SYLLABLE-LESS PHONOLOGY

Katarzyna Dziubalska-Kołaczyk
Adam Mickiewicz University, Poznań, Poland

ABSTRACT

The basic assumptions of a syllable-less model of phonology developed by the author [4] are presented. The beats-and-binding model, as it is called, is a natural functional model constructed within the framework of Natural Phonology [1,7] and natural polycentristic theory of language [2].

INTRODUCTION

The following exposition will be limited to the presentation of the preferences and principles of the beats-and-binding model which account for the four levels of phonological structure, i.e. level 0: the level of rhythmical preferences, level 1: the level of underlying phonological binding preferences, level 2: the level of phonotactic preferences and level 3: the level of articulatory preferences.

The unit "syllable" has been used in phonology to account for the processes thought to be conditioned by "syllable boundaries", "syllable weight", and segments sequences occurring within the "syllable". In the present framework, segments phonotactics constitutes a necessary consequence of the operation of the binding preferences, in the sense of counteracting the latter by keeping appropriate sonority distances between segments. Linguistic timing relationships between beats account for what used to be called "syllable weight". "Syllable boundaries" do not, in principle, constitute a phonological issue: speakers of a language are able to produce pauses in between beats as, among others, a side-effect of the operation of the binding preferences. The notion of so-called "syllable contact" (cf. [8]) is also untenable: patterns of consonants are a corollary of binding consonants to beats.

PREFERENCES AND PRINCIPLES

Level 0

A preference for isochrony and for the rhythmic structuring of a sequence in general is rooted in universal principles of human perceptual and motor behaviour. Rhythm can be broadly defined as "the structure of a sequence" consisting of not necessarily linguistic units. Humans possess strong motor-perceptual biases, which on the one hand constrain their production (in rate and pattern) and on the other impose structure on auditory sequences, even if the structure is physically not there. In speech, rhythm facilitates communication and intelligibility.

(1) The primary rhythm units are feet and their constituents - rhythmical beats, similarly as in music. There is a universal preference for two beats per foot: the former beat is preferably strong, the latter - weak, i.e. they constitute a trochee (a metrically falling accent).

(2) A beat (henceforth notated as "B") is realized by a phoneme which is traditionally referred to as a "syllable nucleus"; preferentially, it is a vowel (notated as "V"); secondarily, a consonant may acquire the function of a beat. A vowel is a better candidate for a beat due to its saliency potential based on its high sonority value and articulatory openness. Therefore, those among consonants which possess the latter two features to a higher extent qualify better for a beat than others.

(3) In accordance with the semiotic principle of figure and ground (cf. [3]), a hiatus between two beats is avoided by means of inserting a non-beat (henceforth notated as "n") in between, i.e. a consonant (notated as "C"). Only in this way do the figures, i.e. beats (B), receive a necessary ground, i.e. non-beats (n), in the form of consonants.

So, thanks to the preferences 1 to 3, speech flow consists of beats and non-beats, which are phonetically realized by perceptually and articulatorily contrasting sounds - vowels and consonants respectively. This is the most general structural level of phonology, the level of rhythmical preferences (=level 0).

The universal perceptual preferences operate at two levels:
Level 1: the level of underlying phonological binding preferences between beats (B) and non-beats (n), and
Level 2: the level of phonotactic preferences predicting the preferred actual sonority distances between and among vowels (V) and consonants (C), necessary for the origin and maintenance of consonant clusters.

Level 1

(4) Beats (B) and non-beats (n) in a sequence are joined by means of bindings in a binary fashion, i.e., e.g. in a sequence {BnB} there are maximally two bindings, i.e. a Bn-binding (a non-beat is bound to the preceding beat) and a nB-binding (a non-beat is bound to the following beat), i.e. {Bn + nB}. A beat, however, may potentially stay alone while a non-beat must be bound to a beat.

So, non-beats actively work against beat hiatus. The latter is a sequence of two beats, with NO binding between them. If a {B + B} sequence is not "broken" by a non-beat, it either (a) reduces to one beat {B}, represented phonemically/segmentally by a short vowel, which involves a change in the structure on Level 1 or (b) remains underlyingly a two-beat unbounded sequence i.e. {B+B}, represented phonemically either by a diphthong or a long vowel, which leaves the structure on the level of bindings (level 1) unaffected.

Two neighbouring beats (by default unbounded) without any "trace" of a non-beat in between them (i.e. no gliding, no preglottalization) and without any morphological boundary separating them, count as a long beat on level 0, i.e. on the level of universal rhythmical preferences. Counting of beats on this level corresponds to what is usually interpreted as speakers' intuitions about the number of "syllables". For example, a trochee on level 0 counts two, while on level 1 it often consists of three beats.

"Heaviness" in a beat-and-binding model is expressed by means of a number of

beats AND bindings (and beats and bindings count equal) contained within a binary foot, from a beat to another one or to a phonological word boundary. For example, in a {Bn} cluster (/VC/) there is one beat and one binding, i.e. count 2, and in a {BB} cluster (/V:/, /VV/) there are two beats, i.e. also count 2. Another possibility is to have an intervening morphological boundary between two beats in a hiatus.

Since bindings are perceptually based, binding preferences (i.e. how bindings preferably arise and combine) belong to the universal perceptual level of phonology. The latter consists of two levels; binding preferences occupy level 1, i.e. the level of underlying phonological binding preferences between beats (B) and non-beats (n).

(5) The two bindings differ in strength: the {nB} binding, i.e. the binding of a non-beat to the following beat (preferentially realized by a /CV/ sequence), is always stronger than the {Bn} binding, i.e. the binding of a non-beat to the preceding beat (preferentially realized by a /VC/ sequence).

A subjective perceptual measure of contrast between a beat and a nonbeat is constituted by sonority. At the level of phonological bindings beats are uniformly more sonorous than nonbeats. In objective terms, it is the degree of modulation in several acoustic parameters (amplitude, periodicity, spectral shape, F0; cf. [6]) that decides about a {nB}-binding being uniformly stronger than a {Bn}-binding. As Ohala (1990) notices, larger modulations have more survival value than lesser ones and therefore will persist in the languages.

Level 2

(6) Actual distances between segments in terms of sonority become relevant only at the level of phonotactic preferences (level 2). At this level sonority becomes a relative measure of distances between (and among) consonants and vowels, the values of which decide about the fate of segments in a phonotactic sequence.

The universal preferences consist in the strength-by-distance relations between segments measured in distance among the six positions on the sonority scale (e.g. *la* - distance of two positions, *st* - distance of one, *ka* - distance of five, etc.; so, e.g., ka > la > st).

Level 3

(7) Two main functions of phonology: to serve clarity of perception and ease of articulation are reflected in perceptual, hearer-friendly preferences, on the one hand, and in articulatory, speaker-friendly preferences, on the other. Another level of structure, called level 3, will be reserved exactly for the speaker-friendly preferences for articulatorily easy phonotactic sequences. While contrast is an underlying principle on the perceptual levels (cf. a figure-and-ground principle), similarity reigns on the articulatory level (cf. the proximity law).

The Principle of Balance

(8) Conflicts among universal preferences, and especially those between hearer-friendly and speaker-friendly preferences, are mediated by the major tendency for balance (cf. [5]), which is realized on a language-specific level. Conflict solutions are implemented language-specifically to establish language-specific or typological relationships between bindings, phonotactic preferences and articulatory preferences.

In the present framework, the effectiveness and optimality of the balanced solutions are emphasized, which is clearly possible within a functional approach to phonology advocated by the natural framework.

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