

## PHONETIC UNIVERSALS IN PHONOLOGICAL SYSTEMS AND THEIR EXPLANATION

## Summary of Moderator's Introduction

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In many ways the study of phonetic and phonological universals is a relatively old endeavor in linguistics and in other ways it is relatively new. It is old in the sense that some 100 years ago when our intellectual forefathers, Ellis, Sweet, Bell, Lepsius, Passy, Jespersen, and others were struggling to develop a workable phonetic alphabet that could be used to transcribe the sounds of any language, they had, implicitly at least, to deal with the problem of whether there were phonetic universals. That they succeeded in devising such a practical universally-applicable phonetic notation, such as we use today, is a tribute to their hard work, their vast experience with languages of the world, and their scientific judgment. The phonetic alphabet and the set of descriptive terms accompanying it are not perfect, of course, but modern work on universal sound patterns would be impossible without these important tools.

It is an old interest, too, in the sense that during the past century there has been a steady, if small, flow of relatively sophisticated explanations for observed universal sound patterns, e.g., (to mention just a few) Passy 1890, Issatchenko 1937, Troubetzkoy 1939, Jakobson 1941, Hockett 1955, Martinet 1955. Characteristic of the keen insights offered during this period are the following (and here I present remarks relevant to topics of particular interest to this symposium):

Passy (1890) on obstruent devoicing: 'On remarque que ce sont les explosives qui se dévocalisent le plus souvent. Cela se conçoit, car pour produire une explosive vocalique, il faut chasser dans une chambre fermée l'air qui fait vibrer les cordes vocales; action qui nécessite un effort considérable, et ne peut pas se prolonger. Aussi les explosives doubles sont-elles particulièrement sujettes à devenir soufflées..' [161].

Chao (1936) on the patterning of voiced glottalized stops: 'A very significant circumstance about the occurrence of [ʔb, ʔd, ʔs, ʔj] is that in all the [Chinese] dialects in which they are known to exist they are always limited to labials and dentals and never exist in velars ... The reason is not

far to seek. Between the velum and the glottis, there is not much room to do any of the tricks that can be done with the larger cavity for a b or a d. As soon as there is any vibration of the vocal cords, the cavity for a g is filled and a positive pressure is created. There is therefore no space or time to make any impression of suspension [of voicing via simultaneous glottal closure, as with ?b and ?d] or of inward "explosion" as with [b, d]. The velar plosive is difficult to voice without having to do any additional tricks.'

In another sense, however, interest in universal sound patterns is rather recent or at least renewed. This has come about, I think, due to the interaction of a number of trends and events. First, there is the interest in phonological universals stimulated by the new set of research goals presented by generative phonology, namely, to look at universals of language for what they will reveal about humans' genetically-based capacity for language.

Second, there has been the sheer accumulation of reliable phonological data on a large number of languages. Works such as Guthrie's Comparative Bantu and Li's Comparative Tai (to mention just two), which synthesize large amounts of phonological data, exemplify this trend. It is because of this latter development that a project such as the Stanford Phonology Archive, constructed by Charles Ferguson and Joseph Greenberg, was possible. Third, there has been the almost explosive growth of experimental phonetics over the past 30 years or so -- especially in the development of empirically-validated mathematical models of various aspects of the speech production and perception mechanisms. In short, phonologists have realized that the study of universal sound patterns can be interesting and very important and that they now have the resources to do a better job of it than ever before.

The contributions to this symposium on phonetic universals represent very well the wide range of data, of talents, and of theoretical outlooks that are necessary in this area.

Björn Lindblom, in 'Some phonetic null hypotheses for a biological theory of language' raises the possibility that the form of language and the range over which it varies when it changes, may be determined by the biological constraints of its human users. He looks to phonetics to provide the evidence on this issue.

Kenneth N. Stevens, in 'Bases for phonetic universals in the properties of the speech production and perception systems' considers how the natural classes among speech sounds must arise due to the individual members of the classes sharing common modes of production at the neuromuscular level and/or giving rise to a common set of sensory images via the tactile, kinesthetic, or auditory channels.

Kenneth Pike, in 'Universals and phonetic hierarchy' suggests that the inability of phonologists to integrate such elusive units as the syllable or stress group into their descriptions of language may be due to their commitment to use just a single hierarchical structure. He proposes the use of parallel but interlocking hierarchies, e.g., one each for the phonological, grammatical, and referential domains.

Two papers in this symposium and one section paper deal with closely related topics on universal patterns in languages' obstruent inventories.

Thomas V. Gamkrelidze, in 'Hierarchical relations among phonetic units as phonological universals', presents a comprehensive analysis of universal co-occurrence tendencies among various features of obstruents, e.g., place of articulation, voicing, glottalization, and uses this to support a reanalysis of the Indo-European stop inventory.

André G. Haudricourt, in 'Apparition et disparition des occlusives sonores préglottalisées', presents the phonetic factors that lead to the development or loss of voiced preglottalized stops and presents extensive supporting cross-linguistic data, especially from South and Southeast Asian languages.

Sandra Pinkerton, in her section paper 'Quichean (Mayan) glottalized and non-glottalized stops: a phonetic study with implications for phonological universals', presents instrumental data on the manner of production of glottalized stops in five Mayan languages. Having found voiceless uvular implosives, she proposes a revision of Greenberg's (1970) implicational hierarchy for glottalized stops which would equate it to Gamkrelidze's claims: voicing is marked for velar obstruents, voicelessness for labial obstruents.

Robert K. Herbert, in 'Typological universals, aspiration, and post-nasal stops', points out several universal patterns characteristic of nasal + stop clusters and uses these to call into

question one reconstruction of the history of such clusters in Eastern Bantu languages.

Jean Marie Hombert, in 'Universals of vowel systems: the case of centralized vowels', presents data from speech perception tests conducted in the field with speakers of Fe?fe? (a Bantu language of Cameroon) which suggest that the universal tendency of disfavoring central vowels may have its origin in a human auditory constraint.

In my own paper, 'Universals of labial velars and de Saussure's chess analogy', I present four phonetically-based universal patterns characteristic of labial velars and use this to call into question the wisdom of structuralist phonology's pre-occupation with system-internal relations in language and their descriptions.

#### Conclusion

It is worth mentioning that study of phonological universals is of more than theoretical interest. If it is done well, it could yield results of great practical benefit, too, e.g., in such areas as speech therapy, second language teaching, speech recognition, and neurophysiology.

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