NATURAL PHONOLOGY: UNIVERSAL PRINCIPLES FOR THE STUDY OF LANGUAGE (INSIDERS MEET OUTSIDERS)

Katarzyna Dziubalska-Kołaczyk

Adam Mickiewicz University, Poznan, Poland
dkasia@ifa.amu.edu.pl

ABSTRACT

Ever since Jakobson (or, shall we say, Plato?) linguists have been searching for universals (e.g. [1]). Their views on the role of universals in language and linguistics have varied widely, though. In this session we want to concentrate on the question of the existence of universal principles for the study of language. Natural Phonology has always advocated (cf. e.g. [2], [3], [4]) the holistic view on language, both in the sense of analyzing language structures (against 'splendid isolation' of any structure) as well as in the sense of seeing language as part of the universe. The latter means that the same principles of explanation apply to language and to other aspects of life, and thus they are derivable from the most general laws of human interaction with nature. In Natural Phonology the principles are cognitive, phonetic, psychological, sociological, etc. They lead to the establishment of linguistic preferences which guide the explanation of language-specific structures. Apart from Natural Phonology, many other theories refer to universals. Do they, however, look for universal principles of explanation? This is the core of the planned debate between the NP insiders and the outsiders wishing to take part.

Keywords: linguistic universals, naturalness, principles of explanation

1. INTRODUCTION

This paper will briefly present the explanatory model of Natural Linguistics, encompassing Natural Phonology, with a view to demonstrate the understanding of universal principles of explanation within the theory. An illustration of the operation of the model will be provided, based on research in phonotactics (and morphonotactics).

2. NATURAL PHONOLOGY: A REMINDER

2.1. The rationale

Natural Phonology (NP henceforth) is a theory of phonological structure, acquisition and change originated by David Stampe ([5], [6]) and developed by David Stampe and Patricia Donegan (cf., among others, [2], [7]). The theory operates with *phonological processes*, which constitute natural responses of the human vocal and perceptual systems to the difficulties encountered in the production and perception of speech. For instance, it is more difficult, on purely aerodynamic grounds, to produce a voiced stop than a voiceless one, as well as a voiced velar stop than an alveolar one, while a bilabial one is the easiest of the three. Phonological processes are thus phonetically motivated. They are universal, since all humans exhibit the same potential to respond to the difficulties of speech. A child learns to inhibit some of those natural responses in order to arrive at a language-specific phonology. Importantly, "the universality of processes does not mean that they apply in all languages – only that they are motivated in all speakers" ([8]: 64). NP explains by referring to the tension between two conflicting criteria (ease of production vs. clarity of perception). There is also a conflict between paradigmatic (segmental) and syntagmatic (sequential) difficulty. Processes perform substitutions in order to adapt the speaker's phonological intentions to his/her phonetic capacities as well as enable the listener to decode the intentions from the flow of speech. They are thus either context-sensitive, assimilatory substitutions (lenitions), or context-free, dissimilatory ones (fortitions). Higher order prosodic processes map segmental material on rhythmic patterns prior to the operation of articulatorily and perceptually driven substitutions.

Stampe insists on a strict distinction between phonology and morphonology: *morphonological rules* do not have any synchronic phonetic motivation and have to be learned by children in first language acquisition.

A phoneme in NP is an underlying *intention* (cf. Baudouin and Sapir) shared by the speaker and the listener (who are always "two in one"). The shared knowledge of intentions guarantees communication between the speaker and the listener within a given language, even if the actually pronounced forms diverge substantially from what is intended, for example, in casual speech. In other words, phonemes are fully specified, pronounceable percepts.

"*Naturally pronounceable*" in NP means "derivable by means of phonological processes". Processes manifest themselves in all types of phonological behaviour of language users: in normal performance, in child language, in second language acquisition, in aphasia and other types of disorders, in casual speech, in emphatic speech, in slips, errors, language games, whispered and silent speech, as well as in the changing phonological behaviour resulting in sound change. Processes account for all these types of behaviour and more: they also account for implicational universals by substituting the implying sound by the implied one. The task of NP, then, is a constant search for processes in the languages of the world.

2.2. The evolution

As all theories, Natural Phonology has evolved and changed over the years since its inception in the 1960s and 1970s. The type of explanation offered by NP originated in a variety of phonetic and phonological studies of the 19th and 20th century[1]. Its basic thesis was that phonological systems are phonetically motivated. NP was proposed as an alternative to both structural and generative approaches to phonology current at the time. The theory grew into a large explanatory framework of Natural Linguistics due to the works of Wolfgang U. Dressler (starting with [9]) and followers. Modern Natural Phonology (MNP) has many facets, and although the main tenet has remained valid, its interpretations may vary. Still more importantly, MNP has a much wider perspective, reaching far into the areas of external evidence and relying on a solid functional and semiotic foundation. It is no longer true to say that "natural phonology (...) lacks any a priori methodology or formalization" ([2]: 168); the methodology stems from universal, functional and semiotic, principles, while formalizations are being introduced without detriment to the theory (most recently, Beats-and-Binding theory of phonology by [10]). Due to those developments, a favourable ground for cross-framework discussion has been formed and has already been exercised (e.g., a discussion with Optimality Theory, with Government Phonology in [11]). Dynamically increasing scope of external evidence in such areas as psycholinguistics, acquisition of first and second language, neurolinguistics, speech technology and, indeed, phonetics itself, increases the potential of the theory. The holistic, all-embracing, and interdisciplinary nature of the theory tunes in very well with the interdisciplinary demands of modern research, and thus directly responds to the scholarly challenges of the 21st century.

3. NATURAL LINGUISTICS

3.1. Core assumptions

The following are the three basic characteristics of the natural linguistic framework. First, predictions and explanations are *functionalist* and *semiotic* in nature. One can, to some extent, predict form on the basis of its function; however, a given form may be allowed to serve more than one function, as well as a particular function may be satisfied by multiple forms. This is reflected in multifunctionality of forms across languages. For instance, vowel epenthesis in a cluster of consonants serves both the speaker and the listener, since it facilitates production and clarifies perception. On the other hand, production of a cluster may be also facilitated by assimilation, deletion or even metathesis. The latter processes would not improve perception, though, since they would lower the recoverability of the original.

Particular linguistic choices are seen as results of goal-oriented (functional) linguistic behaviour of language users. Semiotics has been adapted as a metatheory for linguistics, which allows one to link linguistics with other disciplines in which signs are also the subject of investigation, and in this way better capture and explain linguistic phenomena. It is from semiotics that the criteria of transparency, iconicity, diagramaticity, indexicality and biuniqueness come from.

Second, generalizing statements formulated in natural linguistics have the status of universal or language-specific *preferences* and not absolute rules or laws. One can gradually move from less to more preferred forms when referring to a preference. A binary distinction between admissible and nonadmissible forms is replaced by a gradual differentiation of forms along a preference scale specified according to a complex set of relevant criteria. *Preference* implies a human agent, i.e. (some) control of language by the selves of the speakers, reflecting behavioural strategies preferred by them (cf. functional explanation). Natural Linguistics is, thus, explicitly constructed as a *preference theory* rather than a general descriptive theory.

Third, *external* linguistic evidence in Natural Linguistics is regarded as substantive: performance data, such as e.g. casual speech, speech of young children or speech of second language learners, provides evidence for the structure of the speaker's competence. Consequently, to get an insight into the linguistic competence of language users, a linguist needs to consult both internal linguistic evidence (which amounts to grammaticality judgements issued by speakers, both consciously and subconsciously) and external evidence, which translates to all imaginable facets of linguistic behaviour, i.e. of language use, traditionally referred to as performance.
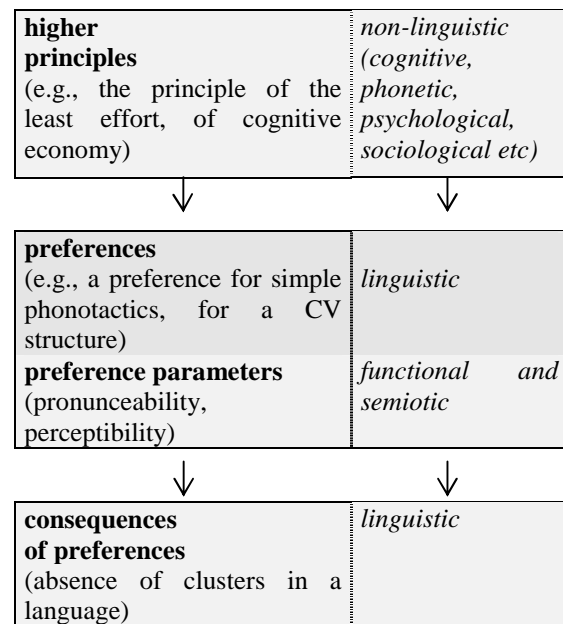
While structuralists relied on distinctiveness, and generativists on simplicity, natural linguists refer to the tension between contradictory preferences as the guiding principle according to which linguistic grammars are structured.

3.2. The explanatory model of Natural Linguistics

The explanatory model of Natural Linguistics can be envisaged graphically as in Fig. 1.

Linguistic principles have a non-linguistic basis and as such lead to explanatory preferences, referring linguistic phenomena holistically to "the nature of things" and "the knowledge of the

Figure 1: The explanatory model of Natural Linguistics.

higher principles (e.g., the principle of the least effort, of cognitive economy)	*non-linguistic (cognitive, phonetic, psychological, sociological etc)*
preferences (e.g., a preference for simple phonotactics, for a CV structure)	*linguistic*
preference parameters (pronounceability, perceptibility)	*functional and semiotic*
consequences of preferences (absence of clusters in a language)	*linguistic*

world". Within language, preferences of performance become preferences of structure. Conflicts among preferences are resolved for the benefit of the more *natural* solution which is "cognitively simple, easily accessible (especially to children), elementary and therefore universally preferred, i.e. derivable from human nature, or unmarked/less marked" ([12]:135). Conditioning factors influencing such resolutions are highly complex. Therefore conflicts may be solved either with respect to <u>universal</u> preferences (i.e. the ones which all languages respect on some level of usage) or with respect to <u>typological</u> preferences (for the benefit of a given language type) or with respect to <u>language-specific</u>, local preferences (for the benefit of a given language system).

4. B&B PHONOTACTICS

In Beats-and-Binding Phonology ([10]) phonotactics of consonant clusters is described in terms of an overall perceptual distance between members of a cluster. The universal preferences specify the optimal shape of a particular cluster in a given position by referring to the *Net Auditory Distance Principle* (*NAD Principle*). For instance, the preference defining initial double clusters takes the form of the following well-formedness condition:

(1) $\text{NAD}(C_1, C_2) \geq \text{NAD}(C_2, V)$

- which reads: In word-initial double clusters, the net auditory distance (NAD) between the two consonants should be greater than or equal to the net auditory distance between a vowel and a consonant neighbouring on it.
- where: NAD = |MOA| + |POA| + |Lx|

In other words, perceptual contrast between the two initial consonants counteracts the preferred CV contrast and, in consequence, saves the cluster.

Using the explanatory model in Fig. 1 let us reconstruct the reasoning behind B&B phonotactics. **The higher, non-linguistic principles** involved here are: the cognitive principle of least effort (it is less effortful to produce a single consonant than a cluster; the effort is better managed when a produced cluster is well perceived); the semiotic principle of figure and ground (the contrast between a single consonant and a vowel is a better figure-against-ground structure than a cluster); and the phonetic principle of alternation. The latter is best explained by Maddieson:

> To construct a useful signaling system out of sound, there must be some differentiation between different parts of the signal in time. It appears that a basic organization of this differentiation of sound in all (spoken) languages consists of an alternation between louder and quieter levels of sound, with a period not too far from 150-200 ms ([13]:2525).

This amounts to

> [a] fairly regular wave-like alternation of amplitude peaks and valleys. The occurrence and timing of this pattern have been suggested to be related to a natural frequency of the jaw, which can be approximately equated with a comfortable mastication rate ([13]:2525).

There is a lot of supportive evidence that indeed a CV sequence is the most successful realization of the above perception- and production-driven requirements. Thus, **the linguistic CV-preference** (cf. Fig. 1) is derivable directly from phonetics as well as from the other two principles. A universal preference for a cluster is then defined with reference to the CV-preference (i.e. it necessarily needs to counteract it).

The functional parameter (cf. Fig. 1) used to measure the phonotactic preferences is that of perceptibility, i.e. perceptual distance measured in MOA (manner of articulation), POA (place of articulation) and Lx (voicing). It is perceptibility rather than pronunceability since phonotactics is prelexical.

The linguistic consequence (cf. Fig. 1) of the universal phonotactics is a typological absence of clusters (70 percent of languages do not have them), a typological occurrence of preferred clusters as well as universal and language-specific processes reducing dispreferred clusters (in diachrony, acquisition, phonostylistics, speech pathology, etc).

5. MORPHONOTACTICS

Semiotic metatheory of Natural Linguistics situates morphology as prior to phonology. Thus, a morphological function may override a phonological one. In the case of phonotactics, signaling a morphological boundary may override a phonologically driven phonotactic preference and, consequently, lead to the creation of a marked cluster. Therefore, one expects relatively marked clusters across morpheme boundaries and relatively unmarked ones within morphemes. Dressler & Dziubalska-Kołaczyk ([14]) coined the term *morphonotactics* as an area of interaction between phonotactics and morphotactics, in analogy to and as part of morphonology.

Language specific morphonotactics provides thus an additional parameter constraining the actual outcome of universal phonotactic preferences. This is an example of the holistic non-isolationist view on language represented by Natural Linguistics.

6. CONCLUSIONS

This paper has shown that explanations in Natural Linguistics stem from universal principles of human existence and interaction with nature, in which human language plays an essential part. Since both language and the setting are complex, explanations are necessarily holistic and take the form of preferences and not absolute laws.

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[1] Donegan and Stampe (1979: 126) mention the following names of the 19th and 20th century researchers: Sweet, Sievers, Winteler, Passy, Jespersen, Kruszewski, Baudouin, Grammont, Fouché, Sapir, Jakobson.