THE EVOLUTION OF VOCATIVE MORPHOLOGY AS SHAPED BY THE TUNE

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Human communication systems can express multiple types of meaning simultaneously such as propositional meaning and discourse-pragmatic meaning. To do so language users often exploit different aspects of the speech signal. While propositional content tends to be signaled primarily through *segmental* means (i.e. different combinations of consonants and vowels), its broader interpretation within the discourse context is often expressed *prosodically* by the modulation of pitch across the utterance (henceforth referred to as the *tune*, see Ladd 2008).[1]

Segmental and prosodic aspects of the signal are not independent of each other. For successful articulation and perceptual retrieval of the tune, the segmental carriers need to have a rich harmonic structure and high periodic energy (e.g. Barnes et al. 2014). The optimal carriers of the tune are therefore vowels. When there is a shortage of vowels, communicatively relevant tunes can be phonetically impoverished (e.g. Odé 2005), endangering the recovery of the intended meaning. These functional conflicts can lead to biases towards speech variants that optimize the transmission of the tune including the insertion of non-lexical vowels (e.g. Roettger 2017, Roettger & Grice 2019). The results of such systematic biases might then be diachronically reanalyzed as a grammatical marker.

The present paper will argue that vocative morphology is an example of such a grammaticalization process. Vocative constructions – used to call interlocutors or to attract /maintain the addressee's attention (e.g. Daniel & Spencer 2009) – are often characterized by specific tunes (e.g. Ladd 1978). Many languages also mark vocatives morphologically. Since the tunes associated with vocatives require 'tune-friendly' segmental carriers, one potential pathway for the diachronic emergence of such morphological markers is the grammaticalization of tune-driven intrusive vowels (Roettger & Grice 2019). Such markers would consist of a single vowel, and therefore we predict that vocatives should contain consonants less frequently than other grammatical markers.

We performed a large-scale literature search and assembled a cross-linguistic database of 101 languages (46 language families) that have been described with

[1] Note that neither is propositional meaning restricted to segmental contrasts, nor is discourse-pragmatic meaning restricted to prosody.

grammatical vocatives. We extracted segmental information about vocative markers and compared them to structural case markers (SCM) that overtly mark either the agent or patient. The results are shown in Fig. 1(B). The estimated posterior probability of consonants in SCMs is 0.85 (95% Credible Interval [0.62,0.97]), while in vocatives it is only 0.40 (95% CI [0.17,0.66]). The estimated difference is –0.45 (95% CI [–0.69,–0.18]). These patterns hold even when only considering suffixes (see Fig. 1C). Our results indicate that vocative markers are substantially more tune-friendly than other comparable grammatical markers, suggesting that many of them may have emerged from tune-driven adjustments to the segmental material.

These findings suggest that accounts of the evolution of linguistic systems must consider the expression of different communicative functions (Foulkes et al. 2018). Here we have focused on how the acoustic properties of prosodic patterns (used to convey pragmatic meaning) interact with segmental features, and how this interaction potentially shapes the emergence of morphological vocatives.

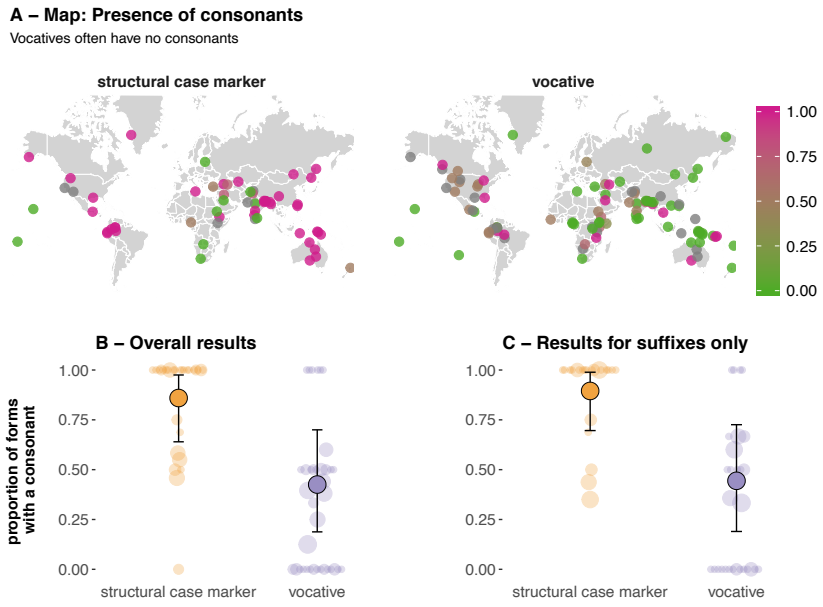

Figure 1. A - World map illustrating the proportion of morphological markers that have at least one consonant across the languages within our corpus; B - Model estimates (posterior means and 95% CIs) for all markers; C - Model estimates for only suffixes. Semi-transparent points are averages for language families scaled for the number of languages in each family.

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