | Trans-New Guinea | -3.83 | 135.5 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | ekg | 100000 | 15766.37 |
| English | eng | Indo-European | 52 | 0 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | eng | 309582484 | 7897.817 |
| Epena Pedee | epe | Choco | 3 | -77 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | sja | 8050 | 23198.55 |
| Evenki | eve | Altaic | 56 | 125 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | evn | 29000 | 11667.79 |
| Even | evn | Altaic | 68 | 130 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | eve | 7543 | 11445.09 |
| Ewe | ewe | Niger-Congo | 6.33 | 0.42 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | ewe | 3112400 | 1313.063 |
| Ewondo | ewo | Niger-Congo | 4 | 12 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | ewo | 577700 | 646.0998 |
| Eyak | eya | Na-Dene | 60.5 | -145 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | eya | 1 | 14717.15 |
| Fasu | fas | Trans-New Guinea | -6.58 | 143.33 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | faa | 1200 | 16678.73 |
| Fe'fe' | fef | Niger-Congo | 5.25 | 10.17 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | fmp | 123700 | 726.1316 |
| Fijian | fij | Austronesian | -17.83 | 178 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | fij | 334061 | 20632.27 |
| Finnish | fin | Uralic | 62 | 25 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | fin | 5232728 | 7737.948 |
| French | fre | Indo-European | 48 | 2 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | fra | 64858311 | 7651.918 |
| Fulni?¥ | ful | Macro-Ge | -8 | -37.5 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | fun | 2788 | 27414.04 |
| Fur | fur | Nilo-Saharan | 13.5 | 25 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | fvr | 501800 | 2366.992 |
| Fuzhou | fuz | Sino-Tibetan | 26 | 119.5 | 1.3900889 | -1.5544112 | 1.86204304 | 0.565906908 | cdo | 9103157 | 12614.44 |
| Fyem | fye | Niger-Congo | 9.58 | 9.33 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | pym | 3000 | 1203.632 |
| G?£ | ga | Niger-Congo | 5.67 | -0.17 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | gaa | 600000 | 1320.201 |
| Great Andamanese | gan | Great Andamanese | 12 | 92.67 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | apq | 24 | 10777.14 |
| Garo | gar | Sino-Tibetan | 25.67 | 90.5 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | grt | 677000 | 9955.409 |
| Gbeya Bossangoa | gbb | Niger-Congo | 6.67 | 17.5 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | gbp | 176000 | 1249.753 |
| Gadsup | gds | Trans-New Guinea | -6.25 | 146 | -1.2345266 | -1.5544112 | 1.86204304 | -0.308964919 | gaj | 22061 | 16932.33 |
| Georgian | geo | Kartvelian | 42 | 44 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | kat | 4178604 | 5922.392 |
| German | ger | Indo-European | 52 | 10 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | deu | 95392978 | 7277.99 |
| Gelao | gla | Tai-Kadai | 22.92 | 105.5 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | gio | 3000 | 11479.69 |
| Gooniyandi | goo | Australian | -18.33 | 126.33 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | gni | 100 | 16045.97 |
| Grebo | grb | Niger-Congo | 5 | -8 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | gry | 23700 | 2063.092 |
| Greek (Modern) | grk | Indo-European | 39 | 22 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | ell | 12258540 | 6024.787 |
| Garrwa | grr | Australian | -17.08 | 137.17 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | gbc | 200 | 16739.59 |
| Greenlandic (West) | grw | Eskimo-Aleut | 64 | -51 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | kal | 54800 | 18085.53 |
| Guaran?? | gua | Tupian | -26 | -56 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | gug | 4848000 | 27074.66 |
| Gwari | gwa | Niger-Congo | 9.5 | 7 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | gbr gby | 1050000 | 1226.217 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hadza | had | Hadza | -3.75 | 35.17 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | hts | 800 | 2863.102 |
| Haida | hai | Haida | 53 | -132 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | hdn hax | 55 | 15861.48 |
| Hakka | hak | Sino-Tibetan | 25 | 116 | -0.4846364 | -0.7169629 | 1.86204304 | 0.220147906 | hak | 29937959 | 12349.67 |
| Hamtai | ham | Trans-New Guinea | -7.5 | 146.25 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | hmt | 45000 | 17013.93 |
| Hausa | hau | Afro-Asiatic | 12 | 7 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | hau | 24162000 | 1498.044 |
| Hawaiian | haw | Austronesian | 19.58 | -155.5 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | haw | 1000 | 22535.9 |
| Hebrew (Modern Ashkena | hba | Afro-Asiatic | 31.75 | 35.17 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | heb | 5055000 | 4596.115 |
| Hindi | hin | Indo-European | 25 | 77 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | hin | 180764791 | 8691.814 |
| Hixkaryana | hix | Cariban | -1 | -59 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | hix | 600 | 24920.96 |
| Hmong Njua | hmo | Hmong-Mien | 28 | 105 | -0.4846364 | 1.79538213 | 1.86204304 | 1.057596241 | blu | 1290600 | 11214.83 |
| Hamer | hmr | Afro-Asiatic | 5 | 36.5 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | amf | 42838 | 3076.661 |
| Hopi | hop | Uto-Aztecan | 36 | -110 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | hop | 5264 | 18388.91 |
| Huastec | htc | Mayan | 22.08 | -99.33 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | hsf | 1749 | 20237.17 |
| Huitoto (Murui) | hum | Huitotoan | -1 | -73.5 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | huu | 2900 | 23734.11 |
| Hungarian | hun | Uralic | 47 | 20 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | hun | 13611600 | 6368.741 |
| Hupa | hup | Na-Dene | 41.08 | -123.67 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | hup | 8 | 17305.97 |
| Huave (San Mateo del Ma | hve | Huavean | 16.22 | -95 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | huv | 12000 | 21019.99 |
| Hunzib | hzb | Nakh-Daghestanian | 42.17 | 46.25 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | huz | 2000 | 6072.393 |
| Iaai | iaa | Austronesian | -20.42 | 166.58 | 1.3900889 | 1.79538213 | -0.7687792 | 0.805563957 | iai | 1562 | 19594.32 |
| Iban | iba | Austronesian | 2 | 112 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | iba | 415000 | 13296.74 |
| Igbo | igb | Niger-Congo | 6 | 7.33 | 1.3900889 | 1.79538213 | 0.54663194 | 1.244034323 | ibo | 18000000 | 840.8655 |
| Ingessana | igs | Nilo-Saharan | 11.5 | 34 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | tbi | 67166 | 3054.267 |
| Ijo (Kolokuma) | ijo | Niger-Congo | 4.92 | 5.67 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | ijc | 1000000 | 806.7756 |
| Ik | ik | Nilo-Saharan | 3.75 | 34.17 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | ikx | 2000 | 2795.69 |
| Ika | ika | Chibchan | 10.67 | -73.75 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | arh | 14301 | 23147.22 |
| Imonda | imo | Border | -3.33 | 141.17 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | imn | 250 | 16312.9 |
| Indonesian | ind | Austronesian | 0 | 106 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | ind | 23143354 | 13271.85 |
| Ingush | ing | Nakh-Daghestanian | 43.17 | 45.08 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | inh | 230315 | 6076.723 |
| Irish (Donegal) | ird | Indo-European | 55 | -8 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | gle | 355000 | 8498.085 |
| Iraqw | irq | Afro-Asiatic | -4 | 35.5 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | irk | 462000 | 2902.023 |
| Irarutu | irr | Austronesian | -3 | 133.5 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | irh | 4000 | 15526.95 |
| Iranxe | irx | Arawakan | -13 | -58 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | irn | 191 | 25814.99 |
| Isoko | iso | Niger-Congo | 5.5 | 6.25 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | iso | 423000 | 832.3132 |
| Ivatan (Southern) | ivs | Austronesian | 20.33 | 121.83 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | ivv | 35000 | 13119.01 |
| Jakaltek | jak | Mayan | 15.67 | -91.67 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | jac jai | 99000 | 21225.21 |
| Jaqaru | jaq | Aymaran | -13 | -76 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | jqr | 736 | 24979.68 |
| Javanese | jav | Austronesian | -7 | 111 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | jav | 75508300 | 14149.33 |
| Jeh | jeh | Austro-Asiatic | 15.17 | 107.83 | 1.3900889 | 1.79538213 | -0.7687792 | 0.805563957 | jeh | 23256 | 12072.16 |
| Jingpho | jng | Sino-Tibetan | 25.42 | 97 | -0.4846364 | 0.9579338 | 1.86204304 | 0.778446796 | kac | 940000 | 10577.3 |
| Jomang | jom | Niger-Congo | 10.58 | 30.5 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | tlo | 1500 | 2667.944 |
| Japanese | jpn | Japanese | 37 | 140 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | jpn | 122433899 | 13672.06 |
| Japreria | jpr | Cariban | 10.5 | -73 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | jru | 90 | 23206.52 |
| Ju\|'hoan | juh | Khoisan | -19 | 21 | -0.4846364 | 1.79538213 | 1.86204304 | 1.057596241 | ktz | 5000 | 2336.498 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Kabardian | kab | Northwest Caucasian | 43.5 | 43.5 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | kbd | 1012000 | 6016.822 |
| Kadugli | kad | Kadugli | 11 | 29.67 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | xtc | 81500 | 2611.667 |
| Kalami | kal | Indo-European | 35.5 | 72.5 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | gwc | 40000 | 8051.176 |
| Kashmiri | kas | Indo-European | 34 | 76 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | kas | 4611000 | 8383.788 |
| Kayardild | kay | Australian | -17.05 | 139.5 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | gyd | 6 | 16930.76 |
| Koyra Chiini | kch | Nilo-Saharan | 17 | -3 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | khq | 200000 | 2447.26 |
| Kedang | ked | Austronesian | -8.25 | 123.75 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | ksx | 30000 | 15007.67 |
| Kefa | kef | Afro-Asiatic | 7.25 | 36.25 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | kbr | 569626 | 3112.478 |
| Kera | ker | Afro-Asiatic | 9.83 | 15.08 | -0.4846364 | -0.7169629 | 1.86204304 | 0.220147906 | ker | 50523 | 1377.37 |
| Ket | ket | Yeniseian | 64 | 87 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | ket | 550 | 9550.919 |
| Kewa | kew | Trans-New Guinea | -6.5 | 143.83 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | kew kjs | 90000 | 16724.99 |
| Koromfe | kfe | Niger-Congo | 14.25 | -0.92 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | kfz | 196100 | 2069.288 |
| Kirghiz | kgz | Altaic | 42 | 75 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | kir | 3136733 | 8276.863 |
| Khalkha | kha | Altaic | 47 | 105 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | khk | 2337095 | 10609.53 |
| Khmer | khm | Austro-Asiatic | 12.5 | 105 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | khm | 13276639 | 11937.28 |
| Khoekhoe | kho | Khoisan | -25.5 | 18 | -0.4846364 | 0.9579338 | 1.86204304 | 0.778446796 | naq | 233701 | 2844.541 |
| Kharia | khr | Austro-Asiatic | 22.5 | 84.33 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | khr | 293575 | 9487.132 |
| Khasi | khs | Austro-Asiatic | 25.5 | 92 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | kha | 865000 | 10103.47 |
| Kiowa | kio | Kiowa-Tanoan | 37 | -99 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | kio | 1092 | 18787.47 |
| Kiwai | kiw | Kiwaian | -8 | 143.5 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | kiw kjd | 14100 | 16764.42 |
| Konkani | kkn | Indo-European | 15.25 | 74 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | knn | 4000000 | 8826.033 |
| Kaliai-Kove | kkv | Austronesian | -5.58 | 149.67 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | khl kvc | 8750 | 17279.57 |
| Klao | kla | Niger-Congo | 4.75 | -8.75 | 1.3900889 | -1.5544112 | 1.86204304 | 0.565906908 | klu | 192000 | 2133.034 |
| Klamath | klm | Penutian | 42.5 | -121.5 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | kla | 1 | 17263.44 |
| Kilivila | klv | Austronesian | -8.5 | 151.08 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | kij | 20000 | 17545.36 |
| Kala Lagaw Ya | kly | Australian | -10.12 | 142.12 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | mwp | 3000 | 16741.11 |
| Kunimaipa | kmp | Trans-New Guinea | -8 | 146.83 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | kup | 11000 | 17095.09 |
| Khmu' | kmu | Austro-Asiatic | 21 | 102 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | kjg | 479739 | 11236.83 |
| Kannada | knd | Dravidian | 14 | 76 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | kan | 35346000 | 9081.292 |
| Kaingang | kng | Macro-Ge | -26 | -52 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | kgp | 18000 | 27315.15 |
| Kanakuru | knk | Afro-Asiatic | 10 | 12 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | kna | 20000 | 1280.38 |
| Kunama | knm | Nilo-Saharan | 14.5 | 37 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | kun | 108883 | 3494.943 |
| Kanuri | knr | Nilo-Saharan | 12 | 13 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | knc | 3425138 | 1522.249 |
| Koasati | koa | Muskogean | 34.83 | -85.17 | -1.2345266 | -1.5544112 | 1.86204304 | -0.308964919 | cku | 200 | 19617.2 |
| Kobon | kob | Trans-New Guinea | -5.17 | 144.33 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | kpw | 6000 | 16715.23 |
| Kohumono | koh | Niger-Congo | 6 | 8.12 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | bcs | 30000 | 820.0783 |
| Koiari | koi | Trans-New Guinea | -9.5 | 147.33 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | kbk | 1700 | 17215.53 |
| Komo | kom | Nilo-Saharan | 8.75 | 33.75 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | xom | 11500 | 2906.295 |
| Korean | kor | Korean | 37.5 | 128 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | kor | 67019690 | 12738.18 |
| Kota | kot | Dravidian | 11.5 | 77.17 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | kfe | 2000 | 9329.268 |
| Koya | koy | Dravidian | 17.5 | 81.33 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | kff | 330000 | 9414.456 |
| Kpan | kpa | Niger-Congo | 7.58 | 10.17 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | kpk | 11386 | 984.0412 |
| Kpelle | kpe | Niger-Congo | 7 | -10 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | xpe | 487400 | 2348.62 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Kiribati | krb | Austronesian | 1.33 | 173 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | gil | 67790 | 19566.19 |
| Kurdish (Central) | krd | Indo-European | 36 | 44 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | kmr | 9113505 | 5534.577 |
| Karok | krk | Karok | 41.67 | -123 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | kyh | 10 | 17277.92 |
| Krongo | kro | Kadugli | 10.5 | 30 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | kgo | 21688 | 2615.703 |
| Koryak | kry | Chukotko-Kamchatkan | 61 | 167 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | kpy | 3500 | 13290.66 |
| Karen (Sgaw) | ksg | Sino-Tibetan | 18 | 97 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | ksw | 1584700 | 10897.79 |
| Kisi (Southern) | kss | Niger-Congo | 8.5 | -10.25 | 1.3900889 | -0.7169629 | 0.54663194 | 0.406585987 | kss | 200000 | 2441.211 |
| Kotoko | ktk | Afro-Asiatic | 11.33 | 15.33 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | aal | 30000 | 1539.169 |
| Khanty | kty | Uralic | 65 | 65 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | kca | 12000 | 8691.389 |
| Kullo | kul | Afro-Asiatic | 6.75 | 37.08 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | gmo | 1236637 | 3185.289 |
| Kuna | kun | Chibchan | 8 | -77.33 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | kvn | 1576 | 22658.89 |
| Kutenai | kut | Kutenai | 49.5 | -116 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | kut | 12 | 16871.28 |
| Kwaio | kwa | Austronesian | -8.95 | 161 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | kwd | 13249 | 18580.83 |
| Kwakw'ala | kwk | Wakashan | 51 | -127 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | kwk | 235 | 16250.85 |
| Kawaiisu | kws | Uto-Aztecan | 36 | -117.5 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | xaw | 8 | 18060.71 |
| Kuku-Yalanji | kya | Australian | -16 | 145 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | gvn | 700 | 17344.53 |
| Kayah Li (Eastern) | kyl | Sino-Tibetan | 19 | 97.5 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | eky | 360220 | 10899.36 |
| Kam (Zhanglu) | kzh | Tai-Kadai | 26 | 108.5 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | doc | 463000 | 11620.07 |
| Komi-Zyrian | kzy | Uralic | 65 | 55 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | kpv | 262200 | 8381.375 |
| Ladakhi | lad | Sino-Tibetan | 34 | 78 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | lbj | 114000 | 8566.608 |
| Lahu | lah | Sino-Tibetan | 20 | 98.17 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | lhu | 577178 | 10917.85 |
| Lak | lak | Nakh-Daghestanian | 42.17 | 47.17 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | lbe | 119512 | 6131.37 |
| Lam?© | lam | Afro-Asiatic | 9 | 14.5 | -0.4846364 | 0.9579338 | 1.86204304 | 0.778446796 | lme | 35720 | 1266.441 |
| Lango | lan | Nilo-Saharan | 2.17 | 33 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | laj | 977680 | 2638.481 |
| Latvian | lat | Indo-European | 57 | 24 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | lav | 1543844 | 7202.816 |
| Lavukaleve | lav | Lavukaleve | -9.08 | 159.2 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | lvk | 1783 | 18399.45 |
| Lenakel | len | Austronesian | -19.45 | 169.25 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | tnl | 6500 | 19815.13 |
| Lezgian | lez | Nakh-Daghestanian | 41.67 | 47.83 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | lez | 451112 | 6142.042 |
| Lakkia | lkk | Tai-Kadai | 24.08 | 110.17 | -0.4846364 | 1.79538213 | 1.86204304 | 1.057596241 | lbc | 12000 | 11860.59 |
| Lakhota | lkt | Siouan | 43.83 | -101.83 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | lkt | 6000 | 18018.4 |
| Lelemi | llm | Niger-Congo | 7.33 | 0.5 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | lef | 48900 | 1380.082 |
| L?º | lu | Tai-Kadai | 22 | 100.67 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | khb | 672064 | 11066.23 |
| Lua | lua | Niger-Congo | 9.75 | 17.75 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | nie | 5157 | 1525.6 |
| Lugbara | lug | Nilo-Saharan | 3.08 | 30.92 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | lgg | 1040000 | 2427.589 |
| Luise?±o | lui | Uto-Aztecan | 33.33 | -117.17 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | lui | 30 | 18337.04 |
| Luo | luo | Nilo-Saharan | -0.5 | 34.75 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | luo | 3465000 | 2806.794 |
| Lushootseed | lus | Salishan | 48 | -122 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | lut | 60 | 16735.08 |
| Luvale | luv | Niger-Congo | -12 | 22 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | lue | 669000 | 1823.445 |
| Maasai | maa | Nilo-Saharan | -3 | 36 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | mas | 883000 | 2949.057 |
| Maba | mab | Nilo-Saharan | 13.75 | 20.83 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | mde | 250000 | 2082.197 |
| Malagasy | mal | Austronesian | -20 | 47 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | plt | 5948700 | 19232.24 |
| Maori | mao | Austronesian | -40 | 176 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | mri | 50000 | 21248.63 |
| Mapudungun | map | Araucanian | -38 | -72 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | arn | 300000 | 27783.66 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maricopa | mar | Hokan | 33.17 | -113.17 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | mrc | 181 | 18525.07 |
| Maung | mau | Australian | -11.92 | 133.5 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | mph | 200 | 16071.17 |
| Maxakal?? | max | Macro-Ge | -18 | -40 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | mbl | 728 | 27667.17 |
| Maybrat | may | West Papuan | -1.33 | 132.5 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | ayz | 20000 | 15344.28 |
| Mazahua | maz | Oto-Manguean | 19.42 | -99.92 | -1.2345266 | 1.79538213 | 0.54663194 | 0.369162496 | maz mmc | 365000 | 20477.8 |
| Mba | mba | Niger-Congo | 1 | 25 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | mfc | 36087 | 1740.378 |
| Meithei | mei | Sino-Tibetan | 24.75 | 94 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | mni | 1261000 | 10321.07 |
| Mangghuer | mgg | Altaic | 36 | 102 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | mjg | 152000 | 10658.02 |
| Mien | mie | Hmong-Mien | 25 | 111 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | ium | 818685 | 11894.33 |
| Maranungku | mku | Australian | -13.67 | 130 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | zmr | 15 | 15915.16 |
| Mambila | mla | Niger-Congo | 6.75 | 11.5 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | mcu mzk | 129000 | 916.2551 |
| Malakmalak | mlk | Australian | -13.42 | 130.42 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | mpb | 9 | 15928.6 |
| Mandarin | mnd | Sino-Tibetan | 34 | 110 | -0.4846364 | 0.9579338 | 1.86204304 | 0.778446796 | cmn | 873014298 | 11418.85 |
| Maidu (Northeast) | mne | Penutian | 40 | -120.67 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | nmu | 1 | 17537.29 |
| Moghol | mog | Altaic | 35 | 62 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | mhj | 200 | 7099.201 |
| Mor | mor | Austronesian | -2.95 | 135.75 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | mhz | 700 | 15747.56 |
| Movima | mov | Movima | -13.83 | -65.67 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | mzp | 1452 | 25394.71 |
| Murrinh-Patha | mpa | Australian | -14.67 | 129.67 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | mwf | 900 | 15968.52 |
| Marind | mrd | Marind | -7.83 | 140.17 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | mrz | 7000 | 16430.57 |
| Murle | mrl | Nilo-Saharan | 6.5 | 33.5 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | mur | 60200 | 2797.952 |
| Maranao | mrn | Austronesian | 7.83 | 124.25 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | mrw | 776169 | 14136.36 |
| Moro | mro | Niger-Congo | 11 | 30.17 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | mor | 30000 | 2658.971 |
| Martuthunira | mrt | Australian | -20.83 | 116.5 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | vma | 5 | 15795.13 |
| Miwok (Southern Sierra) | mss | Penutian | 37.5 | -120 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | skd | 7 | 17807.63 |
| Mixe (Totontepec) | mtp | Mixe-Zoque | 17.25 | -96 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | mto | 5200 | 20871.34 |
| Muinane | mui | Huitotoan | -1 | -72.5 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | bmr | 150 | 23783.5 |
| Mumuye | mum | Niger-Congo | 9 | 11.67 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | mzm | 400000 | 1164.097 |
| Mundari | mun | Austro-Asiatic | 23 | 84.67 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | muw | 2074700 | 9500.179 |
| Mixtec (Chalcatongo) | mxc | Oto-Manguean | 17.05 | -97.58 | -0.4846364 | -0.7169629 | 1.86204304 | 0.220147906 | mig | 14453 | 20820.82 |
| Mixtec (Molinos) | mxm | Oto-Manguean | 17 | -97.58 | -0.4846364 | -0.7169629 | 1.86204304 | 0.220147906 | mig | 14453 | 20825.86 |
| Ma'ya | mya | Austronesian | -1.25 | 130.92 | -0.4846364 | -1.5544112 | 1.86204304 | -0.05900154 | slz | 4000 | 15183.16 |
| Mangarrayi | myi | Australian | -14.67 | 133.5 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | mpc | 50 | 16267.45 |
| Mazatec (Chiquihuitl?°n) | mzc | Oto-Manguean | 17.75 | -96.92 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | maq | 2500 | 20779.78 |
| Nanai | nai | Altaic | 49.5 | 137 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | gld | 5772 | 12708.62 |
| Nandi | nan | Nilo-Saharan | 0.25 | 35 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | kln | 2458123 | 2838.398 |
| Neo-Aramaic (Persian Aze | nap | Afro-Asiatic | 38 | 47 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | trg | 4378 | 5871.083 |
| Nara (in Ethiopia) | nar | Nilo-Saharan | 15.08 | 37.58 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | nrb | 80000 | 3580.178 |
| Navajo | nav | Na-Dene | 36.17 | -108 | -1.2345266 | 0.9579338 | 0.54663194 | 0.090013051 | nav | 148530 | 18461.67 |
| Naxi | nax | Sino-Tibetan | 27.5 | 100 | 1.3900889 | 1.79538213 | 1.86204304 | 1.682504689 | nbf | 308839 | 10775.54 |
| Ndut | ndt | Niger-Congo | 14.92 | -16.92 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | ndv | 35000 | 3415.417 |
| Nenets | nen | Uralic | 69 | 72 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | yrk | 26730 | 9208.659 |
| Nepali | nep | Indo-European | 28 | 85 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | nep | 17209255 | 9357.227 |
| Newari (Kathmandu) | new | Sino-Tibetan | 27.67 | 85.5 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | new | 825458 | 9414.689 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nez Perce | nez | Penutian | 46 | -116 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | nez | 100 | 17181.91 |
| Nganasan | nga | Uralic | 71 | 93 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | nio | 500 | 10016.63 |
| Ngizim | ngz | Afro-Asiatic | 12.08 | 10.92 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | ngi | 80000 | 1489.566 |
| Nahuatl (North Puebla) | nhn | Uto-Aztecan | 20 | -98.25 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | ncj | 60000 | 20494.01 |
| Nahuatl (Tetelcingo) | nht | Uto-Aztecan | 19.67 | -99 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | nhg | 3500 | 20493.66 |
| Nishi | nis | Sino-Tibetan | 27.5 | 93.5 | 1.3900889 | -0.7169629 | 0.54663194 | 0.406585987 | dap | 261000 | 10171.56 |
| Nivkh | niv | Nivkh | 53.33 | 142 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | niv | 1089 | 12770.47 |
| Nkore-Kiga | nko | Niger-Congo | -0.92 | 29.83 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | cgg | 1391442 | 2259.059 |
| Nyah Kur (Tha Pong) | nkt | Austro-Asiatic | 15.67 | 101.67 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | cbn | 10000 | 11457.57 |
| Nambiku?°ra | nmb | Nambikuaran | -13 | -59 | -0.4846364 | 0.9579338 | 1.86204304 | 0.778446796 | nab | 1150 | 25741.21 |
| Nancowry | nnc | Austro-Asiatic | 8.05 | 93.5 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | ncb | 2200 | 11068.46 |
| Nobiin | nob | Nilo-Saharan | 21 | 31 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | fia | 495000 | 3402.265 |
| Noni | non | Niger-Congo | 6.42 | 10.58 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | nhu | 25000 | 860.7081 |
| Norwegian | nor | Indo-European | 61 | 8 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | nor | 4640000 | 8027.009 |
| Ngiti | nti | Nilo-Saharan | 1.33 | 30.25 | 1.3900889 | 1.79538213 | 1.86204304 | 1.682504689 | niy | 100000 | 2323.407 |
| Nunggubuyu | nug | Australian | -13.75 | 135.67 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | nuy | 300 | 16381.74 |
| Nung (in Vietnam) | nun | Tai-Kadai | 21.92 | 106.42 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | nut | 856412 | 11611.48 |
| Nuuchahnulth | nuu | Wakashan | 49.67 | -126.67 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | noo | 200 | 16381.58 |
| Nyimang | nyi | Nilo-Saharan | 12.17 | 29.33 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | nyi | 70000 | 2648.169 |
| Ocaina | oca | Huitotoan | -2.75 | -71.75 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | oca | 66 | 23994.17 |
| Ogbia | ogb | Niger-Congo | 4.67 | 6.25 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | ogb | 200000 | 750.3215 |
| Ojibwa (Eastern) | oji | Algic | 46 | -80 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | ojg | 25885 | 18773.89 |
| Oneida | ond | Iroquoian | 43 | -75.67 | -1.2345266 | 0.9579338 | 0.54663194 | 0.090013051 | one | 250 | 19237.46 |
| O'odham | ood | Uto-Aztecan | 32 | -112 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | ood | 11819 | 18691.13 |
| Oromo (Harar) | orh | Afro-Asiatic | 9 | 42 | -0.4846364 | 0.9579338 | 1.86204304 | 0.778446796 | hae | 4526000 | 3774.159 |
| Ormuri | orm | Indo-European | 32.5 | 69.75 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | oru | 1050 | 7825.179 |
| Otom?? (Mezquital) | otm | Oto-Manguean | 20.17 | -99.17 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | ote | 100000 | 20435.83 |
| Pacoh | pac | Austro-Asiatic | 16.42 | 107.08 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | pac | 29224 | 11937.9 |
| P?°ez | pae | P?°ezan | 2.67 | -76 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | pbb | 71400 | 23255.28 |
| Paiwan | pai | Austronesian | 22.5 | 120.83 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | pwn | 66084 | 12913.47 |
| Paumar?? | pau | Arauan | -6 | -64 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | pad | 700 | 24798.66 |
| Pawaian | paw | Teberan-Pawaian | -7 | 145.08 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | pwa | 4000 | 16873.52 |
| Pech | pec | Chibchan | 15 | -85.5 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | pay | 994 | 21571.42 |
| Phlong | phl | Sino-Tibetan | 15 | 99 | -0.4846364 | -1.5544112 | 1.86204304 | -0.05900154 | pww | 60000 | 11234.22 |
| Pitjantjatjara | pit | Australian | -26 | 130 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | pjt | 2500 | 16956.14 |
| Paamese | pms | Austronesian | -16.5 | 168.25 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | pma | 6000 | 19602.77 |
| Panare | pnr | Cariban | 6.5 | -66 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | pbh | 1200 | 23918.74 |
| Po-Ai | poa | Austronesian | -20.67 | 164.83 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | fwa | 1131 | 19436.81 |
| Pohnpeian | poh | Austronesian | 6.88 | 158.25 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | pon | 29000 | 17845.57 |
| Polish | pol | Indo-European | 52 | 20 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | pol | 42708133 | 6789.507 |
| Pirah?£ | prh | Mura | -7 | -62 | -1.2345266 | -0.7169629 | 0.54663194 | -0.46828584 | myp | 150 | 25033.52 |
| Persian | prs | Indo-European | 32 | 54 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | pes | 24316121 | 6351.344 |
| Pashto | psh | Indo-European | 33 | 67 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | pst | 7922657 | 7564.181 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Passamaquoddy-Maliseet | psm | Algic | 45 | -67 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | pqm | 1655 | 19389.8 |
| Parauk | puk | Austro-Asiatic | 23.25 | 99.5 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | prk | 528400 | 10901.56 |
| Pur?©pecha | pur | Tarascan | 19.5 | -101.67 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | tsz | 120000 | 20392.09 |
| Qawasqar | qaw | Alacalufan | -49 | -75 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | alc | 20 | 28979.01 |
| Quechua (Cochabamba) | qco | Quechuan | -17.5 | -66 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | quh | 3637500 | 25742.48 |
| Quileute | qui | Chimakuan | 47.92 | -124.25 | -1.2345266 | 0.9579338 | 0.54663194 | 0.090013051 | qui | 10 | 16643.32 |
| Rama | ram | Chibchan | 11.75 | -83.75 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | rma | 24 | 21978.58 |
| Rapanui | rap | Austronesian | -27.12 | -109.37 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | rap | 3392 | 28010.45 |
| Res??garo | res | Arawakan | -2.42 | -71.5 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | rgr | 14 | 23975.49 |
| Romanian | rom | Indo-European | 46 | 25 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | ron | 23498367 | 6031.231 |
| Roro | ror | Austronesian | -8.75 | 146.58 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | rro | 15000 | 17105.38 |
| Romansch (Scharans) | rsc | Indo-European | 46.75 | 9.5 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | roh | 40000 | 7071.052 |
| Rotokas | rtk | West Bougainville | -6 | 155.17 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | roo | 4320 | 17866.34 |
| Rukai | ruk | Austronesian | 22.83 | 120.83 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | dru | 10543 | 12896.25 |
| Russian | rus | Indo-European | 56 | 38 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | rus | 145031551 | 7094.689 |
| Rutul | rut | Nakh-Daghestanian | 41.5 | 47.42 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | rut | 20111 | 6103.329 |
| Sango | san | Niger-Congo | 5 | 18 | 1.3900889 | 0.9579338 | 0.54663194 | 0.964884878 | sag | 404000 | 1171.636 |
| S?°liba (in Colombia) | sba | S?°liban | 6 | -70 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | slc | 1555 | 23496.69 |
| Saami (Central-South) | scs | Uralic | 64.67 | 16.75 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | sma | 600 | 8133.627 |
| Sindhi | sdh | Indo-European | 26 | 69 | 1.3900889 | 1.79538213 | -0.7687792 | 0.805563957 | snd | 21362000 | 7891.445 |
| Sandawe | sdw | Khoisan | -5 | 35 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | sad | 40000 | 2859.423 |
| Sedang | sed | Austro-Asiatic | 14.83 | 108 | 1.3900889 | 1.79538213 | -0.7687792 | 0.805563957 | sed | 101434 | 12105.63 |
| Selknam | sel | Chon | -53 | -70 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | ona | 1 | 29455.87 |
| Shan | sha | Tai-Kadai | 22 | 98 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | shn | 3260000 | 10813.25 |
| Shiriana | shi | Yanomam | 3.5 | -62.83 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | shb | 566 | 24337.07 |
| Shipibo-Konibo | shk | Panoan | -7.5 | -75 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | shp | 26000 | 24384.75 |
| Shuswap | shu | Salishan | 52 | -120 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | shs | 500 | 16477.86 |
| Slave | sla | Na-Dene | 67 | -125 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | scs xsl | 2200 | 15291.47 |
| Semelai | sml | Austro-Asiatic | 3 | 103 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | sza | 2932 | 12258.61 |
| Seneca | snc | Iroquoian | 42.5 | -77.5 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | see | 175 | 19209.35 |
| Senadi | snd | Niger-Congo | 9.5 | -6.25 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | sef | 862000 | 2113.121 |
| Sinhala | snh | Indo-European | 7 | 80.5 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | sin | 13220256 | 9903.463 |
| Sanuma | snm | Yanomam | 4.5 | -64.67 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | xsu | 5074 | 24109.59 |
| Somali | som | Afro-Asiatic | 3 | 45 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | som | 12653480 | 3971.735 |
| Soqotri | soq | Afro-Asiatic | 12.5 | 54 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | sqt | 64000 | 7216.364 |
| Sora | sor | Austro-Asiatic | 20 | 84.33 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | srb | 288000 | 9590.51 |
| Spanish | spa | Indo-European | 40 | -4 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | spa | 322299171 | 8163.111 |
| Squamish | squ | Salishan | 49.67 | -123.17 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | squ | 15 | 16535.56 |
| Sre | sre | Austro-Asiatic | 11.5 | 108 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | kpm | 128723 | 12277.46 |
| Sirion?? | srn | Tupian | -15.58 | -64 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | srq | 399 | 25652.6 |
| Suena | sue | Trans-New Guinea | -7.75 | 147.55 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | sue | 3000 | 17155.9 |
| Sui | sui | Tai-Kadai | 26 | 107.5 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | swi | 200120 | 11528.36 |
| Supyire | sup | Niger-Congo | 11.5 | -5.58 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | spp | 364000 | 2186.62 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Savosavo | svs | Savosavo | -9.13 | 159.8 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | svs | 2415 | 18463.28 |
| Swahili | swa | Niger-Congo | -6.5 | 39 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | swh | 772642 | 3321.007 |
| Taba | tab | Austronesian | 0 | 127.5 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | mky | 20000 | 14781.94 |
| Tacana | tac | Tacanan | -13.5 | -68 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | tna | 1821 | 25249.2 |
| Tagalog | tag | Austronesian | 15 | 121 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | tgl | 15900098 | 13328.44 |
| Tamang | tam | Sino-Tibetan | 28 | 85.25 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | taj tge | 777234 | 9380.789 |
| Tehuelche | teh | Chon | -48 | -68 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | teh | 4 | 28932.73 |
| Telugu | tel | Dravidian | 16 | 79 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | tel | 69688278 | 9263.461 |
| Tera | ter | Afro-Asiatic | 11 | 11.83 | -0.4846364 | 1.79538213 | 1.86204304 | 1.057596241 | ttr | 100620 | 1385.42 |
| Tigak | tgk | Austronesian | -2.72 | 150.8 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | tgc | 6000 | 17290.46 |
| Tigr?© | tgr | Afro-Asiatic | 16.5 | 38.5 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | tig | 800000 | 3742.01 |
| Thai | tha | Tai-Kadai | 16 | 101 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | tha | 20229987 | 11377.11 |
| Tibetan (Standard Spoken | tib | Sino-Tibetan | 30 | 91 | 1.3900889 | 1.79538213 | 0.54663194 | 1.244034323 | bod | 1261587 | 9856.141 |
| Ticuna | tic | Ticuna | -4 | -70.5 | -0.4846364 | -0.7169629 | 1.86204304 | 0.220147906 | tca | 41000 | 24183.02 |
| Tiwi | tiw | Australian | -11.5 | 131 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | tiw | 1500 | 15832.01 |
| Teke (Southern) | tks | Niger-Congo | -2.33 | 14.5 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | kkw | 38787 | 568.1662 |
| Tlingit | tli | Na-Dene | 59 | -135 | -1.2345266 | 1.79538213 | 0.54663194 | 0.369162496 | tli | 845 | 15262.57 |
| Tama | tma | Nilo-Saharan | 14.5 | 22 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | tma | 62931 | 2225.867 |
| Temein | tmn | Nilo-Saharan | 11.92 | 29.42 | 1.3900889 | -0.7169629 | 0.54663194 | 0.406585987 | teq | 10000 | 2641.431 |
| Tampulma | tmp | Niger-Congo | 10.42 | -0.58 | 1.3900889 | -1.5544112 | 0.54663194 | 0.127436542 | tpm | 16000 | 1709.985 |
| Temne | tne | Niger-Congo | 8.67 | -13.08 | 1.3900889 | -0.7169629 | 0.54663194 | 0.406585987 | tem | 1200000 | 2732.891 |
| Toaripi | toa | Eleman | -8.33 | 146.25 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | tqo | 23000 | 17052.65 |
| Tarok | tok | Niger-Congo | 9 | 10.08 | -0.4846364 | 0.9579338 | 1.86204304 | 0.778446796 | yer | 300000 | 1140.841 |
| Tol | tol | Tol | 14.67 | -87 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | jic | 350 | 21536.89 |
| Totonac (Papantla) | tpa | Totonacan | 20.33 | -97.33 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | top | 80000 | 20502.09 |
| Trumai | tru | Trumai | -11.92 | -53.58 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | tpy | 78 | 26087.73 |
| Tiruray | try | Austronesian | 6.75 | 124.17 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | tiy | 50000 | 14156.81 |
| Tausug | tsg | Austronesian | 6 | 121 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | tsg | 1022000 | 13848.91 |
| Tsimshian (Coast) | tsi | Penutian | 52.5 | -129 | -1.2345266 | 1.79538213 | -0.7687792 | -0.06930787 | tsi | 800 | 16034.73 |
| Tsou | tso | Austronesian | 23.5 | 120.75 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | tsu | 2127 | 12854.2 |
| Tetun | ttn | Austronesian | -9 | 126 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | tet | 450000 | 15240.98 |
| Tsova-Tush | ttu | Nakh-Daghestanian | 42.5 | 45.5 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | bbl | 3420 | 6050.101 |
| Tuareg (Ahaggar) | tug | Afro-Asiatic | 23 | 6 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | thv | 62000 | 2721.271 |
| Tukang Besi | tuk | Austronesian | -5.5 | 123.5 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | bhq khc | 250000 | 14773.44 |
| Tulu | tul | Dravidian | 12.75 | 75.33 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | tcy | 1949000 | 9086.559 |
| Turkish | tur | Altaic | 39 | 35 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | tur | 50625794 | 5218.225 |
| Tuvan | tuv | Altaic | 52 | 95 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | tyv | 209400 | 9833.798 |
| Tiwa (Northern) | twn | Kiowa-Tanoan | 36.5 | -105.5 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | twf | 927 | 18542.03 |
| Tzeltal (Aguacatenango) | tza | Mayan | 16.42 | -92.5 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | tzh | 90000 | 21112.25 |
| UMbundu | umb | Niger-Congo | -12.5 | 15 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | umb | 4002880 | 1389.191 |
| Una | una | Trans-New Guinea | -4.67 | 140 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | mtg | 4000 | 16255.16 |
| Ungarinjin | ung | Australian | -16.33 | 126 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | ung | 82 | 15848.19 |
| Urub??-Kaapor | urk | Tupian | -2.33 | -46.5 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | urb | 500 | 26262.71 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Usan | usa | Trans-New Guinea | -4.83 | 145.17 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | wnu | 1400 | 16786.23 |
| Uzbek (Northern) | uzn | Altaic | 40.67 | 66.5 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | uzn | 18795591 | 7555.523 |
| Vietnamese | vie | Austro-Asiatic | 10.5 | 106.5 | 1.3900889 | 0.12048546 | 1.86204304 | 1.124205799 | vie | 67439139 | 12186.95 |
| Wahgi | wah | Trans-New Guinea | -5.83 | 144.72 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | wgi whg | 86000 | 16784.02 |
| Wambaya | wam | Australian | -18.67 | 135.75 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | wmb | 12 | 16742.62 |
| Wari' | war | Chapacura-Wanhan | -11.33 | -65 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | pav | 1833 | 25194.31 |
| Wich?? | wch | Matacoan | -22.5 | -62.58 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | mzh | 15000 | 26398.5 |
| Wichita | wic | Caddoan | 33.33 | -97.33 | -1.2345266 | 0.12048546 | -0.7687792 | -0.627606761 | wic | 3 | 19216.67 |
| Wintu | win | Penutian | 41 | -122.5 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | wit | 5 | 17363.24 |
| Wolof | wlf | Niger-Congo | 15.25 | -16 | 1.3900889 | 0.9579338 | -0.7687792 | 0.526414511 | wol | 3612560 | 3348.594 |
| West Makian | wma | West Papuan | 0.5 | 127.58 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | mqs | 12000 | 14764.19 |
| Wik Munkan | wmu | Australian | -13.92 | 141.75 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | wim | 400 | 16926.06 |
| Wantoat | wnt | Trans-New Guinea | -6.17 | 146.5 | 1.3900889 | -1.5544112 | -0.7687792 | -0.311033824 | wnc | 8201 | 16979.56 |
| Woisika | woi | Trans-New Guinea | -8.25 | 124.83 | 1.3900889 | -0.7169629 | -0.7687792 | -0.031884379 | woi | 16522 | 15090.83 |
| Wapishana | wps | Arawakan | 2.67 | -60 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | wap | 7500 | 24664.26 |
| Warao | wra | Warao | 9.33 | -61.67 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | wba | 18000 | 24385.32 |
| Wardaman | wrd | Australian | -15.5 | 131 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | wrr | 50 | 16134.48 |
| Waray (in Australia) | wry | Australian | -13.17 | 131.25 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | wrz | 4 | 15975.44 |
| Wu (Changzhou) | wuc | Sino-Tibetan | 31.67 | 119.92 | 1.3900889 | 0.9579338 | 1.86204304 | 1.403355244 | wuu | 77175000 | 12371.61 |
| Xiamen | xia | Sino-Tibetan | 24.5 | 118.17 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | nan | 46227965 | 12570.5 |
| !X???µ | xoo | Khoisan | -24 | 21.5 | -0.4846364 | 1.79538213 | 1.86204304 | 1.057596241 | nmn | 4200 | 2838.755 |
| Yagua | yag | Peba-Yaguan | -3.5 | -72 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | yad | 5692 | 24056.11 |
| Yapese | yap | Austronesian | 9.58 | 138.17 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | yap | 6592 | 15617.32 |
| Yaqui | yaq | Uto-Aztecan | 27.5 | -110.25 | -0.4846364 | -0.7169629 | 0.54663194 | -0.218322461 | yaq | 16406 | 19213.52 |
| Yareba | yar | Yareban | -9.5 | 148.5 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | yrb | 750 | 17331.48 |
| Yawa | yaw | Yawa | -1.75 | 136.25 | -0.4846364 | -1.5544112 | -0.7687792 | -0.935942272 | yva | 6000 | 15741.91 |
| Yay | yay | Tai-Kadai | 22.42 | 104.75 | -0.4846364 | 0.12048546 | 1.86204304 | 0.499297351 | pcc | 2049203 | 11431.97 |
| Yucuna | ycn | Arawakan | -0.75 | -71 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | ycn | 1800 | 23850.17 |
| Yucatec | yct | Mayan | 20 | -89 | -0.4846364 | 0.12048546 | 0.54663194 | 0.060826985 | yua | 700000 | 20910.71 |
| Yel?Æ Dnye | yel | Yele | -11.37 | 154.17 | 1.3900889 | 1.79538213 | -0.7687792 | 0.805563957 | yle | 3750 | 17981.82 |
| Yessan-Mayo | yes | Sepik | -4.17 | 142.58 | -1.2345266 | -0.7169629 | -0.7687792 | -0.906756206 | yss | 1988 | 16493.31 |
| Yeyi | yey | Niger-Congo | -20 | 23.5 | -0.4846364 | 1.79538213 | 0.54663194 | 0.619125875 | yey | 25200 | 2579.903 |
| Yagaria | ygr | Trans-New Guinea | -6.33 | 145.42 | -0.4846364 | -1.5544112 | 0.54663194 | -0.497471906 | ygr | 21116 | 16877.2 |
| Yidiny | yid | Australian | -17 | 145.75 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | yii | 12 | 17471.56 |
| Yimas | yim | Lower Sepik-Ramu | -4.67 | 143.55 | -1.2345266 | -1.5544112 | -0.7687792 | -1.185905651 | yee | 300 | 16613.97 |
| Yukaghir (Kolyma) | yko | Yukaghir | 65.75 | 150.83 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | yux | 10 | 12354.75 |
| Yakut | ykt | Altaic | 62 | 130 | 1.3900889 | 0.12048546 | -0.7687792 | 0.247265066 | sah | 363000 | 11687.51 |
| Yanyuwa | yny | Australian | -16.42 | 137.17 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | jao | 70 | 16692.95 |
| Yoruba | yor | Niger-Congo | 8 | 4.33 | 1.3900889 | -0.7169629 | 1.86204304 | 0.845056353 | yor | 19327000 | 1176.774 |
| Yukaghir (Tundra) | ytu | Yukaghir | 69 | 155 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | ykg | 30 | 12259.78 |
| Yuchi | yuc | Yuchi | 35.75 | -86.75 | -0.4846364 | 1.79538213 | -0.7687792 | 0.180655509 | yuc | 10 | 19457.92 |
| Yulu | yul | Nilo-Saharan | 8.5 | 25.25 | 1.3900889 | 1.79538213 | 1.86204304 | 1.682504689 | yul | 7000 | 2053.629 |
| Yurok | yur | Algic | 41.33 | -124 | -0.4846364 | 0.9579338 | -0.7687792 | -0.098493936 | yur | 12 | 17268.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Yupik (Siberian) | yus | Eskimo-Aleut | 65 | -173 | -1.2345266 | 0.9579338 | -0.7687792 | -0.348457316 | ess | 1350 | 13515.31 |
| Zande | zan | Niger-Congo | 4 | 26 | 1.3900889 | 0.12048546 | 0.54663194 | 0.685735432 | zne | 1142000 | 1923.022 |
| Zoque (Copainal?°) | zqc | Mixe-Zoque | 17 | -93.25 | -0.4846364 | -0.7169629 | -0.7687792 | -0.656792827 | zoc | 10000 | 21020.07 |
| Zulu | zul | Niger-Congo | -30 | 30 | -0.4846364 | 0.9579338 | 0.54663194 | 0.33997643 | zul | 9563422 | 3858.811 |
| Zuni | zun | Zuni | 35.08 | -108.83 | -0.4846364 | 0.12048546 | -0.7687792 | -0.377643382 | zun | 9651 | 18529.96 |

**Supplementary Information for Atkinson, Q. D. (In prep) Phonemic diversity supports serial founder effect model of language spread from Africa.**

**Supplementary Table S2** - Data table for all 50 language families of size N>1 from the World Atlas of Langauge Structures (WALS; http://wals.info/) showing the number of sampled languages, mean vowel*, consonant† and tone‡ diversity, mean total phoneme diversity, geometric mena of population size§ and distance from the best fit origin to centroid of each family.

* Normalized vowel diversity based on WALS feature #2 "Vowel Quality Inventories"

† Normalized consonant diversity based on WALS feature #1 "Consonant Inventories"

‡ Normalized tone diversity based on WALS feature #13 "Tone"

§Population size information was taken from - Gordon, Raymond G., Jr. (ed.), Ethnologue: Languages of the World, Fifteenth edition. Dallas, Tex.: SIL International. Online version: http://www.ethnologue.com/ (2005).

| Family | Languages | Mean Normalized Vowel Diversity* | Mean Normalized Consonant Diversity† | Mean Normalized Tone Diversity‡ | Mean Total Phoneme Diversity | Geometric Mean Speaker Population Size§ | Distance from best fit origin to centroid |
|---|---|---|---|---|---|---|---|
| Afro-Asiatic | 27 | -0.02637025 | 0.52370133 | 0.449194078 | 0.315508385 | 281838.29 | 4145.56045 |
| Algic | 4 | -0.859581513 | -0.5076008 | -0.43992639 | -0.602369564 | 2089.3 | 19445.2832 |
| Altaic | 15 | 0.640198761 | 0.00882568 | -0.76877916 | -0.039918239 | 363078.05 | 10703.0928 |
| Arawakan | 8 | -0.765845246 | -0.1935577 | -0.43992639 | -0.466443099 | 1071.52 | 26191.4719 |
| Australian | 28 | -0.966708676 | -0.4776919 | -0.76877916 | -0.737726586 | 95.5 | 17921.6738 |
| Austro-Asiatic | 16 | 0.921407562 | 0.38218807 | -0.35771319 | 0.315294145 | 165958.69 | 12634.9164 |
| Austronesian | 42 | -0.190036748 | -0.4577527 | -0.58086329 | -0.409550905 | 52480.75 | 17690.5376 |
| Aymaran | 2 | -1.234526582 | 1.37665797 | -0.76877916 | -0.208882593 | 40738.03 | 26671.494 |
| Caddoan | 2 | -1.234526582 | 0.12048546 | -0.11107361 | -0.408371578 | 10.23 | 20699.2834 |
| Cariban | 6 | 0.452726227 | -1.135687 | -0.76877916 | -0.483913326 | 1122.02 | 26035.4438 |
| Chibchan | 4 | -0.203427643 | -0.2982387 | -0.43992639 | -0.313864245 | 870.96 | 23735.1297 |
| Chon | 2 | -1.234526582 | 0.53920963 | -0.76877916 | -0.488032038 | 3.16 | 30590.4007 |
| Chukotko-Kamchatkan | 2 | -0.484636445 | -0.7169629 | -0.76877916 | -0.656792827 | 5888.44 | 14635.8324 |
| Dravidian | 6 | -0.172182221 | 0.26006019 | -0.76877916 | -0.226967066 | 1380384.26 | 10364.2008 |
| Eskimo-Aleut | 3 | -1.234526582 | 0.67878435 | -0.76877916 | -0.441507131 | 3311.31 | 16806.1904 |
| Hmong-Mien | 2 | 0.452726227 | 1.37665797 | 1.862043036 | 1.230475742 | 1023292.99 | 12950.6826 |
| Hokan | 3 | -0.734599824 | 0.39963491 | -0.76877916 | -0.367914693 | 269.15 | 19895.6418 |
| Huitotoan | 3 | -0.484636445 | 0.12048546 | 0.108161571 | -0.085329804 | 309.03 | 25233.3645 |
| Indo-European | 30 | 0.390235382 | 0.4554648 | -0.63723805 | 0.069487375 | 6025595.86 | 9025.31557 |
| Iroquoian | 3 | -0.734599824 | -0.7169629 | 0.108161571 | -0.447800376 | 870.96 | 20753.6657 |
| Kadugli | 2 | 0.452726227 | 0.12048546 | 1.204337487 | 0.592516392 | 41686.94 | 3536.723 |
| Khoisan | 6 | -0.484636445 | 1.23708324 | 1.204337487 | 0.652261428 | 10232.93 | 1160.73192 |
| Kiowa-Tanoan | 2 | -0.484636445 | 0.53920963 | 0.546631937 | 0.200401708 | 1000 | 20060.8548 |
| Macro-Ge | 6 | 1.077634674 | -1.2752618 | -0.54954398 | -0.249057023 | 1995.26 | 28284.5666 |
| Matacoan | 2 | -0.859581513 | 0.12048546 | -0.76877916 | -0.502625072 | 16595.87 | 27894.244 |
| Mayan | 4 | -0.484636445 | 0.32984755 | -0.43992639 | -0.198238429 | 57543.99 | 22267.4391 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mixe-Zoque | 2 | 0.452726227 | -1.135687 | -0.76877916 | -0.483913326 | 7244.36 | 22341.8098 |
| Muskogean | 2 | -1.234526582 | -1.135687 | 0.546631937 | -0.607860562 | 446.68 | 20990.6224 |
| Na-Dene | 7 | -0.913145095 | 0.83829832 | -0.01711568 | -0.03065415 | 398.11 | 17427.4941 |
| Nakh-Daghestanian | 8 | -0.344032044 | 1.58602005 | -0.60435278 | 0.212545077 | 31622.78 | 7494.26576 |
| Niger-Congo | 62 | 0.936526315 | 0.06645654 | 0.992174406 | 0.665052419 | 218776.16 | 3049.61199 |
| Nilo-Saharan | 25 | 0.790176788 | 0.12048546 | 0.862330601 | 0.590997617 | 151356.12 | 3473.24726 |
| Northwest Caucasian | 2 | -1.234526582 | 0.12048546 | -0.76877916 | -0.62760676 | 331131.12 | 7332.69492 |
| Oto-Manguean | 9 | 0.056950876 | 0.02743565 | 1.569729458 | 0.551371994 | 16218.1 | 22146.3288 |
| Penutian | 6 | -0.734599824 | 0.53920963 | -0.76877916 | -0.321389785 | 15.85 | 18594.1437 |
| Salishan | 4 | -1.047054048 | 1.37665797 | -0.76877916 | -0.146391748 | 56.23 | 17867.6278 |
| Sepik | 2 | 0.077781158 | -0.2982387 | -0.76877916 | -0.32974557 | 1737.8 | 17938.5467 |
| Sino-Tibetan | 25 | 0.3102471 | 0.08698753 | 1.230645708 | 0.542626779 | 1548816.62 | 12153.2107 |
| Tacanan | 2 | -1.234526582 | 0.53920963 | -0.76877916 | -0.488032038 | 389.05 | 26592.163 |
| Tai-Kadai | 9 | 0.556877634 | 0.39963491 | 1.862043036 | 0.939518526 | 398107.17 | 12817.0736 |
| Teberan-Pawaian | 2 | -0.484636445 | -1.135687 | 0.546631937 | -0.357897184 | 6309.57 | 18234.1436 |
| Trans-New Guinea | 19 | 0.067914182 | -0.5847342 | 0.062006795 | -0.151604404 | 8317.64 | 18037.515 |
| Tucanoan | 2 | -0.484636445 | -1.5544112 | 0.546631937 | -0.497471906 | 2089.3 | 25157.9016 |
| Tupian | 3 | 0.140272003 | -0.158664 | -0.76877916 | -0.262390381 | 10000 | 27726.0915 |
| Uralic | 7 | 0.58663518 | 0.35975642 | -0.76877916 | 0.059204144 | 56234.13 | 9758.7268 |
| Uto-Aztecan | 9 | -0.651278698 | -0.3447636 | -0.47646558 | -0.490835965 | 776.25 | 20401.703 |
| Wakashan | 2 | -0.859581513 | 1.79538213 | -0.76877916 | 0.05567382 | 218.78 | 17712.3163 |
| West Papuan | 2 | -0.484636445 | -1.135687 | -0.76877916 | -0.79636755 | 15488.17 | 16450.3364 |
| Yanomam | 2 | 0.452726227 | -1.5544112 | -0.76877916 | -0.623488048 | 1698.24 | 25619.4304 |
| Yukaghir | 2 | -0.484636445 | 0.12048546 | -0.76877916 | -0.377643382 | 18.62 | 13703.3717 |

**Supplementary Information for Atkinson, Q. D. (In prep) Phonemic diversity supports serial founder effect model of language spread from Africa.**

**Supplementary Table S3** - Summary of Mantel and partial Mantel tests for correlations between phoneme diversity and speaker population size and distance from the best-fit origin in Africa.

| Dataset | Diversity Measure | Test | N | partial correlation with distance - r | Determination of diversity by distance | Significance (p-value) |
|---|---|---|---|---|---|---|
| Global | Total | Diversity vs distance from Africa | 504 | -0.544 | 0.296 | <0.001 |
| Global | Vowel | Diversity vs distance from Africa | 504 | -0.390 | 0.152 | <0.001 |
| Global | Consonant | Diversity vs distance from Africa | 504 | -0.265 | 0.070 | <0.001 |
| Global | Tone | Diversity vs distance from Africa | 504 | -0.389 | 0.151 | <0.001 |
| Global | Total | Diversity vs distance from Africa, partial with logged population size | 504 | -0.438 | 0.256 | <0.001 |
| Global | Vowel | Diversity vs distance from Africa, partial with logged population size | 504 | -0.249 | 0.105 | <0.001 |
| Global | Consonant | Diversity vs distance from Africa, partial with logged population size | 504 | -0.231 | 0.070 | <0.001 |
| Global | Tone | Diversity vs distance from Africa, partial with logged population size | 504 | -0.325 | 0.143 | <0.001 |

**Supplementary Information for Atkinson, Q. D. (In prep) Phonemic diversity supports serial founder effect model of language spread from Africa.**

**Supplementary Table S4** - Waypoints used to calculate pairwise geographic distances between locations on different continents.

| Waypoint | Linking | Location | Long. | Lat. |
|---|---|---|---|---|
| 1 | Africa and Asia | Cairo | 31.0 E | 30.0 N |
| 2 | Asia and Europe | Istanbul | 29.0 E | 41.0 N |
| 3 | Asia and Oceania | Phnom Penh | 105.0 E | 11.5 N |
| 4 | Asia and North America | Bering Strait | 170.0 W | 66.0 N |
| 5 | North America and South America | Panama | 77.5 W | 8.0 N |

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