The global distribution of complexly articulated consonants supports a monoplanar substrate for modern languages

The global distribution of 'phonemic diversity', with greatest diversity being found in Africa, has been hailed as evidence for a monogenetic origin of fully modern spoken language in Africa (Atkinson 2011, Perreault & Mathew 2012, Author 2016, 2017, Pérez-Losada & Fort 2018). Atkinson (2011) posits an analogy between the global distribution of genetic and phonological diversity; in both cases, trait diversity outside of Africa is a subset of the diversity found within Africa, suggesting a "serial founder effect" associated with human "range expansion." But such a founder effect model of phonemic diversity requires a mechanism that produces sufficient in situ phonemic diversity for phonemic loss through migration to leave a signal. Atkinson, and others who have elaborated his model, have invoked the positive correlation between speech community size and phonological inventory size, posited by Bay and Hauer 2007, as just such a mechanism. Unfortunately, this correlation itself appears to be spurious, a reflection of sampling bias (Donohue & Nichols 2011, Ringe 2011), and is ill-suited to explain phonological diversity of languages spoken by small populations of hunter-gatherers, the kinds of human groups responsible for the global radiation of the species (Bowern 2011).

Author 2016, 2017 proposes an alternative explanation. If the first modern languages had much larger phonemic inventories than contemporary ones, the presence of articulatorily and perceptually marked segments would be expected to be rarer outside of contact zones where those segments could be reacquired via horizontal transmission (i.e., on the assumption of an African origin for modern language, with greater distance from Africa). This seeming violation of uniformitarianism is rendered intelligible if we posit protolinguistic substrates of the first fully modern spoken languages which had very large phonemic inventories; phonemic diversity in early fully modern languages would, on this hypothesis, reflect inherited phonological structure. Such a scenario does not appear improbable if, as Hockett (1960:96) conjectured, "duality of patterning was the last [design feature of language] to be developed." A linguistic system possessing duality of patterning is seen as having an adaptive value because of the way in which it allow speakers to furnish an indefinitely large lexicon. In a language lacking duality of patterning—what Hjelmslev (1961) called a monoplanar language—minimal units of sound capable of distinguishing semantic meanings would themselves have inherent semantic contents, quite in contrast to phonemes and distinctive features in modern spoken languages. In a monoplanar language, the size of the phonological inventory would be correlated with the number of semantic distinctions that could be made in that language, conditioning strong selection for the elaboration of diverse phonological segment types.

As a test of the monoplanar substrate hypothesis [MSH], this paper looks at the global distribution of complexly articulated consonants (Lindblom & Maddieson 1988) involving simultaneous closures at two places of articulation: implosives, ejectives, labial-velars, and clicks. Complexly articulated consonants offer a more probative line of evidence for testing the MSH than purely quantitative comparisons of phoneme inventory size (cf. Creanza 2015) for two reasons. (1) In monoplanar speech, there would be selection for co-articulated segments and for consonants produced employing multiple airstream mechanisms because of the greater semantic potential of languages employing these articulations. These phonological articulations multiply the number of segment which can be produced at a given place of articulation (e.g., plosives produced not only by a pulmonic

airstream mechanism, but also by lingual suction or by a glottalic airstream mechanism can be produced at the same place of articulation). In dually patterned languages, however, selective pressure of this kind is significantly relaxed (Ladd 2014). And indeed, most languages exclusively rely upon a pulmonic egressive airstream mechanism without suffering any cost in terms of morphological richness. (2) Related to this last point, paths of internal (non-contact derived) development of these complexly articulated consonants are rare or unattested, meaning that they offer a less noisy signal of a phonologically rich substrate protolanguage than other productive synchronous co-articulations like aspiration or velarization that do have well-established paths of diachronic development.

Drawing on the UPSID phonological inventory database, Table 1 presents the global distribution of the four principal classes of complex co-articulated segments: ejectives, implosives, clicks, and labial-velars. We use the most common phoneme type for each series as a proxy for the series (i.e. voiced bilabial implosive /ɓ/, unvoiced velar ejective /k'/, alveolar-palatal click /!/, and voiced labial-velar plosive /gb/).

Table 1: Geographical distribution of complex co-articulated plosives (UPSID).

UPSID%	[0.89%]		[8.65%]		[10.86%]		[13.97%]	
Segment	**/ǃ/**		**/gb/**		**/ ɓ /**		**/k'/**	
	Langs.	Stocks	Langs.	Stocks	Langs.	Stocks	Langs.	Stocks
Africa	4	4	37	5	37	7	16	7
Europe	0	0	0	0	0	0	0	0
Asia	0	0	0	0	7	2	8	4
Oceania	0	0	2	2	0	0	0	0
N. Amer.	0	0	0	0	3	3	33	19
S. Amer.	0	0	0	0	1	1	6	6
Total	**4**	4	**39**	7	**48**	11	**63**	36

Our findings strongly support the MSH. The rarest complex consonant types are most widely attested in Africa, both at the level of languages and stocks. This is particularly notable given the greater stock-diversity of the New World (Nichols 1992). Ejectives offer the least support for the hypothesis, but this sound class is also the most widely distributed.

References

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