zech syllabic consonants revisited

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1. Goal

To explain the following three facts about syllabic consonants in Modern Czech:
(i) root-initial liquids are never syllabic even if they are sandwiched between two consonants
(ii) the presence of a syllabic liquid in the root always provokes a zero alternant in the prefix
(iii) syllabic consonants never alternate with V+C sequences

2. Syllabic consonants in Czech

Basic facts
(i) syllabic consonants form a small subset of the consonantal inventory of Czech – only liquids, i.e. [r], [l], can be syllabic
(ii) syllabic consonants are never adjacent to vowels

<table>
<thead>
<tr>
<th>(1)</th>
<th>context</th>
<th>L</th>
<th>non-L</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_#</td>
<td>sokl, výmysl, loť</td>
<td>lept, jilm, vpř</td>
<td>socle, untruth, rouge, etching, elm, pig</td>
<td></td>
</tr>
<tr>
<td>C_C</td>
<td>mlčet, mřtvý, strkat</td>
<td>pštros, hřmot</td>
<td>to be quiet, dead, to push, ostrich, din</td>
<td></td>
</tr>
</tbody>
</table>

How do we know that liquids are syllabic? Stress and metre tell us:

Behaviour of syllabic consonants
(i) Czech is a fixed stress language → liquids can be in stressed positions
(ii) Czech literary poetry is based on the syllabo-tonic system → liquids can be metric

Compare two isosyllabic couplets, each made up from octosyllabic verses (from K. J. Erben: Kytice (1853), a collection of ballads):

(2) mlč, synáčku, mlč, mlč, hochu, | a na ten hřmot a na ten hlas |
    1  2  3  4  5  6  7  8 | 1  2  3  4  5  6  7  8 |
    počkej jenom ještě trochu | mrtvý se zdvihá z prkní zas |
    1  2  3  4  5  6  7  8 | 1  2  3  4  5  6  7  8 |

Interim summary
Czech syllabic consonants: a) form a small subset, b) never adjoin vowels, c) can be stressed, d) can be metric
Problem
Non-vowel-adjacent liquids are not automatically syllabic:
root-medial and root-final NVA liquids – always syllabic
root-initial NVA liquids – never syllabic

The fact that root-initial NVA liquids are never syllabic is evidenced by the stress and metre:

In (3), the stress falls always on the first vowel of a given word:

(3)

<table>
<thead>
<tr>
<th>LC</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbi, lhát, lhostejný, lhůta</td>
<td>skull (GenSg), to lie, indifferent, term</td>
</tr>
<tr>
<td>lkát, lněný, lnout, lpět</td>
<td>to moan, flaxy, to adhere</td>
</tr>
<tr>
<td>lstivý, lvice, lze, lžíce</td>
<td>tricky, lioness, it is possible to, spoon</td>
</tr>
<tr>
<td>rdesno, rdít, rdousit, rmen</td>
<td>knotweed, to flush, to strangle, camomile</td>
</tr>
<tr>
<td>rmoutit, rtuť, rty, rvát</td>
<td>to grieve, mercury, lip (NomPl), to rip</td>
</tr>
<tr>
<td>rží, ržát, rži</td>
<td>rust (GenSg), to neigh, rye (GenSg)</td>
</tr>
</tbody>
</table>

In (4), the left-hand couplet illustrates that the word-initial liquid in lstivý (tricky) does not contribute to the metre:

(4)  Vari od našeho prahu,  a ticho, pusto v dědině
     12345678  12345678
     vari pryč, ty lstivý vrahu  vítr burácel jedině
     12345678  12345678

Substantial observation (not mentioned in any Czech grammar)
The merger of a root of the LC type and a consonant-final prefix does not produce the syllabic liquid.

(5)

<table>
<thead>
<tr>
<th>LC</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-lhostejněť</td>
<td>become indifferent (inf.)</td>
</tr>
<tr>
<td>z-rdousit</td>
<td>strangle (perf. inf.)</td>
</tr>
<tr>
<td>bez-rtuťový</td>
<td>mercuryless</td>
</tr>
</tbody>
</table>

Two pieces of evidence:
(i) in zlhostejněť and zrdousit, only the first vowel is stressed
(ii) the following couplet (from Google) demonstrates that the root-initial r in zrdousil ("he strangled") is not metric

(6)  Vlk si zuby brousil,
     1 2 3 4 5 6
     že by ji hned zrdousil
     1 2 3 4 5 6
Syllabicity of consonants in Czech is determined by two conditions:
(i) their quality
(ii) their phonological and morphological distribution

Question
How are these two conditions related?

3. Syllabic consonants in CVCV

CVCV (Lowenstamm 1996, Scheer 2004) is a representation-based autosegmental theory

Syllable structure in CVCV:
(i) is expressed by lateral relations (Government and Licensing)
(ii) is made up of the CV sequences (C = non-nuclear position, V = nuclear position)
(iii) is recorded in the lexicon

Consequences
(i) the syllable structure of each morpheme starts with a C and ends in a V
(ii) relations between syllabic positions and melody need not be one to one: empty Nuclei, floating melodies, pieces of melody linked to multiple constituents

(7) Lexical representation of the root \(\sqrt{\text{UPÍR}}\) "vampire"

\[
\begin{array}{ccccccc}
C & V & C & V & C & V & V \\
| & | & \overline{\text{u p i r}} & | \\
\end{array}
\]

Syllabic consonants
– they are on the boundary between consonants and vowels

hence the branching representation:
(i) syllabic consonants are double-linked melodies
(ii) C position determines their articulation – they are articulated the same way as their non-syllabic pendants
(iii) V position determines their phonological behaviour – they behave the same way as vowels (e.g. bear stress)

The branching representation is employed e.g. in Szigetvári (1999), Toft (2002), Blaho (2004), Scheer (2004), the latter two analyses are based on the Czech data

Blaho (2004) and Scheer (2004) are in agreement that syllabic consonants:
(i) are the product of a repair strategy – they spread to adjacent Nuclei to save them
(ii) have the same structure – they spread in one direction only

They differ in which Nucleus is the target of spreading:
New analysis based on Czech data

(i) Czech syllabic liquids branch in both directions
(ii) the direction depends on the position in which they occur:
root-medial liquids are right-branching, root-final liquids are left-branching
(iii) Czech syllabic liquids cannot be analysed in terms of a repair strategy
(iv) they branch not in order to save the adjacent Nucleus but because of their internal structure (perhaps)
(v) liquids branch lexically

Arguments:

(i) prefixal allomorphy: roots with syllabic liquids never take vocalised allomorphs
(ii) phonotactic of roots with medial syllabic liquids: they can be quadriconsonantal (C_i,C_C)
(iii) absence of doublets: root-final syllabic liquids never alternate with a VL cluster

3.1 e ~ ø alternation in prefixes

In Czech, all prefixes ending in a consonant have vocalised allomorphs, i.e. pod-/pode-, roz-/roze- etc.
Scheer (2004:§28) claims that the vocalisation of these prefixes depends on root structure:

<table>
<thead>
<tr>
<th>Context</th>
<th>e</th>
<th>ø</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_[J]V</td>
<td>ø</td>
<td>e</td>
<td>absolvovat (to complete (perf.))</td>
</tr>
<tr>
<td>C_[J]C</td>
<td>rozø-</td>
<td>ø</td>
<td>ložit (to spread out)</td>
</tr>
<tr>
<td>C_[J]TR</td>
<td>rozø-</td>
<td>ø</td>
<td>drobit (to fall apart, to scratch up)</td>
</tr>
<tr>
<td>C_[J]RT</td>
<td>rozø-</td>
<td>ø</td>
<td>rvat (to tear up)</td>
</tr>
</tbody>
</table>

Vowel-zero alternation sites in CVCV
Nuclei with lexically floating segments. They connect if they are not targets of Government, otherwise they remain unconnected, i.e. unheard.
(10) Governor and governee are adjacent (as in odabsolvovat and rozložit)

\[
\begin{array}{ccc}
C & V_2 & - & C & V_1 \\
\downarrow & \quad | & | & | & | \\
C & e & (C) & V
\end{array}
\]

In (11), the governor and governee are separated by an empty Nucleus (V₂) which is enclosed within a consonantal domain (marked with ⇐⇐⇐⇐):

(11) Governor and governee are not adjacent (as in rozdrobit)

\[
\begin{array}{ccc}
C & V_3 & - & C & V_2 & C & V_1 \\
\downarrow & \quad | & | & | & | & | & | \\
C & e & C & ⇐⇐⇐⇐ & C & V
\end{array}
\]

Why rozedrat and rozervat are not derived as in (11)?
Scheer’s answer: because their initial-clusters do not create any domain

In Scheer’s model, root-initial consonants create a domain iff both conditions are met:
(i) they are of rising sonority (√TR), and
(ii) they are followed by a root vowel

(Consonantal domains are derived from the internal structure of sonorants and obstruents, which is in nature different, and from the Infrasegmental-Government: sonorants IG obstruents and to do it they need to be supported by full Nuclei.)

(12) a. √RV (roze-rv-a-t): falling sonority, no vowel → no domain
    \[
    \begin{array}{ccc}
    C & V & C & V \\
    | & | & | & | \\
r & v
    \end{array}
    \]

b. √DR (roze-dr-a-t): raising sonority, no vowel → no domain
    \[
    \begin{array}{ccc}
    C & V & C & V \\
    | & | & | & | \\
d & r
    \end{array}
    \]

c. √DROB (roz-drob-i-t): raising sonority + vowel → domain
    \[
    \begin{array}{ccc}
    C & V & C & V & C & V \\
    | & | & | & | & | \\
d & ⇐⇐⇐⇐ & r & o & b
    \end{array}
    \]

What is the function of consonantal domains?

Three categories of Empty Nuclei according to the ECP:
(i) morpheme-final – their ECP is parametric
    (in Czech, they can be empty → consonant-final words; see Kaye 1990)
(ii) within consonantal domains – their ECP is satisfied by the presence of a domain
(iii) ECP of all other empty Nuclei can be satisfied only by the Government
(13) Initial domain, hence the prefix-final Nucleus is governed (*roz-drobit*)

\[
\begin{array}{cccc}
C & V & C & V_3 \ \rightarrow \ C & V_2 & C & V_1 \\
\end{array}
\]

\[
\begin{array}{c}
roz\text{ e}\text{ d} \ \Leftarrow \ roz\text{ e}\text{ d}
\end{array}
\]

(14) No initial-domain, hence the prefix-final Nucleus is not governed (*roze-drat*)

\[
\begin{array}{cccc}
C & V & C & V_3 \ \rightarrow \ C & V_2 & C & V_1 \\
\end{array}
\]

\[
\begin{array}{c}
roz\text{ e}\text{ d} \ \Rightarrow \ roz\text{ e}\text{ d} \ \Rightarrow \ roz\text{ e}\text{ d} \ \Rightarrow \ roz\text{ e}\text{ d}
\end{array}
\]

**What about roots with syllabic liquids?**

In their context, prefix-final Nuclei never emerge, hence they are always governed:

(15)

<table>
<thead>
<tr>
<th>(\sqrt{\text{TL}}C)</th>
<th>(\sqrt{\text{RL}}C)</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>zö-hět-nout</td>
<td>odø-mlź-it</td>
<td>to devour, to demist</td>
</tr>
<tr>
<td>rozö-słz-et</td>
<td>zö-mls-anŷ</td>
<td>start to weep, choosy</td>
</tr>
<tr>
<td>rozö-plk-at</td>
<td>odø-mlě-et</td>
<td>start to chatter, to pause</td>
</tr>
<tr>
<td>odø-frč-et</td>
<td>zö-mrž-ačit</td>
<td>to take off, to cripple</td>
</tr>
<tr>
<td>obö-drž-ēt</td>
<td>rozö-mřh-at</td>
<td>to receive, to squander</td>
</tr>
<tr>
<td>rozö-brm-ēt</td>
<td>rozö-mrž-elý</td>
<td>start to prickle, annoyed</td>
</tr>
</tbody>
</table>

**Scheer's analysis**

Root-initial domains are restricted to clusters with rising sonority, hence liquids in nasal-initial roots (the second column in (15)) must be left-branching. Only in that case, the prefix-final Nucleus will be governed.

(16) Prefix + \(\sqrt{\text{RL}}C\)

\[
\begin{array}{cccc}
C & V_3 \ \rightarrow \ C & V_2 & C & V_1 & C & V \\
\end{array}
\]

**Problem of Scheer's analysis**

its prediction: only \(\sqrt{\text{TRV}}\) take unvocalised prefixes
reality: all \(\sqrt{\text{CCV}}\) take unvocalised prefixes (see the first column in (17))
→ his hypothesis that root-initial consonant domains are restricted to clusters with rising sonority is based on incomplete data

**Interim conclusion – consonantal domains**

In Czech, root-initial consonantal domains are blind to sonority. They are created whenever a given cluster is followed by the full Nucleus.
Consequence for root-medial syllabic liquids:
They can be left as well as right-branching, both these representations produce unvocalised prefixes:

(18) a. Left-branching representation  b. Right-branching representation
→ prefix-final Nucleus is governed  → prefix-final Nucleus is governed
\[
\begin{array}{ccccccc}
C & V & - & C & V & C & C \\
| & | & \Rightarrow & | & | & \Rightarrow & |
\end{array}
\]
\[
\begin{array}{ccccccc}
C & e & C & L & C \\
C & e & C & \Leftarrow & L & C
\end{array}
\]

**Interim conclusion – root-medial liquids**
The systematic absence of prexical vowels does not indicate whether root-medial syllabic liquids are left or right-branching.

But, the phonotactics of CLC suggests that they must be right-branching.

3.2 Phonotactics of CLC clusters

Data in (19) show that roots with syllabic liquids can be quadriconsonantal:
(i) CLC clusters can be followed by any consonant
(ii) CLC clusters are preceded only by a sibilant (S)

(19) $\sqrt{\text{CLCC}}$ $\sqrt{\text{SCLC}}$ gloss

<table>
<thead>
<tr>
<th>hřd-0</th>
<th>strk-at</th>
<th>throat, to push</th>
</tr>
</thead>
<tbody>
<tr>
<td>fřčk-a</td>
<td>strn-ad</td>
<td>stripe, bunting</td>
</tr>
<tr>
<td>srđc-e</td>
<td>sprčh-a</td>
<td>heart, shower</td>
</tr>
<tr>
<td>hřnc-řř</td>
<td>svřb-ět</td>
<td>potter, to itch</td>
</tr>
<tr>
<td>břnk-at</td>
<td>smřd-ět</td>
<td>to pluck, to stink</td>
</tr>
<tr>
<td>mřtv-ý</td>
<td>škřt-at</td>
<td>dead, to cross out</td>
</tr>
</tbody>
</table>

Quadriconsonantal roots of the type CLCC can be accounted for only if the right-branching representation is employed.
What about the sibilant-initial roots?

Data in (21) demonstrate that the presence of a sibilant does not influence the vocalisation of the prefix → initial SC clusters behave as single consonants. In that they are similar to affricates. (Such a single-consonant-behaviour of initial SC clusters is attested in many Indo-European languages, e.g. English *stole, scare, strike, spring;* see e.g. Bell (1978), Kaye (1992).)

### Root-initial SC clusters

They are dominated by one syllable position, hence there is no empty Nucleus to be governed

<table>
<thead>
<tr>
<th></th>
<th>√CLCC</th>
<th>√SCLC</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>rozø-břítkat</td>
<td>odø-střkat</td>
<td>start to pluck, to push away</td>
<td></td>
</tr>
<tr>
<td>odø-dřítcat</td>
<td>rozø-škr̄t-at</td>
<td>to bump away, to strike</td>
<td></td>
</tr>
<tr>
<td>zo-mřtvělý</td>
<td>odø-šplh-at</td>
<td>bloodless, to climb away</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

Root-internal syllabic liquids must be right-branching because:
(i) they are heads of consonantal domains  
(ii) they govern prefix-final Nuclei  
(iii) there are no phonotactic restrictions on their right periphery

There exist two other contexts where liquids are followed by empty Nuclei:  
(i) in root-initial position: √C  
(ii) in root-final position: √...C

Let’s examine the predictions of the right-branching representation.

#### 3.3. Root-initial liquids

**Predictions of the right-branching representation:**
(i) they should be syllabic  
(ii) they should merge only unvocalised prefixes

As shown in (22), neither prediction is borne out → roots beginning with LC clusters behave exactly as roots starting with other clusters
Root-initial liquids behave as other initial consonants, they never branch.

Problem: this is only description. Fair question: why root-initial liquids are disabled to branch?

3.4. Root-final liquids

**Prediction of the right-branching representation:**
sites of vowel-zero alternations which precede them should remain silenced

Data in (24) demonstrate that this prediction is wrong → liquid-final roots can display alternating vowels:

<table>
<thead>
<tr>
<th>CeL</th>
<th>CL</th>
<th>V</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>kotel</td>
<td>kotøl-e</td>
<td>boiler, NomSg, GenSg</td>
<td></td>
</tr>
<tr>
<td>chumel</td>
<td>chumøl-u</td>
<td>cluster, NomSg, GenSg</td>
<td></td>
</tr>
<tr>
<td>živèl</td>
<td>živøl-u</td>
<td>element, GenPl, GenSg</td>
<td></td>
</tr>
<tr>
<td>pater</td>
<td>patør-a</td>
<td>floor, GenPl, GenSg</td>
<td></td>
</tr>
<tr>
<td>maker</td>
<td>makør-a</td>
<td>macro, GenPl, GenSg</td>
<td></td>
</tr>
</tbody>
</table>

In (25), there are the same root-final clusters but this time with syllabic liquids.

| CL|I | gloss          |
|----|----------------|
| trotł | prune, NomSg |
| šimł | grey horse, NomSg |
| póvl | scum, NomSg |
| lotr | rouge, NomSg |
| cukr | sugar, NomSg |
Scheer’s analysis:
Syllabic consonants are the product of a repair strategy.
Scheer (2004:317): "Syllabic consonants are not produced by nature. They are created when the ECP of a Nucleus is at pains to be satisfied."

Predictions:
L₁ ~ VL alternations, because there exist two options how Nuclei with floating vowels before liquids can be saved:
(i) they can vocalise, or
(ii) they can receive a liquid melody

Substantial observation (not addressed in Scheer’s analysis)
In Czech, there are no L₁ ~ VL alternations. Nuclei with floating segments followed by liquids always vocalize when they are not governed.

Two possible interpretations:
(i) external to CVCV: ranking of both strategies: vocalisation >> spreading (reason? Charity begins at home?)
(ii) CVCV-friendly: lexically floating vowels serve as barriers to the spreading

However, there exist languages with L₁ ~ VL alternations, see e.g. doublets of the German infinitive -en (data from Scheer (2007)):

<table>
<thead>
<tr>
<th>ãN</th>
<th>Ñ</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>geb-ãn</td>
<td>geb-ãm</td>
<td>to give</td>
</tr>
<tr>
<td>helf-ãn</td>
<td>helf-ãm</td>
<td>to help</td>
</tr>
<tr>
<td>wett-ãn</td>
<td>wett-ãn</td>
<td>to bet</td>
</tr>
<tr>
<td>sag-ãn</td>
<td>sag-ãŋ</td>
<td>to say</td>
</tr>
</tbody>
</table>

Difference between Czech (no C generates VC alternations) and German (C generates VC alternations) will be parametric:
Floating vowels serve as barriers: YES (Czech) / NO (German)

The repair-strategy-analysis of Czech syllabic liquids faces the fact that words can end in CC clusters:
From this it follows that:

<table>
<thead>
<tr>
<th>(28)</th>
<th>CC</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>fakt</td>
<td>fact, NomSg</td>
<td></td>
</tr>
<tr>
<td>lept</td>
<td>etching, NomSg</td>
<td></td>
</tr>
<tr>
<td>koks</td>
<td>coke, NomSg</td>
<td></td>
</tr>
<tr>
<td>biceps</td>
<td>biceps, NomSg</td>
<td></td>
</tr>
<tr>
<td>šimpanz</td>
<td>chimp, NomSg</td>
<td></td>
</tr>
<tr>
<td>pracant</td>
<td>hard worker, NomSg</td>
<td></td>
</tr>
<tr>
<td>lump</td>
<td>crook, NomSg</td>
<td></td>
</tr>
</tbody>
</table>

**In Czech, final empty Nuclei can govern other empty Nuclei.**

In that case, the reason why postconsonantal final liquids always branch cannot be the ungoverned Nucleus to their left.

An alternative analysis:

**Root-final liquids branch to their left lexically. What decides whether they are syllabic or not is the Nucleus to their right:**

(i) if it is empty, they are syllabic (as in (29)a)
(ii) if it is filled with a vowel of the following morpheme, they are not syllabic (as in (29)b)

(29) a. *lotr*-Ø “rouge, NomSg”
   → the root-final Nucleus is empty

   \[
   \begin{array}{cccc|c}
   C & V & C & V & C & V \\
   \hline
   l & o & t & r & | & |
   \end{array}
   \]

b. *lotr*-a “rouge, GenPl”
   → the root-final Nucleus is filled with the case-marking melody

   \[
   \begin{array}{cccc|c|c}
   C & V & C & V & C & V & C \\
   \hline
   l & o & t & r & a & | & |
   \end{array}
   \]

4. Conclusion

1. Czech syllabic consonants branch to adjacent Nuclei.
2. There exist the systematic difference between root-medial and root-final liquids: the former are right-branching, the latter are left-branching.

The proposed model accounts for the phonological behaviour of syllabic consonants in Modern Czech more adequately then the existing analyses.

It explains why:

(i) roots with syllabic liquids never take vocalised allomorphs of consonant-final prefixes
(ii) quadriconsonantal roots of the CLCC type normally exist
(iii) there are no L~VL alternations
(iv) only liquids can be syllabic
Questions to be answered:
- internal structure of liquids
- the representation of “trapped” liquids in Old Czech

References


