

### **Piece-driven phase: Slavic vowel-zero alternations and a unified phase theory**

Vowel-zero alternations have been a classical object of study in Slavic languages. The pattern that has focussed generative attention since Lightner (1965) is called Lower and found for example in Czech or Polish, cf. (1a). After the abandon of the "abstract" analysis that supposes the addition of two absolutely neutralized vowels to the vocalic inventory, the classical autosegmental analysis distinguishes alternating and non-alternating vowels by means of association: the former are floating melodies (Rubach 1986 et passim), while the latter are lexically associated.

In this presentation we draw attention to another pattern that is found in Slavic (and elsewhere), i.e. the regularity that was originally discovered by A. Havlík (1889) on the grounds of Old Czech, cf. (1b). Given a sequence of alternating vowels, languages that follow the Havlík pattern realise every other (counting from the right edge), while languages that implement Lower promote all alternating vowels to the surface. These two patterns appear to exhaust the cross-linguistically variation that is found for vowel-zero alternations (German, French and Moroccan Arabic for example follow Havlík).

Following the classical Lower rule where the vocalization of alternating vowels is controlled by a syntagmatic relation with the following vowel, the analysis in Government Phonology holds that alternating vowels float in the lexicon and associate when escaping government (the syntagmatic relation), while stable vowels are lexically associated to their nucleus. In this perspective, Scheer (2004,2005) opposes the Havlík and the Lower pattern by a parameter on the lexical ability of alternating vowels to govern the preceding nucleus: they are good governors in Havlík, but not in Lower languages.

Following Gussmann & Kaye (1993), rather than a representational, we propose a phase-based, (i.e. procedural) encoding of the opposition Havlík vs. Lower. Suffixes with a vowel-zero alternation on their left edge (like the Cz diminutive *-ek*) have identical phonological representations in both Havlík and Lower languages (cf. (2)), but are phase heads (i.e. cyclic in the familiar phonological vocabulary) only in the latter. In the former, they do not trigger phases: the non-cyclic derivation (3a) of the double dim. in OCz (a Havlík language) simply concatenates and does phonology: the empty  $V_1$  cannot govern  $V_2$  which therefore surfaces and is able to govern  $V_3$  which therefore remains unvocalized. In MCz (a Lower language), however, the concatenation of *-ek* triggers a phase. Hence under (3b), the double dim. contains three phases. In the first phase, nothing relevant happens. In the second phase, the floating *e* of the suffix enters the stem-final empty  $V_3$ .  $V_3$  cannot be governed by the following empty  $V_2$  and hence associates with the floating *e*. In the third phase, the floating *e* of the second suffix attaches to  $V_2$  for the same reason, but is unable to govern  $V_3$  because of Phase Impenetrability: all previously concatenated material has already been interpreted, and the result cannot be modified. Hence  $V_2$ , although a sound governor, cannot govern  $V_3$ , which surfaces.

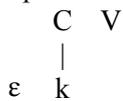
The only thing that has changed in the evolution from OCz to MCz (and from Old Polish to Modern Polish for that matter) is thus that the dim. suffix has become a phase head (i.e. cyclic). The idea that cyclicity (i.e. the property of triggering interpretation) is a lexical property of affixes was introduced by Halle & Vergnaud (1987). However, our analysis contrasts with the system of these authors in two important respects: 1) Phase Impenetrability is not instrumental in Halle & Vergnaud's system, and 2) cyclic affixes trigger the interpretation of their own node with Halle & Vergnaud, while in our system they provoke the spell-out of their *sister*: crucially under (3b), *-ek* in *dom-ek* triggers the spell-out of the root, not of the entire root+ek complex (otherwise there would be no Phase Impenetrability effect). These two departures from Halle & Vergnaud have been introduced by Kaye (1995). In pursuit of the goal to build a unified spell-out theory with syntax, we point out two things. First, spelling out the sister of phase heads is exactly parallel to current syntactic practice, where only the complement of  $X^\circ$  is actually sent to PF/LF upon the spell-out of  $X^\circ$ , while  $X^\circ$  and Spec (the Phase Edge) are only spelled out at the next higher phase. Second, the Halle-Vergnaud-Kaye approach contrasts with a core property of current syntactic phase theory. In syntax (and phonological applications of Distributed Morphology, e.g. Marvin 2002), phasehood is a property of node labels (node-driven phase), while in phonology node labels are irrelevant: nodes inherit phasehood, which is a lexical property of affixes (piece-driven phase). We show that den Dikken's (2007) Phase Extension is a step in the direction of piece-driven phase in syntax.

Finally, our analysis makes a previously unreleased prediction: since the existence of a phase supposes concatenation, vowel-zero alternations within morphemes must always follow Havlík. This appears to be true for the languages we are familiar with.

(1) V ~ Ø alternations: Lower pattern vs. Havlik pattern

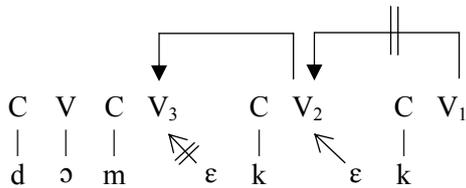
a. Lower		b. Havlik	
Modern Czech	dom-ek (nom.), dom-Øk-u (gen.) 'house, dim.' dom-eč-ek, dom-eč-Øk-u 'house, double dim.'	Old Czech	dom-ek, dom-Øk-u 'house, dim.' dom-Øč-ek, dom-eč-Øk-u 'house, double dim.'
Polish	pies (nom.), pØs-a (gen.) 'dog' pies-ek, pies-ecz-ek 'dim.', 'double dim.'	Old Polish	pies (nom.), pØs-a (gen.) 'dog' pØs-ek, pies-Øk-a 'dim. nom.', 'dim. gen.'
		Moroccan Arabic	kØtib (sg.), kitØb-u (pl.) 'write, pf. 3 m.'

(2) Representation of the diminutive suffix -ek

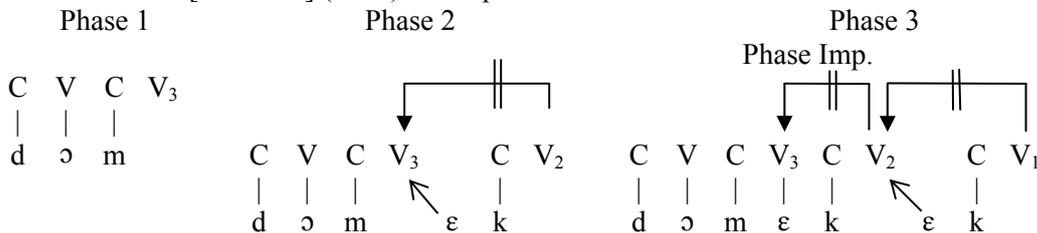


(3) Havlik pattern vs. Lower pattern: phonological properties of suffixes

a. Derivation of [domček] (OCz): one phase



b. Derivation of [domeček] (MCz): three phases



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