FDSL 6.5, 325-335

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Why are case markers in the Czech nominal declension not cyclic suffixes?*

1. Introduction

In this paper, I analyze the lexical representations of case markers in Czech and their merger with those nominal stems which end in consonants. My aim is to provide independent morphological evidence for empty Nuclei and lexically floating vowels, the phonological objects introduced in the Standard Government Phonology and developed in the CVCV framework (Lowenstamm 1996, Scheer 2004).

I assume that in the lexicon, all stem-final consonants are followed by empty Nuclei. On the basis of two alternations, an *e* ~ *ø* alternation and alternations of syllabic liquids, I argue in favour of the following analyses: 1. Zero case markers have no phonological structure of their own. Their effect on the form of the stem arises from the empty Nucleus which stands at the end of the stem. 2. Marker-initial vowels are lexically specified to associate to the stem-final Nucleus. Their effect on the form of the stem follows from the full Nucleus which they create.

2. Vowel-zero alternations and liquid alternations

In Czech nominal declension, there are two types of case markers: zero markers and suffixes beginning with vowels, both short and long. With respect to *e* ~ *ø* alternations (in Czech, only the mid front vowel alternates with zero) and liquid alternations (in Czech, liquids [r] and [l], henceforth L, have syllabic and non-syllabic alternants), vowel-initial markers behave alike, in an opposite way to zero markers. This is illustrated in table (1).

* Thanks to Tobias Scheer for helpful comments.

(1) Distribution of alternants: e ~ ø, L ~ L̩[1]

	positive marker		zero marker	
strong alternant: e/L̩			kot**e**l-Ø pat**e**r-Ø	trot**l̩**-Ø brat**r̩**-Ø
weak alternant: ø/L	kot**ø**l-ů pat**ø**r-em	trot**l**-ů brat**r**-em		

To sum up: 1. The weak alternant, i.e. a zero or a non-syllabic liquid, occurs when the stem-final consonant is immediately followed by a vowel-initial marker. 2. The strong alternant, i.e. an *e* or a syllabic liquid, occurs when the stem-final consonant is also word-final. In what follows, I submit a plausible (perhaps) explanation why these two categories of case markers produce such opposite effects on the stem.

3. Levels of representation

In this section, I explore representations of those phonological objects which are relevant to my analysis: final codas, vowels alternating with zero, and syllabic consonants.

3.1. Final codas: Onsets of empty Nuclei

In CVCV, phonological structure is represented on two separate levels. The syllable level consists of a strict sequence of non-branching Onsets (i.e. consonantal constituents, C) and non-branching Nuclei (i.e. vocalic constituents, V), hence CVCV. The segmental level consists of phonological expressions which are considered to have a hierarchical structure as well. What is important is that CV units are the minimal building blocks (the existence of C implies the existence of V, and *vice versa*). There are three consequences of this: 1. The parts of all consonant clusters are separated by empty Nuclei. 2. All morpheme-final consonants are Onsets of empty Nuclei. 3. The syllable structure of all morphemes starts with an Onset (empty or full) and ends in a Nucleus (empty or full).

To illustrate these consequences, under (2), I give the representation of the nominative singular form [atlas] ‘atlas’. It consists of eight constituents, three of

1 Through this paper, ø stands for the weak alternant and Ø for the zero case marker. Glosses: *kotel* ‘boiler, NomSg’, *pater* ‘floor, GenPl’, *trotl* ‘prune, NomSg’, *bratr* ‘brother, NomSg’, *kotlů* ‘GenPl’, *patrem* ‘InsSg’, *trotlů* ‘GenPl’, *bratrem* ‘InsSg’.

which are empty: it begins with an empty Onset and ends with an empty Nucleus, and an empty Nucleus separates two morpheme-internal consonants as well.

(2) NomSg [atlas]: empty Onset & empty Nuclei

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C V C V C V C V
  | |   | | |
  a t   l a s
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3.2. V ~ ø alternations: Nuclei with floating vowels

CVCV assumes that the syllable structure is recorded in the lexicon, and then projected into the derivation. This is a phonological version of the syntactic Projection Principle.[2] From this principle it follows that Nuclei which host V ~ ø alternations are already present in the lexical representation. In CVCV, vowels alternating with zero are lexically floating segments. Their phonetic realization depends on whether they link to their Nucleus. By way of illustration, I show the lexical representation of the root √PATR 'floor', which features an alternation site between *t* and *r*.

(3) Lexical representation of alternating *e*: √PATR

```
C V C V C V
| | |   |
p a t ɛ r
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Outside CVCV, V ~ ø alternations are analysed in two ways: the vowel is either epenthetic or present in the underlying structure, and then disappears. In absence of the Projection Principle (i.e. in case that the syllable structure is considered not to be projected from the lexical representation of particular morphemes, but to be derived in the phonological component), both of these strategies, epenthesis and deletion, lead to resyllabification. In that case, the final consonant of the root √PATR sits either in a Coda or in a branching Onset depending on whether the alternation site between *t* and *r* is vocalised (e.g. *pater* 'floor, GenPl') or not (e.g. *patro* 'floor, NomSg').

If alternating vowels are either inserted or deleted by rule, their distribution should be predictable. However, what is predictable is the distribution of alternants, but not the distribution of the alternation sites themselves. This can be illustrated by three roots: √PATR 'floor', √KATR 'frame-saw', and √CITER

2 The phonological Projection Principle was originally formulated within the Standard Government Phonology; see e.g. Kaye et al. (1990).

‘cither’. If we adopt an epenthetic scenario, the root √KATR should behave in the same way as the root √PATR because in the underlying structure they both end in a *tr* cluster. In fact, they do not behave alike: in the context of a zero marker, the root √PATR shows the vowel *e*, but the root √KATR shows the syllabic liquid instead; compare *pater-Ø* ‘floor, GenPl’ and *katr̩-Ø* ‘frame-saw, NomSg’. From this it follows that information about epenthesis must be somehow encoded in the lexical representation. If we adopt the deletion scenario, the same problem arises. Even though the roots √PATR and √KATR will differ lexically, i.e. √PATER vs. √KATR, additional information about the alternating vowel is still needed to capture the difference between the root √PATER whose *e* undergoes deletion and the root √CITER whose *e* is stable; compare *pater-Ø* ‘floor, GenPl’ and *patr-a* ‘floor, GenSg’ vs. *citer-Ø* ‘cither, GenPl’ and *citer-a* ‘cither, NomSg’. This behaviour pleads in favour of the analysis proposed by CVCV: in the lexicon, vowels alternating with zero are unique phonological objects.

3.3. Syllabic consonants: segments linked to multiple constituents

Not only vowels alternating with zero, but also syllabic consonants are assumed to have a unique structure: they are only segments that are associated simultaneously with a non-nuclear and a nuclear constituent. Within the CVCV framework, several analyses of syllabic consonants have been proposed, e.g. Scheer (2004) or Blaho (2004), among others. As far as I know, they agree on that in a given language, all syllabic consonants have the same structure, it is either VC (Scheer 2004) or CV (Blaho 2004).

In Czech, the only consonants that can be syllabic are liquids [r] and [l]. Table (4) shows that liquids are syllabic only when two conditions are met: no vowel is adjacent to them and they are not in word-initial position.

(4) Contexts for syllabic and non-syllabic liquids

	C_C	C_#	#_C	(V)_(V)
L̩	✓	✓		
L			✓	✓

Syllabic liquids are of two types depending on their position within the morpheme: morpheme-internal syllabic liquids are stable, but morpheme-final liquids have syllabic and non-syllabic alternants, depending on the structure of the following morpheme. In Ziková (in prep.), I argue that stable and alternating syllabic liquids differ structurally: the former are CV and the latter VC structures.

(5) Alternating and stable syllabic liquids

	alternating L̩	stable L̩
CV		✓
VC	✓	

Of course, the question arises why in Czech only liquids, but not other consonants can be syllabic. It can scarcely be a coincidence that syllabic consonants are typically restricted to sonorants. Adopting the Element Theory view that segments have a hierarchical structure which consists of privative melodic primes (elements), I assume that this is the aperture element A what is responsible for branching. I propose that in Czech only liquids are A-headed consonants, hence only they can branch and only they can be syllabic.

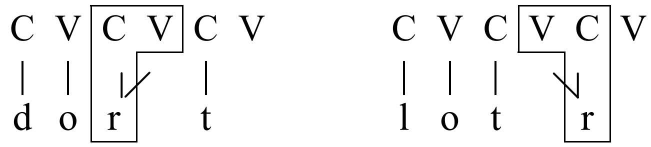
Provided that branching follows from the subsegmental structure, liquids are expected to branch whenever they can, i.e. whenever the empty Nucleus is available. From this it follows that being linked simultaneously to C and V is a necessary, but not a sufficient condition for liquids to be syllabic: only those doubly linked liquids are syllabic which are not adjacent to any vowel.[3]

These assumptions are illustrated in (6). In (6a), I show the lexical representation of the root √DORT 'cake'. The liquid is linked to the following empty Nucleus. It never realizes as syllabic because the full Nucleus precedes it. In (6b), in the root √LOTR 'rouge', the liquid stands in morpheme-final position. The preceding Nucleus is empty, hence a target of spreading. The liquid is syllabic or non-syllabic depending on whether the root-final Nucleus is empty or not; compare *lotr̩-Ø* 'rouge, NomSg' and *lotr-a* 'rouge, GenSg'.

3 On the other hand, if word-initial liquids are never syllabic even though they adjoin no vowels, they can never be doubly linked; see e.g. *rtuť* 'mercury, NomSg', *lhát* 'lie, inf.', or *lhostejnost* 'indiferrence, NomSg'. It follows that not all empty Nuclei can be potential targets for spreading. Of course, one may ask why do root-initial liquids never branch. I claim that they do not branch for two reasons. A first one is a presence of domain. In Ziková (2007), I argue that in Czech root-initial clusters form domains and empty Nuclei enclosed within such domains cannot accommodate any melody. A second reason why root-initial liquids do not spread is a presence of lexically floating vowels which serve as barriers against spreading.

(6) Lexical representation of liquids

a. √DORT b. √LOTR



3.4. Summary

I have shown how V ~ ø alternations and syllabic consonants are encoded in the lexicon: V ~ ø alternations are Nuclei with floating vowels, syllabic consonants are doubly linked segments. In the next section, the derivation of V ~ ø alternants is discussed.

4. V ~ ø alternations are results of Government

Up to now, we have identified three types of Nuclei: full Nuclei (7a), Nuclei with lexically floating vowels (7b), and empty Nuclei (7c). Whether Nuclei with lexically floating vowels end up as full Nuclei depends on whether they are governed or not.

(7) Typology of nuclear constituents

a. full Nucleus	b. V ~ ø	c. empty Nucleus
V	V	V
|		
V	V	

In CVCV, V ~ ø alternations are interpreted as results of Government: Government prevents lexically floating vowels from connecting with their Nuclei, hence produces zero alternants.

Government is a regressive relation that holds between the constituents: Nuclei govern either other Nuclei, or their own Onsets. What is important is that only those Nuclei which are not governed display Government. In case that there are two full Nuclei in a row, the second one always governs the closest constituent, i.e. its own Onset. From this it follows that full Nuclei are never governed, hence always govern: whenever a Nucleus with a lexically floating vowel is followed by a full Nucleus, it is governed. As for morpheme-final empty Nuclei and their effect on V ~ ø alternations, they are governed (due to the morphology), therefore do not govern. In that case, an association line between the floating segment and its Nucleus is created.

4.1. Preliminary conclusion

Given the merger of positive markers produces zero alternants, it follows that no empty Nucleus intervenes between the stem and the positive marker.

5. Zero markers

Zero markers have no phonological structure of their own, i.e. no lexical representation on any phonological level. Their effect on the form of the stem arises from the empty Nucleus which stands at the end of the stem. This is illustrated in (8). In (8a), I show the derivation of the genitive plural form [patɛr]. We already know that the *e* before the stem-final liquid lexically floats (see (3) above). In the genitive plural form, the *e* associates with its constituent (V_2) because it is not governed by the following empty Nucleus. (8b) shows the nominative singular form [lotr̩]. The morpheme-final liquid lexically branches onto the empty V_2 (see the representation of the root in (6b)). The liquid is syllabic because the other adjacent Nucleus, V_1, is empty.

(8) Derivation of strong alternants

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a. GenPl pater-Ø          b. NomSg lotr̩-Ø

C V C V2 C V1             C V C V2 C V1
| | | ↑  |                | | |  \ |
p a t ɛ  r                l o t    r
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This analysis explains why stem-final liquids must be left-branching, not right-branching as Blaho (2004) assumes. If the liquid branches on V_1, V_1 would be a good governor which could govern the empty V_2. The problem is that the same scenario would be expected also for the structure in (8a). If word-final liquids branch to their right, this is what the liquid in (8a) should do. As before, the stem-final Nucleus would be a good governor for the V_2 which, this time, hosts a floating vowel. Since Government prevents floating vowels from surfacing, we get a wrong result with a syllabic liquid **patr̩*. To sum up, the right-branching scenario for word-final liquids predicts that preceding V ~ *ø* alternation sites remain unvocalised. However, the reverse is observed: alternation sites in the context C_L# are always vocalised (e.g. *kot***e***l* 'boiler, NomSg' vs. *kot***ø***l-e* 'boiler, GenSg' or *jisk***e***r* 'spark, GenPl' vs. *jisk***ø***r-a* 'spark, NomSg').

Also, the fact that alternation sites are vocalised before word-final liquids is a strong argument in favour of floating vowels. In the Standard Government Phonology, alternation sites are lexically empty Nuclei. If they remain ungoverned they are filled in with appropriate vowels (see e.g. Kaye (1995) where *e* ~ ø alternations in Polish are discussed). In that case, the roots √PATR and √BRATR have the same structure: the Nucleus which separates the final cluster, i.e. V_2, is empty. The question that arises is how the phonology knows that in case of √PATR the ungoverned V_2 has to be filled in, while it accommodates the spreading of the liquid in the derivation of the root √BRATR. Provided that the alternating vowels are encoded in the lexicon as floating segments, this problem does not arise: the floating vowel serves as a barrier against liquid spreading.

6. Vowel-initial markers

If the merger of positive markers always produces weak alternants, marker-initial vowels must belong to the stem-final Nucleus. How, then, should they be represented lexically?

In case of markers that begin with a short vowel, we have no choice but to let these vowels lexically float. That is, marker-initial short vowels are lexically floating segments that lack any syllabic support. In order to be pronounced, they need to associate to an empty Nucleus. On the other hand, marker-initial long vowels are lexically associated to a Nucleus and specified for spreading to their left. The lexical difference between long and short marker-initial vowels is illustrated in (9).

(9) Affix-initial short vs. long vowels

a. LocPl marker *-ech* [ɛx]

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  C V
  |
ɛ x
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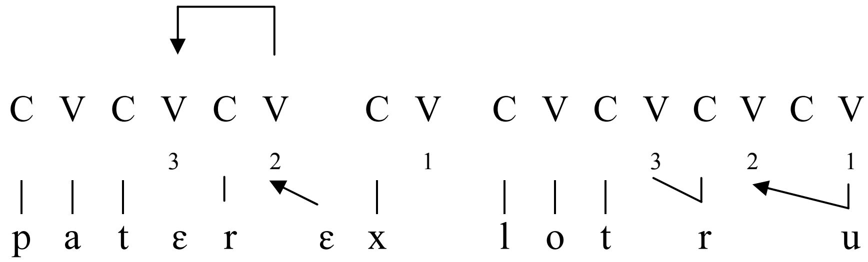
b. GenPl marker *-ů* [uː]

```
C V
  |
  u
```

In (10), I show the effect of the merger of these case markers with our tested roots √PATR and √LOTR. (10a) shows the merger of the root √PATR, whose structure has been introduced in (3), with the LocPl marker *-ech*. The form [patrɛx] is produced. The affix-initial vowel associates with the root-final empty Nucleus V_2. It governs the preceding Nucleus V_3 and thereby prevents the floating *e* from being spelled out (the empty Nucleus V_1 is governed because it is word-final). (10b) illustrates the merger of the root √LOTR, whose lexical representation appears in (6b), with the GenPl marker *-ů*. The form [lotruː] is produced. Following its lexical specification, the affix-initial vowel spreads to the root-final Nucleus V_2 and is therefore realized as a long vowel. The root-final liquid lexically branches to its left, but it is not syllabic now because the Nucleus to its right is filled with the affix vowel.

(10) Derivation of weak alternants

a. LocPl *patr-ech* b. GenPl *lotr-ů*



6. On the notion of a phonological cycle/domain

Vowel-zero alternations are usually interpreted in terms of cyclic derivation; see e.g. Rubach (1984), Kaye (1995) or Marvin (2002), among others. In this section, I argue for a model where the non-cyclic behaviour of vowel-initial case markers follows from their phonological structure, rather than from a diacritic feature attached to the lexical representation of the morpheme (e.g. “being non-analytic” in Kaye 1995).

Kaye distinguishes two types of morphology according to whether the boundary between two morphemes is interpreted phonologically (analytic morphology), or not (non-analytic morphology). In the former case, the adjacent morphemes are said to belong to two separate phonological domains (their phonological structure is derived in two cycles), while in the latter, they sit in the same domain (their phonological structure is derived in one single cycle).

Among others, Kaye analyses the Polish examples *pies-Ø* ‘dog, NomSg’ and *ps-a* ‘dog, GenSg’ which are parallel to the Czech examples discussed in this paper. In the genitive form, the alternation site inside the root is not vocalised, hence must be governed. In Kaye's terms, this means that the case marker is non-analytic and hence the root and the genitive marker *-a* belong to the same domain. The *-a* thus is associated with the final Nucleus of the root which, being contentful, governs the preceding alternation site. However, Kaye does not explain how it has ended up in the root-final empty Nucleus. Furthermore, he claims that being invisible to the phonology, all non-analytic morphology must be recorded in the lexicon. If all positive case markers have the same effect on the alternating site, this inevitably leads to the conclusion that all inflected nominal forms must be stored in the lexicon as such, a result which is highly implausible. Moreover, not only case markers, but also all other vowel-initial suffixes provoke weak alternants as illustrated in (11). Therefore *all* structures derived by vowel-initial suffixes have to be recorded in the lexicon.

(11)	*dvou-patør-ák*	*patør-ov-ý*
	two-√FLOOR-noun	√FLOOR-adj.-Agr
	'double-decker'	'related to floor'

If all vowel-initial suffixes behave alike, their non-cyclic behaviour should be derived from their phonological structure rather than from a diacritic feature as proposes Kaye. Furthermore, provided that all vowel-initial suffixes are non-cyclic, phonological cyclicity cannot be syntactically driven as Marvin (2002) assumes. Otherwise, all vowel-initial suffixes should have analogical syntactic features which they apparently do not have (as shown also in (11)).[4]

7. Conclusion

In this paper, I have presented an analysis of Czech inflected nominal forms that is couched in the phonological framework known as CVCV. I have argued that non-cyclicity of positive case markers follows from the lexical representation of their initial vowels: they are lexically specified to occupy a final Nucleus of the preceding morpheme whenever it is empty.

References

Blaho, Sylvia. 2004. *Syllabic consonants in strict CV*. MA thesis, Pázmany Péter University at Piliscsaba.

Kaye, Jonathan et al. 1990. Constituent structure and government in phonology. *Phonology Yearbook* 7: 193-231.

Kaye, Jonathan. 1995. Derivations and Interfaces. In *Frontiers of Phonology*, ed. J. Durand and F. Katamba, 289-332. London & New York: Longman.

Lowenstamm, Jean. 1996. CV as the only syllable type. In *Current Trends in Phonology. Models and Methods*, ed. J. Durand & B. Laks, 419-441. Salford, Manchester: ESRI.

Marvin, Tatjana. 2002. *Topics in the stress and syntax of words*. PhD dissertation, MIT, Cambridge, MA.

4 For more arguments that phonological cyclicity is independet of morphosyntactic structure see Scheer & Ziková (2007).

Rubach, Jerzy. 1984. *Cyclic and Lexical Phonology. The Structure of Polish*. Dordrecht: Foris.

Scheer, Tobias. 2004. *A Lateral Theory of Phonology. Vol.1: What is CVCV, and why should it be?* Berlin: Mouton de Gruyter.

Scheer, Tobias, and Markéta Ziková. 2007. (Slavic) vowel-zero alternations and Phase Theory. Paper presented at the OCP 4, Rhodes, January 19-21 2007. Handout at http://www.phil.muni.cz/cest/lide/zikova.html

Ziková, Markéta. 2007. Na rozhraní mezi morfologií a fonologií: alomorfie verbálních prefixů. Paper presented at the Jazykovědné sdružení, Brno, April 2007. Handout at http://www.phil.muni.cz/cest/lide/zikova.html

Ziková, Markéta. (in prep.) *Na rozhraní mezi morfologií a fonologií. Studie o češtině*. PhD dissertation, Masarykova univerzita v Brně.

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