

It's nice to see some discussion of a phonological typology issue on this list — it doesn't happen very often, I'm sad to say.

I have a number of comments to make on the Atkinson paper which is now available on-line from Science and will be paper-published next week.

Atkinson purports to show a relationship between decreasing 'phoneme diversity' and distance from Africa. Various conclusions are derived from this but the most significant idea seems to be that this measure of 'phoneme diversity' declines in a vaguely similar way to the way that human genetic diversity diminishes with distance from Africa.

A very major problem with the paper is that how the values of 'phoneme diversity' were calculated is left unexplained. It appears that the data given in three chapters in the World Atlas of Linguistic Structures (WALS, Haspelmath et al 2005) was used. These chapters (whose author is not credited in the paper) report on the size of the consonant inventory in terms of five categories from large to small, the size of the basic vowel inventory using three categories: small, average and large, and the complexity of the tone inventory, divided into just three categories — none, simple and complex. How these data were summed to produce the 'phoneme diversity' value used in the analyses is not reported in the article. This makes it impossible for anyone to attempt to replicate the results. Not to mention the fact that the basic vowel inventory categories do not reflect the total number of phonemic distinctions in the languages but only the subset that are fundamental (for example, abstracting away from distinctions of nasalization or vowel length, which may mean that the number of vowel phonemes is substantially higher than the number reported in the chapter on basic vowel qualities in WALS). Issues of this sort are also not mentioned in the paper.

Another problem with the paper is that 'phoneme diversity' is being equated with genetic diversity. However the two measures being compared have little similarity. Genetic diversity is measured relative to the degree of difference between different lineages. Atkinson's 'phoneme diversity' does not take any account of whether the elements in the phonological systems being compared are similar or dissimilar. Only the number of distinctions is being compared: it is therefore not actually a measure of diversity, that is, of degree of difference. Therefore this study is in no way comparable to studies of the genetic differences between populations which evaluate whether genetic markers are same or different between populations.

Furthermore, the purported correlation between the inexplicit 'phoneme diversity' measure discussed in this article and distance from Africa is only

one of a number of correlations that can be found. Which one is to be privileged and on what basis? For example, there is a significant positive correlation between the size of consonant inventory in a language and the distance from the equator of its point location in WALS and similar databases. This is shown in figure 1 below which shows results for 609 languages ($F_{1, 609} = 49.5$, $p < .0001$, 3 outlier languages with more than 70 consonants excluded).

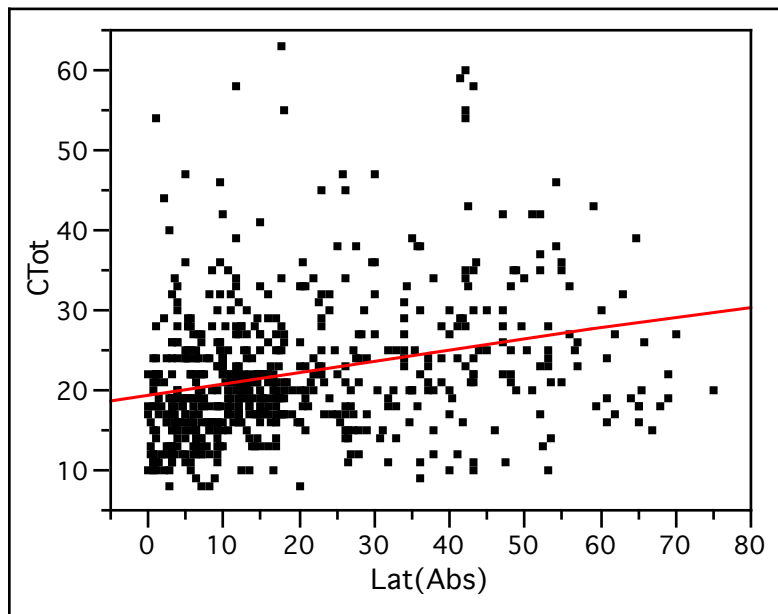


Figure 1. Linear fit between size of consonant inventory and absolute distance from the Equator

Neither basic vowel inventory nor total vowel inventory show any relationship at all to distance from the equator. Elaboration of the syllabic canon (on an 8 point scale) correlates quite highly with distance from the Tropic of Cancer (fairly close to the point of balance between southern and northern landmasses and of global population distributions) ($F_{1,610} = 112.2$, $p < .0001$) — see figure 2. These measures are not significantly associated with variation in longitude (roughly equivalent to distance from Africa in the east-west plane).

These results suggest (1) that different measures of phonological complexity are not distributed geographically in similar ways, and (2) at least one major component of phonological complexity, namely the number of consonants in the phoneme inventory of languages, is not related to distance from Africa, but rather to distance from the Equator, indicating that distance from Africa is not explanatory and other ideas might be worth exploring. The

article under discussion here did not consider any alternative hypotheses, nor did it evaluate whether one or other of the measures it used predicted all or most of the correlation found.

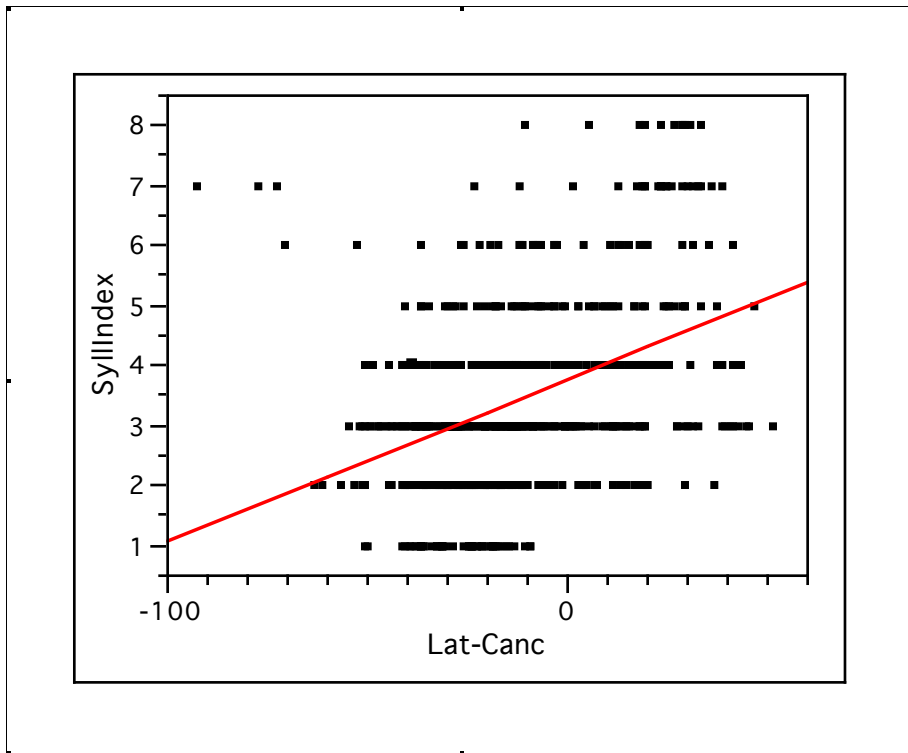


Figure 2. Elaboration of syllable canon as a function of distance and direction from the Tropic of Cancer