

(Slavic) vowel-zero alternations and phase theory

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Abstract

In this paper, we present a unified account of vowel-zero alternations. We argue that the distribution of the alternants is controlled by Government and/or the cyclicity of affixes. We primarily focus on Slavic, but suppose that the analysis can be extended to non-Slavic data: there is only one mechanism in natural language that controls vowel-zero alternations.

1. Introducing the data

- **The distribution of alternants depends on syllable structure: strong alternants, i.e. vowels, appear in open syllables, weak alternants, i.e. zeros, appear in closed syllables.**

(1) $e \sim \emptyset$ alternations in Czech (Cz)

	strong alternant e	weak alternant ø
in open syllables _CV		kotøl-ů 'boiler, GenPl' patør-ový 'related to floor, adj.'
in closed syllables _CC	kotel-na 'boiler room, NomSg' pater-Ø 'floor, GenPl'	

- **In case of several alternation sites in a row, languages follow either the Havlík or the Lower pattern:**

Havlík: counting from the rightmost alternation site, every other is vocalized (strong alternants are always preceded by weak alternants)

Lower: all alternation sites in a row are vocalized (strong alternants are always preceded by strong alternants)

(2) **Havlík vs. Lower: Old Polish vs. Modern Polish**

	Havlík: Old Polish (OPol)	Lower: Modern Polish (MoPol)	gloss
in closed syllables	pies-Ø	pies-Ø	,dog ^c NomSg
in open syllables	pøs-a	pøs-a	GenSg
before alternation site			
a) unvocalised: _CØCV	pies-øk-a	pies-øk-a	dimin., GenSg
b) vocalised: _CvC	pøs-ek-Ø	pies-ek-Ø	dimin., NomSg

- **Havlík and Lower may not coexist within a given language: languages which exhibit V ~ Ø alternations fall either into the Havlík or into the Lower group.**

(3) **Havlík-languages vs. Lower-languages**

Havlík	Lower
Old Polish	Modern Polish
Old Czech	Modern Czech
Moroccan Arabic	Russian
German	
French	

2. Analysis of V ~ Ø alternations in CVCV (Scheer 2004, 2005)

- **There are three lexically different types of nuclear constituents:**

full Nuclei: attached to melody (V₃ under (4))

empty Nuclei: do not contain any melody (V₁ under (4))

Nuclei with floating melody: contain unattached melody (V₂ under (4))

(4) **Lexical representation of the Cz root √KOTL 'boiler'**

C	V ₃	C	V ₂	C	V ₁
k	o	t	e	l	

- Alternating vowels are lexically floating segments, they attach to nuclear constituents whenever they can.

- **Difference between alternating and stable vowels:**
 - alternating vowels are pieces of floating melody that attach to their Nucleus whenever they can, i.e. when the Nucleus is ungoverned.
 - stable vowels are associated to their Nucleus in the lexicon.

- **The distribution of alternants is controlled by Government. Government is an association-inhibitor:**

full Nuclei: are good governors (V₁ under (5)a, V₁ under (5)c)

empty Nuclei: are not good governors (V₁ under (5)b)

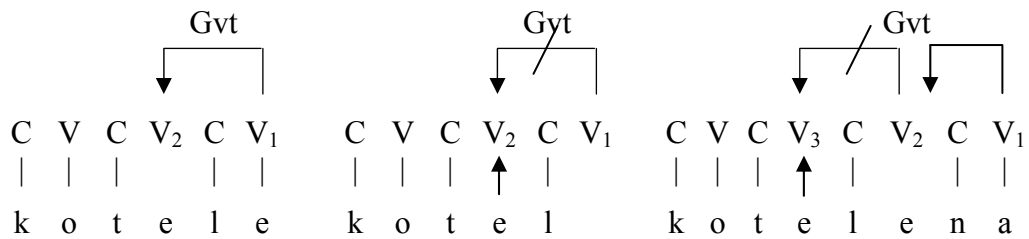
governed Nuclei with floating segments: are not good governors (V₂ under (5)c)

(5) *Representation of derivatives containing the Cz root √KOTL*

a. *kotəl-e* GenSg

b. *kotel-Ø* NomSg

c. *kotel-on-a* 'boiler room, NomSg'



- **The difference between Havlík and Lower is parametric:**

nuclei with floating melody:

Havlík: are good governors (Havlík; V₂ under (6)a)

Lower: are not good governors (V₂ under (6)b)

(6) *Representation of OPol and MoPol diminutives in -ek*

a. *Havlík: pøs-ek* (OPol)

b. *Lower: pies-ek* (MoPol)



- **What's the problem?**

The problem is that stable suffix-initial Vs as well as alternating Vs must be floating:
stable suffix-initial vowels - because they must enter the Final Empty Nucleus of the preceding morpheme
alternating vowels - because this is what makes them different from stable vowels, see the box above.

Hence the difference between alternating and stable vowels cannot be their floating status in the lexicon: some stable vowels also float.

- **The key to the problem**

What we know for sure:

1. there are two kinds of suffix-initial Vs: stable or alternating
2. they do not differ representationally: both are lexically floating
3. still they must be different in some way
4. representational means for differentiation are exhausted - hence the contrast must stem from a procedural difference.

3. Cyclic analysis of V ~ Ø alternations

- **Summary of the observations made:**

The lexical representation of vowels depends on:

- a) whether they do or do not alternate, and/or
- b) whether they are morpheme-initial or morpheme-internal:

morpheme-internal stable Vs: are segments lexically attached to their Nucleus

morpheme-internal alternating Vs: are lexically floating segments

morpheme-initial stable and alternating Vs: are floating segments in absence of their "own" Nucleus

- **Hence the question:**

what is the difference between morpheme-initial alternating and stable vowels?

3.1 Solution, step 1: the difference is their sensitivity to Government

- **Only alternating Vs care for Government, stable Vs do not (this is what we observe morpheme-internally anyway)**

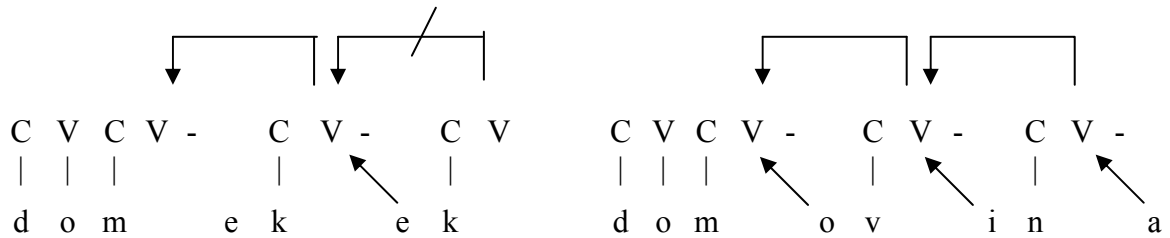
alternating Vs: can only associate to ungoverned Nuclei (see (8)a)

stable Vs: can associate to any Nucleus available no matter whether it is governed or not (see (8)b)

(8) *Representation of derivatives containing the Cz root* \sqrt{DOM} 'house'

a. *dom-oč-ek-Ø* (OCz)
,double diminutive, NomSg'

b. *dom-ov-in-a* (MoCz)
'home, NomSg'



- **Problem with step 1:**

It works only for Havlík-languages: all languages are predicted to follow the Havlík pattern

Havlík, e.g. OCz or OPol diminutives: *dom-oč-ek*, *pøš-ek*

Lower, e.g. MoCz or MoPol *dom-eč-ek*, *pies-ek* cannot be derived since all associated vowels can govern, no matter whether they were lexically floating or not.

- **All representational means are exhausted: the contrast between Lower and Havlík can only be expressed procedurally.**

3.2 Solution, piece 2: Lower the result of cyclic, Havlík of non-cyclic affixation

- **Havlík vs. Lower has a procedural, rather than a representational encoding:**

suffixes with stable Vs: are always **non-cyclic**, i.e. sit in the same phase as the preceding morpheme

suffixes with alternating Vs: may or may not be cyclic

Havlík: they are not cyclic = sit in the same phase as the preceding morpheme

Lower: they are cyclic = do not sit in the same phase as the preceding morpheme

- **Difference between OPol *pøs-ek* and MoPol *pies-ek***

Both diminutives are derived from the same lexical pieces: they contain the root \sqrt{PS} (see (9)a) and the suffix *-ek* (see (9)b).

(9) **Representation of the root \sqrt{PS} and the diminutive suffix *-ek* both in Old and Modern Polish**

a. root \sqrt{PS}

C	V	C	V
p	ie	s	

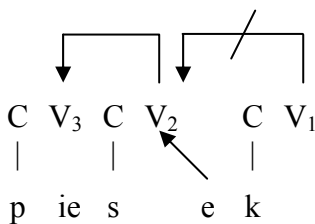
b. diminutive suffix *-ek*

C	V
e	k

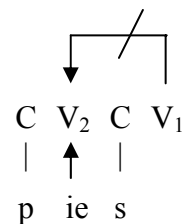
(10) **Derivation of OPol and MoPol diminutives: *Havlík* vs. *Lower***

a. *Havlík*: $\sqrt{PS} + -ek = 1$ phase: pøsek

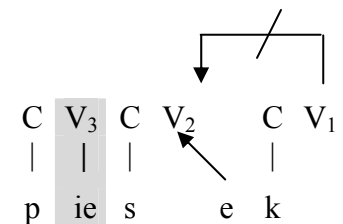
b. *Lower*: $\sqrt{PS} + -ek = 2$ phases: piesek



Phase 1



Phase 2



- In Old Polish (10)a, the form of the diminutive is derived in a single phase: the floating vowel of the suffix attaches to the ungoverned V₂ which in turn governs the floating vowel of the root, i.e. V₃. As a result, the root-vowel is not spelled out.
- In Modern Polish (10)b, the suffix is lexically specified as cyclic, i.e. it triggers a phase before it. In the first phase, the form of the root is derived: the root Nucleus (V₂) is not governed therefore it attaches to its floating segment. In the second phase, the floating vowel of the suffix attaches to the ungoverned V₂. Hence V₂ has become a good governor.
- However, according to **Phase Impenetrability**, the output of a phase may not be modified by computation in a subsequent phase.
- Phase Impenetrability is the modern label for a derivational mechanism that is present in phonological theory since Mascaró's (1976) Strict Cycle Condition (SSC): level 1 vs. level 2 & Bracket Erasure in Lexical Phonology, robustness in Government Phonology etc.

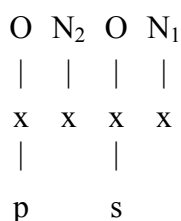
Diachronically, thus, all that has happened between OPol and MoPol is that the suffix *-ek* has become cyclic.

4. Gussmann & Kaye (1993): phonological cyclicity as a lexical property of affixes

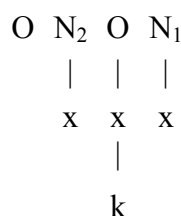
- the solution favoured here is Gussmann & Kaye's (1993). In their vocabulary, *-ek* is analytic (=cyclic) in Lower systems, and alternating vowels in a row survive because of the robustness of analytic domains.
- they did not oppose Lower to Havlík, though.
- they follow an epenthetic scenario for all vowel-zero alternations:
 1. Nuclei which host alternating Vs and Nuclei without any Vs do not differ lexically, both are empty: compare N₁ and N₂ under (11)a.
 2. in the course of the derivation, ungoverned empty Nuclei are filled by an epenthetic default vowel; see (12).

(11) Gussmann & Kaye (1993): root \sqrt{PS} and diminutive suffix *-ek*

a. root \sqrt{PS}



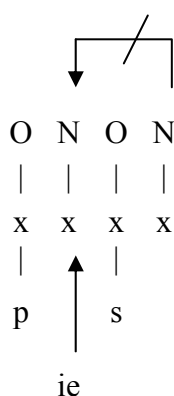
b. diminutive suffix *-ek*



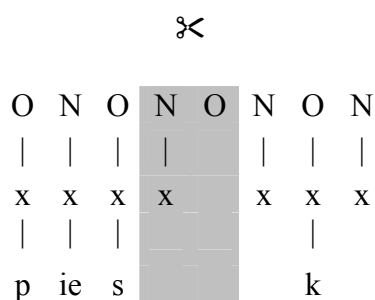
- in their vocabulary, **the suffix *-ek* is analytic, i.e. what we call cyclic**. In order to derive the correct result, i.e. *pies-ek*, they need **reduction**, an operation which cuts out empty VC units from the syllabic string.
- Reduction occurs only with vowel-zero alternations of the Lower type, nowhere else in the grammar.

(12) Gussmann & Kaye (1993): derivation of MoPol *pies-ek*

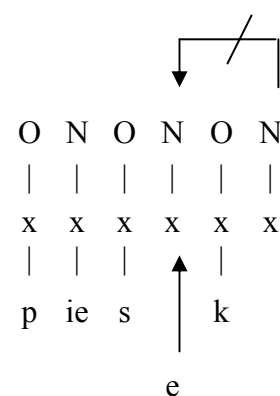
a. Phase 1



b. Input to Phase 2 + reduction



c. Phase 2



5. Phase theory

5.1. Phonology-driven vs. node-driven phase

- a. phase-triggering as a property of affixes (or affix-classes) is an idea first put forth by Halle & Vergnaud (1987).
- b. hence phases are phonology-driven: there is one when we observe its phonological effects.
- c. ideally, the phonological traces of a phase coincide with morphological and/or syntactic properties of affixes. This is the original Lexical Phonology generalisation called affix ordering.
- d. a completely different perspective is “node-driven phase”: Marvin (2002) says that phases are triggered at every xP. Piggott (2006), Piggott (ms) also follow this track: he distinguishes strong (DP, CP) and weak (xP) phases.
- e. **node-driven phase** is certainly a desirable thing to have, but it appears to fall foul of the most basic and best known generalisations regarding English class 1 – class 2 morphology: origin-ál-ity has two suffix xPs, but not a single phase is triggered – otherwise stress would not be penultimate (cf. parén-tal vs. párent-hood).
- f. phase theory is still at an embryotic level of development. One thing that needs to be sorted out, for instance, is the question whether there is any need for phases without traces in the interpretative modules at all.
- g. our best guess: phases exist for reasons of interpretation (Chomsky 2001) (Chomsky 2002: UG reduces to merge and phase), hence phonological phases should leave traces in the phonology.
=> no interpretation, no phase

5.2 Marvin (2002): phonological cyclicity obeys the morphosyntactic structure

- **a phonological cycle is triggered at every xP.**
- **on this account, what is the difference between Lower vs. Havlík? The morphosyntactic structure of the words displaying these patterns?**
 - again OPol vs. MoPol diminutives *ps-ek* vs. *pies-ek*.
 - they are created from the same Vocabulary Items with the same phonological representations.
 - the root vowel is spelled out only when the morpheme boundary between the root and the diminutive suffix is phonologically interpreted.
 - otherwise it is not realized. Hence both diminutives must have a contrasting morphosyntactic structure.
 - however, there is no evidence (other than the root vowel) that the masculine diminutives containing the same root have any different morphosyntactic properties. Rather, they show the same syntactic behaviour.
 - other example: MoCz *pejs-ek* vs. *ps-ík* “dog dim (both)”

5. Conclusion

- no manipulation of syllable structure.
- both the Lower and the Havlík pattern are derived.
- a prediction is made: since the existence of a phonological phase supposes concatenation, vowel-zero alternations within morphemes must always follow Havlík. It is not so easy to find languages with more than one alternation site within a single morpheme, but all cases that we are aware of work: French (e.g. *devenir*), Moroccan Arabic (e.g. *køtɪb*).
- floating vowels rather than Reduction.
- interpretation-driven phase theory:
 - are there really interpretation-independent phases?
 - node-driven phase theory is blind to interpretation and faces serious trouble.

question to be answered

- why is it that only suffixes with alternating vowels are cyclic?
- in other words, why should a phonological property determine the cyclic behaviour of its host?

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