

## Structure of syllables in Czech

The paper describes the structure of syllables in present Standard Czech. The notion *distributional unit* (DU) is introduced as a phonotactic frame upon which the distribution can be effectively described<sup>1</sup>. DU is a self-contained bundle of positions such that in every such position a phoneme can stand and alternate with other phonemes or with  $\emptyset$  (i.e. be empty). It is an underlying structure behind all syllables in a language. Positions are absolute and their number is constant in a given language; what changes is only the way they are filled. One of the positions is chosen as *nuclear*; it is the one upon which other, *non-nuclear* or *peripheral* positions are dependent. In Czech it is the one that is occupied by vowels because vowels are capable of being forms of words without any extension (cf. *a* “and”, *o* “about” etc.). There are two kinds of peripheral positions: *pre-nuclear* and *post-nuclear*; these are occupied by consonants. The number of positions within a DU is postulated so as to describe the distribution exhaustively. From this follows that there must be as many pre-nuclear positions as is the maximum number of consonants that can stand before a vowel in Czech. The number is five, cf. /FSkvjeT/<sup>2</sup> *vzkvět* “prosperity”. Likewise, the number of post-nuclear positions equals the maximum number of consonants capable of standing after a vowel, i.e. four, cf. /borŠTŠ/ *boršč*<sup>3</sup> “borsch”.

The structure of the DU in Czech is given in Fig. 1 alongside with phonemes belonging to individual positions. The assignment of phonemes to the positions is not random; it is a result of a previous analysis, but there is no space to go into details; it will be explained in the paper. Note that the positions extending over two or more slots are so-called *achi-positions*. This notion has been introduced to account for peculiar distribution of certain phonemes. Let us illustrate it on the phoneme /t̚/. In the pre-nuclear context this phoneme can only stand right before a vowel (i.e. before a phoneme from the position ‘n’) and can only be preceded by two phonemes from the positions ‘+4’ and ‘+5’; cf. /Křt̚in/ *křtin* “christening party (gen.)”. The positions ‘+1’, ‘+2’ and ‘+3’ are thus expendable and the phoneme /t̚/ occurs in an *archi-position* equivalent to them.

DU is an underlying structure behind and *capable of generating all syllables in Czech*. Nuclear position is its basis, and we can imagine it as a core around which several layers (i.e. non-nuclear positions) are gathered. The farther a non-nuclear position is, the more peripheral it is, and it is for that reason the non-nuclear positions were labeled as ‘+1’, ‘+2’ etc. and ‘-1’, ‘-2’ etc.

As a way of illustrating this, let us show how the syllable-initial consonantal combinations are generated. We start with the vowel (or with /r/, /l/) in the nuclear position. To it, we add a phoneme belonging to the position ‘+1’ (see Fig. 1). However, it is to be remembered that a position may be empty. Once a choice has been made and the position ‘+1’ is occupied or empty, we continue with the position ‘+2’ which, again, may be filled with a phoneme belonging to that position or be empty. Then we continue with the position ‘+3’ and so on. The process is similar for the post-nuclear context. We can thus imagine DU a series of points at which we choose from a given and limited set of phonemes or from  $\emptyset$ . An illustration of the sequence of choices is given in Fig. 2 for the pre-nuclear context. The output of this scheme is *all* pre-nuclear (syllable-initial) consonantal combinations in Czech (there are around 400 such combinations in our database). Several examples of the way positions may be filled to produce syllables of Czech are found in Fig. 3. Naturally, there are restrictions as to which phonemes can occupy a given position because the occurrence of a phoneme in a position may prevent other phonemes from occurring in

<sup>1</sup> Adopted from Jan Mulder, *Foundations of Axiomatic Linguistics*, Mouton de Gruyter, 1989.

<sup>2</sup> The capitals are so-called *archi-phonemes*. In this case these are phonological units resulting from neutralization of voicing in Czech, i.e. products of suspension of the difference between voiceless and voiced consonants.

<sup>3</sup> The so-called affricates are analyzed as combinations of two consonants, i.e. *c* as /Ts/ (or /TS/) and *č* /Tš/ (or /TŠ).

other positions. The majority of these restrictions are also derivable from the structure of DU. This model therefore offers an effective and easy way of describing formally the structure of syllables in Czech.

+5	+4	+3	+2	+1	n	-1	-2	-3	-4
PTK FSŠX rljM ∅	T SŠ ř ∅	kgxh td szšž ∅	v M ∅	mnň rl jř ∅	aeiou āēīōū äëö r,l	mnň rlj ∅	PTK Š ∅	TS ř ∅	KTĚ Š ∅
		pbf		FX					
		ťď		mnň					

Fig. 1

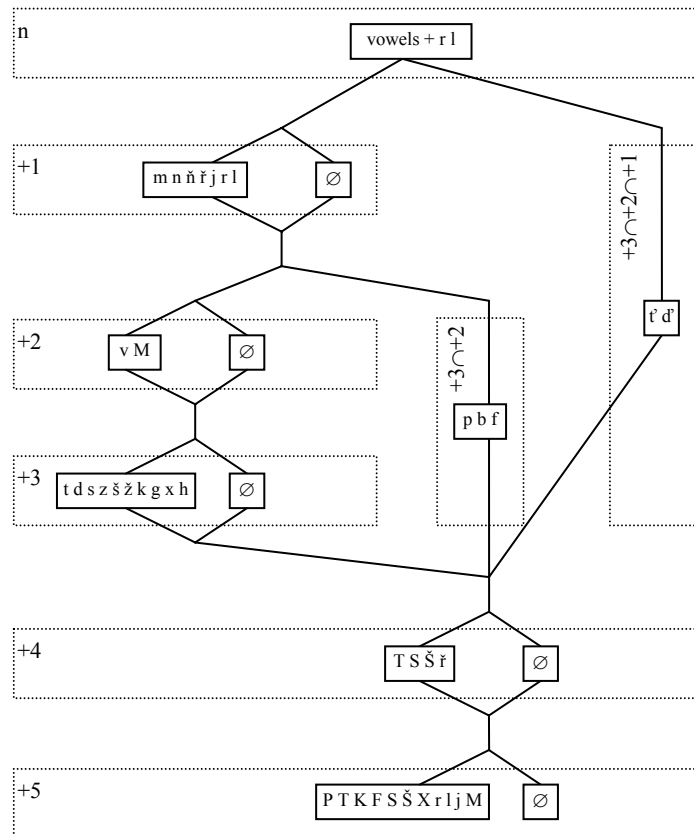


Fig. 2

+5	+4	+3	+2	+1	n	-1	-2	-3	-4	
F	S	k	v	j	e	∅	T	∅	∅	vzkvět
K	ř	t	∅	∅	u	∅	∅	∅	∅	křtu
K	ř	ť		∅	i	n	∅	∅	∅	křtin
r	∅	t	∅	∅	i	∅	∅	∅	∅	rty
P	S	t	∅	r	u	∅	X		∅	pstruh
T	ř	p		∅	i	∅	T	∅	∅	třpyt
∅	∅	h	v	j	e	∅	∅	S	T	hvězd

Fig. 3