Not All Zeros Are the Same: Phonology of Zero Case Markers in Czech[*]

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1. Introduction

In Czech nominal declension Nsg and Gpl morphemes have zero allomorphs which are traditionally assumed to have the same phonology. For example, Halle & Nevins (2009) claim that both zeros are underlyingly yers which, being word-final, are deleted during the phonological computation. However, on the basis of contrasting behavior of consonant clusters with final liquids, I argue that these case markers have different lexical representations: the Gpl zero is a yer, but the Nsg zero has no underlying structure at all.

Before the zero case markers, nominal stems ending in consonant-liquid clusters reveal a striking pattern, which has gone unnoticed in the literature. As shown in (1), before the Nsg zero, CLs are either broken up with an epenthetic vowel or the final liquid becomes syllabic. By contrast, in Gpl only the epenthesis is possible.

(1)

Nsg: CL̩#	Nsg: CeL#	Gpl: CeL#	gloss
mysl̩	osel	vesel	mind, donkey, oar
	(Gsg: osl-a)	(Nsg: vesl-o)	
trotl̩	kotel	metel	josser, pot, broom
	(Gsg: kotl-e)	(Nsg: metl-a)	

This contrast between the Nsg and the Gpl becomes more obvious when it is viewed from a diachronic perspective. The vowels which

[*] This article is based on the paper presented at FASL 20 in which also Polish and Serbo-Croatian data regarding "irregular" vowel-zero alternations were analysed. This original paper was co-authored by Tobias Scheer and Attila Starčević. The Polish part of the original paper, in which two types of alternating vowels, i.e. lexically present and epenthetic, is discussed, is developed in Scheer (2012a,b). I would like to thank an anonymous reviewer for helpful suggestions.

occur in the final CLs have different origins: some of them are inserted in original consonant clusters, some of them just continue Common Slavic high vowels, called yers. What is intriguing in this case is that their distribution follows a difference between both morphological categories. As examples in (2) illustrate, none of the epenthetic vowels which occur in Gpl have CS origin. Furthermore, the data in (2) show that both zero case markers evolved from CS yers.[1]

(2)

Nsg: CeL#		Gpl: CeL#		gloss
kotel	< tьl-ъ	metel	< tl-ъ	pot, broom
kozel	< zьl-ъ	žezel	< zl-ъ	he-goat, sceptre
orel	< rьl-ъ	čísel	< sl-ъ	eagle, number
osel	< sьl-ъ	šídel	< dl-ъ	donkey, awl
úhel	< gъl-ъ	jiter	< tr-ъ	angle, morning
uzel	< zъl-ъ	žeber	< br-ъ	knot, rib
uhel	< gl-ъ			coal
uher	< gr-ъ			blackhead

Since the presence of epenthetic vowels, both etymological or non-etymological, before the Nsg zero is restricted to the closed set of CS stems, the pattern in (1) can be simplified: synchronically, the Nsg zero produces syllabic liquids, while the Gpl zero triggers epenthesis and not the other way round.[2] The productivity of this pattern is also manifested by CL-stems which simultaneously take both zero allomorphs. In (3a) stems are shown, each of which has two different genders (depending on speaker's idiolect or sex of the referent). If a given stem is masculine, a zero appears in the Nsg and the final liquid is syllabic. However, if it is feminine, a zero is in the Gpl and *e*-epenthesis is triggered. The same behavior is shown by homonymous roots in (3b).

[1] The CS data are taken from Kopečný (1981).

[2] There exists a handful of other CL-stems that show an epenthetic vowel in the Nsg, e.g. *pytel* (Gsg *pytl-e*) 'sack', *kyčel* (Gsg *kyčl-e*) 'hip' or anthroponyms *Havel* (Gsg *Havl-a*), *Karel* (Gsg *Karl-a*), *Pavel* (Gsg *Pavl-a*). They do not have CS origin but they are already registered in the earliest Czech texts. The stem *datel* 'woodpecker' poses a special case because the original *e* changed from a stable vowel to an alternating; e.g. the original Gsg form *datel-a* changed to *datl-a*.

(3) a. bi-gender stems

Nsg (masc.)	Gpl (fem.)	Nsg (fem.)	gloss
hadṛ	hader	hadr-a	rag
krekṛ	kreker	krekr-a	cracker
knedḷ	knedel	knedl-a	dumpling
kmotṛ	kmoter	kmotr-a	godfather, godmother
magistṛ	magister	magistr-a	master of arts
Petṛ	Peter	Petr-a	anthroponym

b. homonymous stems

Nsg (masc.)	Gpl (fem.)	Nsg (neu.)	gloss
centṛ	center	centr-um	centre pass, centre
metṛ	meter	metr-o	meter, underground
intṛ	inter	intr-o	hostel, introduction
kvádṛ	kváder	kvádr-o	block, suit
čudḷ	čudel	čudl-a	knob, little fish

The epenthesis in the Gpl is absolutely regular, but only in clusters with final liquids. As shown in (4), other types of final CCs behave irregularly: they either host an epenthetic vowel or not. Moreover, some stems can also show both vocalized and unvocalized forms.

(4)

Gpl: CC#	Gpl: CeC#	gloss
jurt	karet (Nsg kart-a)	yurt, card
verv	barev (barv-a)	vim, colour
krypt	kobek (kobk-a)	crypt, dungeon
elips	kapes (kaps-a)	ellipse, pocket
holb	holeb	pint glass
jacht	jachet	yacht

Finally, the different types of consonant clusters show the different behavior not only in the Gpl, but also in the Nsg: CLs behave uniformly, i.e. the liquid becomes syllabic, otherwise the final cluster is either broken up with an epenthetic vowel or it is preserved; and as in the Gpl,

doublets are also possible.[3]

(5)

Nsg: CC#	Nsg: CeC#	gloss
pazneht	nehet (Gsg neht-u)	hoof, nail
sulc	palec (palc-e)	aspic, thumb
kalk	lilek (lilk-u)	calque, aubergine
nerv	krev (krv-e)	nerve, blood
herynk	herynek	herring
rynk	rynek	market place

I propose an analysis of the Nsg-Gpl puzzle which explains why only final CLs behave uniformly and the same time contrastively, i.e. why in the Nsg they *always* display syllabic liquids, whereas in the Gpl they *always* host epenthetic vowels. A proposed analysis is based on two main assumptions. First, vowels that alternate with zero can have different lexical representations; cf. Bethin (1992) and Scheer (2012a,b) for Polish or Bethin (1979) for Serbo-Croatian. Second, also zero case markers can differ underlyingly; cf. Baylin & Nevins (2008) for Russian.

2. Why standard yer-based analyses fail

Epenthetic vowels in Slavic, i.e. those vowels which alternate with zero in particular morphemes, have been intensively analyzed in various linear and autosegmental frameworks (see the overview in Scheer & Ziková 2010). All of these analyses follow the essence of the Lower rule which was introduced by Lightner (1965): *all* vowels that alternate with zero are underlyingly yers, which vocalize *only* in presence of a following yer.

As we could see in the previous section, an alternating vowel that separates the stem-final cluster surfaces in both Nsg and Gpl; cf. examples in tables (4) and (5) above. Since vowels that alternate with zero are underlying yers and since yers surface only before yers, then both the Nsg and the Gpl zeros must be underlyingly yers. Furthermore, this standard yer-based analysis assumes not only both zero case markers

[3] It should be noted that unlike epenthetic vowels in CLs these vowels are both etymological and non-etymological.

to be yers lexically but also *all* alternating vowels. Hence all stems which show an epenthetic vowel in Gpl must have a yer in their lexical representation.

If both the Nsg and the Gpl zero are yers, then it cannot be phonology which is responsible for the contrasting behavior of final CLs. Generally, two non-phonological analyses are possible. The first possibility is an allomorphy for Nsg. In this case the Nsg zero would receive two phonologically distinct representations: it would be a yer when attached to stems with yers, but literally nothing when merging with CL-stems. The Gpl zero, on the other hand, would be an underlying yer in all circumstances. In that case CL-stems would occur in two different phonological environments in Nsg and Gpl respectively, which would be somehow responsible for their different phonological behavior.[4] The second possibility is a readjustment rule associated to the Gpl yer which would insert yers in stem-final CLs. Neither of these analyses however explains why only just CLs, but not other types of consonant clusters behave uniformly.

3. Strict CV analysis: a problem with final branching onsets

The newly discovered pattern thus questions the essence of the standard yer-based approach to Slavic vowel-zero alternations according to which all alternating vowels must be recorded lexically. Since the presence of alternating vowels in CLs is absolutely predictable, there is no reason to put them into the lexicon: they are genuine epenthetic vowels which are inserted during phonological computation in order to repair an ill-formed structure (i.e. an unlicensed branching onset as I argue below).[5]

According to their behavior in Gpl thus three types of stems ending in consonant clusters can be identified: a) stems without a yer, i.e.

[4] Bailyn & Nevins (2008:285) propose an allomorphy along the same lines for the Nsg zero in Russian. They however do not indicate how allomorph selection works: they only mention a minimal pair /zv'er'-Ø-ь/ and /dv'er'-Ø-Ø/ without any further comments.

[5] The lexical uniformity of vowel-zero alternations has been already questioned by Bethin in her papers on Serbo-Croatian (1979) and Polish (1992). According to Bethin two types of alternating vowels must be distinguished: yers which are present in native vocabulary and epenthetic vowels that occur in loanwords. Scheer (2012a,b) however argues that the distinction between yers and epenthetic vowels in Polish does not pattern with the native-loan opposition.

preserving CCs in Gpl (e.g. Gpl *jurt*, Nsg *jurt-a*), b) stems whose final cluster hosts a yer, c) CL-stems whose final cluster is broken up with an epenthetic vowel; the last two types display an alternating vowel in the Gpl form: *karet* (Nsg *kart-a*) and *vyder* (Nsg *vydr-a*).

This three-way typology can be appropriately expressed in strict CV vocabulary (Scheer 2004). As autosegmental representations in (6) show, a nucleus which separates the stem-final cluster has a different phonological status. In stems like *kart-a – karet* it hosts a lexically floating vowel (6a). In non-vocalizing stems like *jurt-a – jurt* and CL-stems like *vydr-a – vyder*, on the other hand, the cluster internal nucleus is lexically empty. Why only in the latter case this nucleus is target of epenthesis follows from the fact that CLs form branching onsets.

(6) a. kart-a, karet

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C V C V C V
| | |   |
k a r e t
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b. jurt-a, jurt

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C V C V C V
| | |   |
j u r   t
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c. vydr-a, vyder

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C V C V C V
| | |   |
v y d < r
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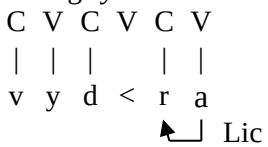
Scheer (2004:§34, 2009) claims that branching onsets differ from coda-onset clusters in that their consonants contract a lateral relation headed by the liquid; it is marked by "<" in (6c). The solidarity of this cluster is manifested by the fact that the empty nucleus enclosed in a CL is invisible not only for phonetics (it is unpronounced), but also for phonology.

In a strict CV theory, distribution of empty nuclei is regulated by an inter-nuclear lateral relation called *government*: an empty nucleus must be governed by the following nucleus. Only in this case can it be unpronounced, otherwise it must receive some melody. Final empty nuclei (FEN), which are assumed to follow all final consonants, are governed parametrically: in Czech, which features word-final codas, they are governed. By contrast, empty nuclei in branching onsets escape from government: they are unpronounced because the head-complement relation is set between the liquid and the preceding consonant. Moreover, empty nuclei which occur in CLs cannot be the target of any phonological process, including epenthesis. A fact that epenthesis takes place in Gpl thus indicates that branching onsets cannot be maintained in word-final position, i.e. they cannot be licensed by FENs.

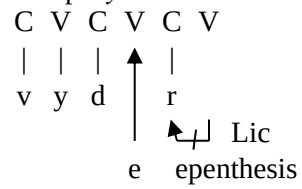
Cyran (2003, 2010) claims that consonant clusters must be licensed by following nuclei. Whether a given nucleus is strong enough to license a particular consonant cluster is defined by parameter setting. Cyran assumes that the licensing strength is a scalar feature and distinguishes four nuclear categories which occupy different positions in a universal licensing hierarchy: full nuclei > nuclei with schwa > final empty nuclei > internal empty nuclei. The licensing hierarchy predicts that nuclei associated to a segmental level are universally more capable to license than empty nuclei. Not only nuclear categories, but also both main types of consonant clusters stay in a hierarchical relation where a branching onset is weaker than a coda-onset cluster (i.e. LC > CL) which means that the former is more difficult to be licensed than the latter.

From the perspective of two hierarchies at hand, stem-final CLs occur in a phonologically adverse environment in the Gpl: a FEN is too weak to license a branching onset. Being unlicensed, the final branching onset is broken up which means that its nucleus is made accessible to epenthesis (7b). In the rest of paradigm cells, on the other hand, the stem's FEN is merged with a case-marking vowel. In that case it becomes strong enough to license and the stem-final CL is thus preserved (7a).

(7) a. Nsg *vydr-a*



b. Gpl *vyder*



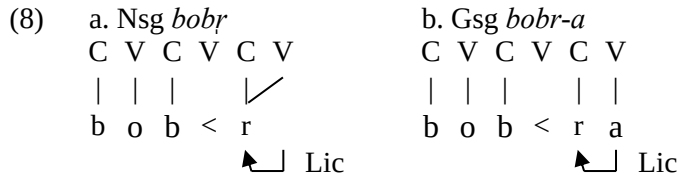
Having introduced a syllable structure for CL-stems, let us return to the main issue which is their contrasting behavior in the Gpl and the Nsg. In what follows I argue that an epenthesis in the Gpl and a syllabic liquid derivation in the Nsg both represent two sides of the same coin: they both react to the situation where a branching onset cannot be licensed word-finally.

Scheer (2004) claims that syllabic consonants branch on a neighboring nucleus which accounts for their peculiar features: their phonetics is consonantal (they are articulated the same way as their

non-syllabic cousins), but phonologically they behave as vowels (e.g. can bear stress). What kind of consonants can branch and where is defined parametrically. In Czech only liquids are able to branch, i.e. only liquids can be syllabic. Furthermore, Scheer (2009) develops an analysis of syllabic consonants in Czech according to which liquids branch to their right in order to save a branching onset in which they are involved. The main argument that syllabic liquids are syllabic because they are heads of branching onsets is the fact that non-vowel-adjacent liquids are never syllabic word-initially: in stems like *rtuť* 'mercury' or *lkát* 'to lament', the initial liquids do not form branching onsets hence they have no reason to branch to their right.

In the Nsg *bobr̥* 'beaver' (8a), the liquid branches to the FEN, creating a full nucleus which in turn licenses the final CL. In (8b), where the structure of Gsg *bobr-a* is shown, the stem-final CL is licensed by the case marking *a* associated with the FEN.

(8)

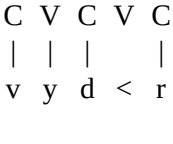


The analysis of Nsg and Gpl forms, which we have developed so far, explains why final CLs behave uniformly in comparison with other types of final CCs: because only CLs have an uniform lexical representation; representation of other types of CCs, i.e. whether they include a yer or not, is a matter of idiosyncrasy. This analysis however says nothing why CLs being lexically identical produce different structures in the Nsg and the Gpl respectively. I argue that the reason is that stem-final CLs occur in two different phonological contexts in these two morphological categories.

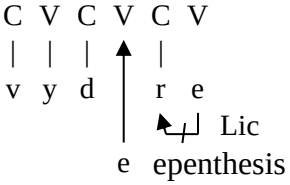
Recall that in the Nsg liquids become syllabic. Translated into strict CV vocabulary, it means that they branch in order to create good licensors of final branching onsets: the Nsg zero is literally nothing, hence in the Nsg stem-final CLs are followed by FENs which are proper targets of liquid spreading. In Gpl the same scenario does not work because the FEN is occupied by a yer: the Gpl zero is a yer lexically which enters the FEN and produces an obstacle to liquid branching.

As shown in (6a), where a representation of the vocalizing LC-stem *kart-a – karet* is depicted, yers are lexically floating vowels. Their association to their syllabic constituent, i.e. their phonetic realization, depends on government: yers associate only if their nucleus is not governed. Governed yers, on the other hand, cannot associate, i.e. cannot be pronounced. Since in Czech all FENs are governed, then the final yer in Gpl is not pronounced; its presence however prevents the final liquid from spreading (9a). The final CL thus appears unlicensed; as a consequence its solidarity breaks down and its nucleus is filled by an epenthetic vowel (9b).

(9) a. Gpl *vyder* (before computation)



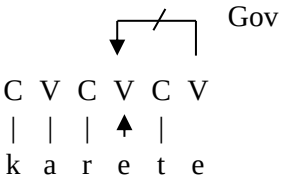
b. Gpl *vyder*



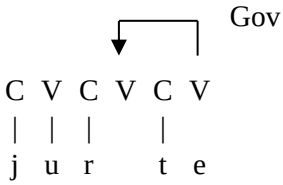
On the other hand, derivation of CC-stems without final liquids depends on whether their final clusters are lexically separated by floating vowels or not. In non-vocalizing stems like *jurt-a – jurt*, the cluster internal nucleus is empty hence it is governed by the FEN (10b). In vocalizing stems this nucleus hosts a floating vowel which cannot be governed by the FEN; being ungoverned the cluster internal floating vowel thus associates with a segmental level, i.e. realizes phonetically (10a).[6]

[6] Stems that show both vocalized and unvocalized forms must have two different lexical representations: one with a floating vowel, one with an empty nucleus; see also Scheer (2012a,b) where analogical doublets in Polish are discussed.

(10) a. Gpl *karet*



b. Gpl *jurt*



To sum up, the contrasting behavior of CL-stems in the Nsg and the Gpl results from the fact that the Nsg and the Gpl zero allomorphs have different lexical representations: the former is literally nothing, whereas the latter is a yer, i.e. a lexically floating vowel.

4. Diachronic evolution

As has been mentioned, both zero allomorphs in question are assumed to have evolved from CS yers; cf. examples in table (2) above. A question thus arises whether the evolution of different underlying structures for the Nsg and the Gpl is related to the phonological changes which affected CS yers.

Recall that our main argument that the Nsg and the Gpl zeros differ underlyingly is based on the contrasting phonological behavior of CL-stems which can however be observed only from the mid-15th century. The loss of yers is dated to 10th-12th centuries (e.g. Vondrák 1906:171ff) and the earliest texts written in Czech come from the turn of the 13th and 14th centuries. These early Old Czech (OCz) texts show that the loss of case marking yers produced the same result: in both cases structures with so-called trapped liquids were derived; e.g. CS *bobr-ъ* > OCz *bobr* 'beaver, Nsg', CS *vydr-ъ* > OCz *vydr* 'otter, Gpl'.

In early stages of OCz, i.e. till the mid-15th century, there exist two types of non-vowel-adjacent liquids: trapped and syllabic. While the latter continue CS yer-L clusters (e.g. CS *sъrn-a* > OCz *sr̥n-a* 'doe, Nsg'), the former appear in place of CS L-yer strings (e.g. CS *krъst-a* > OCz *krst-a* 'baptism, Gsg'). The main criterion how to identify the status of OCz liquids is whether they are counted in verse (syllabic) or not (trapped); see Gebauer (1963:59ff).[7] As examples from early OCz poetry

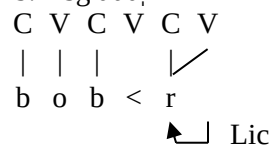
[7] In Scheer (2004:§240) three other criteria are established: a) only syllabic consonants can bear stress, b) trapped, but not syllabic consonants are transparent for voicing, c)

indicate, all liquids in final CLs were really invisible for versification in both Nsg and Gpl forms.

The fact that CL-stems behaved the same way in Nsg and Gpl however does not necessarily mean that both zero desinences had to be lexically identical in early OCz. In the previous section I have argued that two phonological processes which occur in Nsg and Gpl, i.e. syllabic liquid derivation and epenthesis, are both a reaction to a fact that branching onsets are ungrammatical word-finally. Expressed in strict CV vocabulary it means that CLs cannot be licensed by unpronounced final nuclei, regardless whether they are empty (as in the Nsg) or host a floating melody (as in the Gpl). From this perspective the diachronic change in the behavior of CL-stems (Nsg *bobr* > *bobŗ*, Gpl *vydr* > *vyder*) can be interpreted as a change in the parameter setting for licensing of final branching onsets rather than a change in the lexical representation of the case morphemes. Whereas in early OCz unpronounced final nuclei are strong enough to license CLs, in further stages of the development only full nuclei, i.e. the strongest licensors in Cyran's licensing hierarchy, can do this job. The contrast between original forms with final trapped liquids and their descendants with syllabic consonants or epenthetic vowels is illustrated in (11) and (12) below.

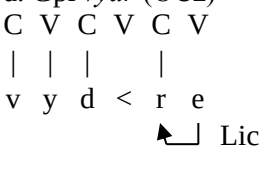
(11) a. Nsg *bobr* (OCz)

b. Nsg *bobŗ*

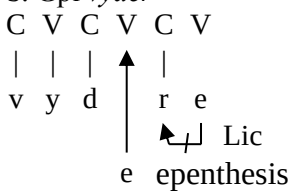


only trapped consonants provoke vocalization of preceding alternation sites. As for the first two criteria, they are inapplicable to OCz because neither stress nor obstruent voicing are marked orthographically in OCz. The last criterion, which in fact concerns (non)-vocalisation of prefixes, is disputable because vowel-zero alternations in prefixes are more irregular than those in roots and suffixes; see also Scheer (2009:411, ft. 2).

(12) a. Gpl *vydr* (OCz)



b. Gpl *vyder*



Another argument that supports the hypothesis that the evolution of different underlying structures for the Nsg and the Gpl is related to sound changes in the CS yers is lengthening of monosyllabic roots. Gebauer (1960:§37,§143,§179) brings examples from the earliest OCz texts which show that the Nsg and the Gpl zeros had different impact on quantity: only in the Gpl vowel lengthening in monosyllabic roots took place; e.g. Nsg *ryb-a* – Gpl *rýb* 'fish'. Although lengthening in the Gpl is not synchronically productive (for example the Gpl mentioned above posits a short vowel synchronically), it used to be a productive phonological process in the early stages of OCz. If different underlying structures for overtly identical case markers are postulated already for early OCz than the puzzle, why only in one case a phonological rule, i.e. a rule which lengthens a preceding vowel, is applied, can be solved on purely phonological grounds.

Given that the zero case markers both have a yer-origin, as is traditionally assumed, one can wonder why these yers underwent different phonological changes: the Nsg yer was deleted at all (as is expected by Havlík's Law) while the Gpl yer was transformed into a floating segment. A possible explanation could be that both case markers differed underlyingly already in Common Slavic. This hypothesis is supported by the fact that the CS yer markers themselves are assumed to have a different Indo-European origin; see Bethin (1979:ft.2) where alternative analyses found in the diachronic literature are summarized.

5. Conclusion

In this paper two main assumptions of the standard Lower-based analyses of Slavic vowel-zero alternations have been questioned: 1. both the Nsg and the Gpl zeros are lexically identical, 2. all alternating vowels are lexically identical as well. On the basis of developments of

CL-stems, I have argued that the Nsg and the Gpl differ underlyingly when the Gpl is phonologically "bigger" than the Nsg.

The purely phonological analysis of the zero markers, which I have proposed for Czech, correspond to a widely accepted view that morphologically, the Gpl is more marked than the Nsg; see e.g. Jakobson (1957). The more marked morphological structure, i.e. the Gpl, is now more marked also phonologically: when comparing to the Nsg which has no phonological structure at all, the Gpl is at least a floating piece of melody.

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