Languages of esoteric societies provide a window into a previous stage in the evolution of human languages

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Contemporary languages of today's esoteric societies are argued to provide a model for a previous stage in the evolution of human languages. A recent analysis of data from the World Atlas of Language Structures compares languages spoken by esoteric and exoteric societies, showing that the languages of esoteric societies tend to be associated with more complex morphological structures alongside greater simplicity in the realm of syntax. Such correlations between societal and linguistic features provide a window into linguistic phylogeny. Given that until recently all human societies were highly esoteric, it may be inferred that the languages spoken by such Upper Paleolithic societies were similar to those of current esoteric societies, instantiating a earlier stage in the evolution of language characterized by more complex morphology but simpler syntax.

1. Introduction

There is a growing consensus that the evolution of human language and human linguistic capabilities was gradual rather than abrupt (Progovac, 2019), this paralleling the gradual evolution of the human physical and behavioral distinctive phenotype (Neubauer et al., 2018; Scerri and Will, 2023). This in turn raises the question what such intermediate stages in language phylogeny might have looked like. Addressing this question, a number of proposals have been put forward in an attempt to characterize early stages in the evolution of language. In one of the earliest and most renowned of such proposals, Bickerton (1990) posits a *protolanguage*, endowed with just rudimentary mechanisms for juxtaposing simple words together. Somewhat further down the evolutionary line, Gil (2017) posits an *IMA language* that is Isolating (lacking internal word structure), Monocategorial (lacking distinct parts of speech), and Associational (lacking construction-specific rules of semantic compositionality) — though with a more

developed combinatorial syntax, and bearing a closer resemblance to at least some contemporary human languages, such as Riau Indonesian. Even later in the evolutionary trajectory, Benítez-Burraco and Progovac (2020) propose a language type characterized by substantially increased morphological complexity alongside a syntax still lacking some of the functional categories of many modern languages (e.g. complementizers), arguing that such languages were associated with the esoteric, inward-oriented societies typical of past stages of human evolution, and to a lesser extent also some contemporary societies such as those of hunter gatherers.

This paper provides novel empirical support for the latter proposal by Benítez-Burraco and Progovac of a stage in the evolution of language associated with Upper Paleolithic societies and characterized by rich morphology and relatively simple syntax. Our argument consists of two parts. First, we present the results of a recent large-scale survey of contemporary languages (Chen et al., 2023), demonstrating that societal esotericity correlates positively with morphological complexity, but negatively with syntactic complexity. Then, invoking the evolutionary inference principle for linguistic and cultural/socio-political complexity (Gil, 2021), we suggest that the languages of today's esoteric societies syntax, provide a model for the languages spoken by similarly esoteric societies in the evolutionary past.

2. Languages of esoteric and exoteric societies

Recent studies have examined the potential relationships between linguistic and societal structures. While some studies, e.g. Koplenig (2019) and Shcherbakova et al (2023) have not found evidence for such connections, a wide range of other studies have revealed some of the ways in which contemporary human languages spoken by esoteric societies differ systematically from their counterparts spoken by exoteric societies. Many of these studies make reference to the notion of complexity, both in the linguistic and societal domains. Specifically, exoteric societies have been characterized as more politically complex than their esoteric counterparts.

Several studies have demonstrated negative correlations between aspects of societal and linguistic complexity. As argued by McWhorter (2005, 2011, 2018), Dahl (2004), Wray and Grace (2007), Lupyan and Dale (2010), Trudgill (2011) and others, smaller societies, generally characterized by sociopolitical esotericity and more context-dependent forms of communication, are fertile grounds for the accretion of linguistic complexity in the domain of morphology, while larger political entities, typically associated with reduced sociopolitical esotericity and

various modes of less context-dependent communication, particularly those able to convey propositional content to strangers, are conducive to linguistic simplification, specifically, in the domain of morphology, one possible reason being imperfect adult second-language acquisition.

In contrast to the above, however, a range of other studies support an opposite positive correlation between sociopolitical complexity and various aspects of linguistic complexity. Thus, recent experiments by Raviv, Meyer and Lev-Ari (2019, 2020) and Raviv (2020) show that in artificial languages, larger speech communities create more highly compositional languages — which entails increased complexity in the domain of combinatorial syntax. Similarly, in sign languages, Meir et al (2012) and Ergin et al (2020) argue that an increase in the size of the signing community results in a greater degree of conventionalization. In the realm of metaphor comprehension, Gil and Shen (2021) show that more highly complex polities tend to be associated with languages whose metaphors are endowed with more complex directional structure. With regard to Tense-Aspect-Mood marking, Gil (2021) demonstrates that languages belonging to larger families, the product of demographic spread, are associated with more complex systems characterized by obligatory as opposed to optional marking. Finally, in the domain of basic clause structure, work reported on in Gil and Shen (2019) shows that more highly complex polities tend to be associated with languages endowed with a greater degree of grammaticalization of thematic-role assignment.

How might these seemingly conflicting results be reconciled? The key lies in the observation that the linguistic features whose complexity correlates with societal complexity in opposing ways, either negatively or positively, are of two qualitatively different kinds. Simplifying somewhat, negative correlations between societal and linguistic complexity are characteristic of features of a morphological nature, while positive correlations between societal and linguistic complexity are associated with features of a syntactic nature.

We have found evidence to this effect in our research (preliminarily described in Benítez-Burraco et al., 2022; Chen et al., 2023). We classified the 82 out of 142 language features from the *World Atlas of Language Structures*, or *WALS* (Haspelmath et al., 2005) that are related to morphology or syntax, as purely morphological features (M), purely syntactic features (S), features pertaining to both domains but predominantly related to morphology (Ms) and features pertaining to both domains but predominantly related to syntax (mS). Independently, we characterized the diverse values for each feature in terms of complexity as either equipollent or privative: while equipollent features are ones

in which there is no prima facie reason to characterize one of the feature values as more complex than the other, privative features are those in which different feature values may be ranked along a scale of complexity, with some feature values more complex than others. The analysis invokes the notion of descriptive complexity, considering one feature value to be more complex than another if its description makes use of a larger number of symbols. For example, WALS feature 22, "Inflectional Synthesis of the Verb", is first classified as primarily morphological (Ms), since it pertains to changes in word form, even though these different forms may be used secondarily for syntactic purposes, as in agreement. Having a larger number of inflectional forms is then taken to be indicative of greater morphological complexity. Likewise, WALS feature 81, "Order of Subject, Object and Verb", is first classified as purely syntactic (S). Then, free word order languages are regarded as being of lesser syntactic complexity than languages with a single dominant order.[1]

As for societal complexity, languages are ranked in accordance with a range of criteria drawn from three different sources: the Expanded Graded Intergenerational Disruption Scale (EGIDS), from *Ethnologue* (Eberhard et al., 2022); the size of the family to which the language belongs, from *Glottolog* (Hammarström et al., 2022); and a variety of criteria from the *D-Place* database (Kirby et al., 2016), including the number of jurisdictional levels above the local community (Feature EA033 in the database), the size of local communities (EA031), and population size (EA202).

Bringing together the above sources, we constructed a dataset containing 94 different classifications along with 1 societal PC. We ran a linear regression between each combination of a classification and the PC, resulting in 94 statistical tests. For binary classifications, namely those with only two values, we ran a logistics regression instead. For each statistical test, we reported the estimated slope along with the p-value. We say a relation between a principal component is significant if the p-value is less than 0.05. We also controlled for potential confounding factors, particularly, language family and geographical regions, by conducting an additional analysis in which we considered the phylogeny and the geographical proximity of languages.

Our results reveal a statistically significant tendency for simpler esoteric societies to be associated with languages of greater morphological complexity but lesser syntactic complexity than their more complex exoteric counterparts. Based

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[1] In addition, WALS feature 81 distinguishes between six dominant word orders; however, since there is no obvious basis for characterizing one such order as more complex than another, this further distinction is considered to be equipollent and therefore ignored in the present analysis.

on these results, two language types are defined: *S-languages*, associated with eSoteric societies, exhibiting simpler syntax but more complex morphology, and *X-languages*, associated with eXoteric societies, characterized by more complex syntax but simpler morphology. Although esotericity and exotericity constitute two poles on a single scale of sociopolitical complexity, the factors driving the development of Type S and Type X languages are not mirror-images but rather of diverse and qualitatively different natures. Thus, while the correlation between esotericity and morphological complexity could be due to factors such as simplification resulting from imperfect adult second-language acquisition, the correlation between exotericity and syntactic complexification may be attributed to factors such as the need to satisfy a broader range of communicative needs, e.g. conveying more complex meanings to unrelated people. Moreover, since these two language types are based on quantitative analyses, they are most appropriately considered to be prototypes around which languages tend to cluster. In particular, as noted, many of the WALS features are of a mixed morphological/syntactic nature (Ms or mS in our characterization). For such features, then, the factors driving the development of Type S and Type X languages pull in opposite directions. For this reason, the development of Type S and Type X languages does not necessarily result, as might have been expected, in a strict trade-off between the morphological and syntactic complexity of languages. This seemingly explains the results of a second quantitative analysis of WALS data we have also conducted, this time without considering sociopolitical factors, which suggest no trade-off (a perhaps a slight trend towards a positive correlation) between morphological and syntactic complexity across languages (Benítez-Burraco, Chen and Gil 2024).

3. A Window into phylogeny

What can the present tell us about the past? In accordance with a slightly modified version of the *Evolutionary Inference Principle for Linguistic and Cultural/Socio-Political Complexity* (Gil 2021), correlations between societal and linguistic complexity observed amongst contemporary human languages, of the sort we have highlighted above, may be used to make inferences about prior stages in linguistic phylogeny. Specifically, if particular linguistic features are found to be systematically associated with today's esoteric societies, it may be inferred that these same features were characteristic of the languages of the Upper Paleolithic era. Archaeological and paleogenetic evidence (e.g. Sikora et al., 2017, Koptekin et al., 2023) indicates that all societies were strongly esoteric at that time, with signs of exotericity increasing only recently. Invoking this principle, our findings

surveyed above thus support the existence of an earlier evolutionary stage in which all languages were S-languages, with simpler syntax but more complex morphology.

4. Conclusion

That contemporary S-languages provide a model for an earlier stage in the evolution of language should not be considered surprising if we consider the effects of the social environment on language structure, and the fact that in many places, human societies still exhibit many of the sociopolitical features of Paleolithic societies. It must be kept in mind, however, that we are referring to actually observable languages, not to the linguistic abilities that underlie them. Clearly, speakers of S-languages are perfectly capable of acquiring X-languages if they are called upon to do so. In fact, in today's modern world, it is probably the case that a large majority of speakers of S-languages are also fluent in an X-language, be it a regional lingua franca or a national language.

However, some speculations in Benítez-Burraco et al. (2022) and Chen et al. (2023) point towards a deeper effect associated with the distinction between S-languages and X-languages. First, it is suggested that these two language types may make differential use of two different kinds of memory that are crucially involved in language processing: while S-languages, with their greater propensity for the kinds of irregularities typical of rich morphologies, may rely more heavily on declarative memory, X-languages, with their greater orientation towards combinatorial syntax, may tend more to call upon procedural memory. Moreover, because declarative and procedural memory seem to depend on different genes (e.g. Ullman et al., 2015), one could hypothesize this differential effect resulting in a language- type distinctive (epi)genetical signal. A more radical view would be that changes external to language resulting in the potentiation of declarative or procedural memory might have favoured the transition to the corresponding language type, S-language or X-language respectively. One such change might be the advent of more complex technologies, whose mastering would demand advanced procedural abilities. At present, this hypothesis has not yet seen any systematic empirical support, but it is a possibility we are currently testing.

Whatever the case, the results of this paper join forces with other recent studies, such as Progovac (2015), Gil (2017) and others, showing how much of the evolutionary past of human languages is still visible, in one way or another, in the contemporary linguistic landscape. Thus, linguistic typology offers a valuable window into linguistic phylogeny.

References

Benítez-Burraco, Antonio, Candy Cahuana, Sihan Chen, David Gil, Ljiljana Progovac, Jana Reifegerste and Tatiana Tatarinova (2022) "Cognitive and Genetic Correlates of a Single Macro-Parameter of Crosslinguistic Variation", The Evolution of Language, Proceedings of the 14th International Conference (EVOLANG14).

Benítez-Burraco, Antonio, Sihan Chen and David Gil (2024) "The Absence of a Trade-off between Morphological and Syntactic Complexity", *Frontiers in Psychology - Language Sciences* 3:1340493.

Benítez-Burraco, Antonio and Ljiljana Progovac (2020) "A four-stage model for language evolution under the effects of human self-domestication", *Language and Communication 73.1–17.*

Bickerton, Derek (1990) *Language and Species*, University of Chicago Press.

Chen, Sihan, David Gil, Sergey Gaponov, Jana Reifegeste, Tessa Yuditha, Tatiana Tatarinova, Ljiljana Progovac and Antonio Benitez-Burraco (2023) "Linguistic and Memory Correlates of Societal Variation, A Quantitative Analysis", PsyArXiv Preprints, 10.31234/osf.io/bnz2s.

Dahl, Östen (2004) *The growth and maintenance of linguistic complexity*, John Benjamins, Amsterdam.

Eberhard, David M., Gary F. Simons, and Charles D. Fennig (eds.). 2022. Ethnologue: Languages of the World. Twenty-fifth edition. Dallas, Texas: SIL International. Online version: http://www.ethnologue.com.

Ergin, Rabia, Limor Raviv, Ann Senghas, Carol Padden and Wendy Sandler (2020) "Community Structure Affects Convergence on Uniform Word Orders: Evidence from Emerging Sign Languages", In A. Ravignani, C. Barbieri, M. Flaherty, Y. Jadoul, E. Lattenkamp, H. Little, M. Martins, K. Mudd, & T. Verhoef eds., *The Evolution of Language: Proceedings of the 13th International Conference (Evolang13)*, Nijmegen, 84-86.

Gil, David (2017) "Isolating-Monocategorial-Associational Language", in H. Cohen and C. Lefebvre eds, Handbook of Categorization in Cognitive Science, Second Edition, Elsevier, Amsterdam, 471-510.

Gil, David (2021) "Tense-Aspect-Mood Marking, Language Family Size, and the Evolution of Predication", in A. Benítez-Burraco and L. Progovac eds., Prehistorical Languages, *Philosophical Transactions B.*

Gil, David and Yeshayahu Shen (2021) "Metaphors: The Evolutionary Journey from Bidirectionality to Unidirectionality", in A. Benítez-Burraco and L. Progovac eds., *Prehistorical Languages, Philosophical Transactions B*.

Hammarström, Harald & Forkel, Robert & Haspelmath, Martin & Bank, Sebastian. 2022. Glottolog 4.6. Leipzig: Max Planck Institute for Evolutionary Anthropology. https://doi.org/10.5281/zenodo.6578297 (Available online at http://glottolog.org, Accessed on 2022-08-25.)

Haspelmath, Martin, Matthew Dryer, David Gil and Bernard Comrie eds. (2005) *The World Atlas of Language Structures*, Oxford University Press, Oxford.

Kirby, K. R., Gray, R. D., Greenhill, S. J., Jordan, F. M., Gomes-Ng, S., Bibiko, H. J., ... & Gavin, M. C. (2016). D-PLACE: A global database of cultural, linguistic and environmental diversity. PloS one, 11(7), e0158391.

Koplenig, Alexander (2019) "Language structure is influenced by the number of speakers but seemingly not by the proportion of non-native speakers", *Royal Society Open Science* 6(2). 181274. https://doi.org/10.1098/rsos.181274.

Koptekin, D., Yüncü, E., Rodríguez-Varela, R., Altınışık, N. E., Psonis, N., Kashuba, N., Yorulmaz, S., George, R., Kazancı, D. D., Kaptan, D., Gürün, K., Vural, K. B., Gemici, H. C., Vassou, D., Daskalaki, E., Karamurat, C., Lagerholm, V. K., Erdal, Ö. D., Kırdök, E., Marangoni, A., … Somel, M. (2023). Spatial and temporal heterogeneity in human mobility patterns in Holocene Southwest Asia and the East Mediterranean. Current biology : CB, 33(1), 41–57.e15. https://doi.org/10.1016/j.cub.2022.11.034

Lupyan, Gary and Rick Dale (2010) "Language Structure Is Partly Determined by Social Structure", *PLoS ONE* 5.1:e8559. (https://doi.org/10.1371/journal.pone.0008559.)

McWhorter, John H. (2005) *Defining Creole*, Oxford University Press, Oxford.

McWhorter, John H. (2011) *Linguistic Simplicity and Complexity, Why Do Languages Undress?* De Gruyter Mouton, Berlin.

McWhorter, John H. (2018) *The Creole Debate*, Cambridge University Press, Cambridge.

Meir, Irit, Assaf Israel, Wendy Sandler, Carol Padden and Mark Aronoff (2012) "The Influence of Community on Language Structure: Evidence from Two Young Sign Languages", *Linguistic Variation* 12.2:247-291.

Nettle, Daniel (2012) "Social scale and structural complexity in human languages", *Philosophical Transactions of the Royal Society B: Biological Sciences* 367.1597:1829-1836.

Neubauer, Simon, Jean-Jacques Hublin, and Philipp Gunz (2018) "The evolution of modern human brain shape", *Science advances*, 4(1), eaao5961 (https://doi.org/10.1126/sciadv.aao5961).

Progovac, Ljiljana (2015). *Evolutionary Syntax*. Oxford: Oxford University Press.

Progovac, Ljiljana (2019) "Gradualist Approaches to Language Evolution", in A Critical Introduction to Language Evolution, Current Controversies and Future Prospects, *SpringerBriefs in Linguistics. Cham,Switzerland: Springer. (doi:10.1007/978-3-030-03235-7_3)* 31-66.

Raviv, Limor (2020) *Language and society: How social pressures shape grammatical structure*, PhD Dissertation, Radboud University, Nijmegen.

Raviv, Limor, Antje Meyer and Shiri Lev-Ari (2019) "Larger Communities Create More Systematic Languages", *Proceedings of the Royal Society B: Vol. 286,* 907, 20191262, 17.07.2019:1-9

Raviv, Limor, Antje Meyer and Shiri Lev-Ari (2020) "The Role of Social Network Structure in the Emergence of Linguistic Structure", *Cognitive Science* 44, (DOI: 10.1111/cogs.12876).

Scerri, Eleanor M. L., and Manuel Will (2023) "The revolution that still isn't: The origins of behavioral complexity in Homo sapiens", *Journal of human evolution*, 179, 103358 (https://doi.org/10.1016/j.jhevol.2023.103358).

Sikora, M., Seguin-Orlando, A., Sousa, V. C., Albrechtsen, A., Korneliussen, T., Ko, A., Rasmussen, S., Dupanloup, I., Nigst, P. R., Bosch, M. D., Renaud, G., Allentoft, M. E., Margaryan, A., Vasilyev, S. V., Veselovskaya, E. V., Borutskaya, S. B., Deviese, T., Comeskey, D., Higham, T., Manica, A., … Willerslev, E. (2017). Ancient genomes show social and reproductive behavior of early Upper Paleolithic foragers. Science (New York, N.Y.), 358(6363), 659–662. https://doi.org/10.1126/science.aao1807

Shcherbakova, Olena, Susanne Maria Michaelis, Hannah J. Haynie, Sam Passmore, Volker Gast, Russell D. Gray, Simon J. Greenhill, Damián E. Blasi & Hedvig Skirgård (2023) "Societies of strangers do not speak less complex languages", *Science Advances* 9(33). eadf7704. https://doi.org/10.1126/sciadv.adf7704.

Trudgill, Peter (2011) *Sociolinguistic Typology: Social Determinants of Linguistic Complexity*, Oxford University Press, Oxford.

Ullman, M. T. (2015). The declarative/procedural model: a neurobiologically motivated theory of first and second language. In Van Patten, B., and Williams, J. (Eds.), Theories in Second Language Acquisition: An Introduction (2nd ed.) (pp. 135-158). London and New York: Routledge

Wray, Allison and George W. Grace (2007) "The Consequences of Talking to Strangers: Evolutionary Corollaries of Socio-cultural influences on Linguistic Form", *Lingua* 117:543-578.