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Andrzej Kątny und Stefan Michael Newerkla

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On the Czech Nuclear /r/ and /l/¹

Aleš Bičan

Academy of Sciences of the Czech Republic

1. Introduction

The sound system of Modern Czech includes two liquids /r/ and /l/ which are non-syllabic like consonants and syllabic like vowels. We will show that traditional descriptions of the distribution of the variants must be revised and made more precise in order to account for their occurrence and function in words like *stárl*, *umrlčí*, *zrdousit*, *předlhůtní*. The paper will suggest that it is more fruitful to rely on a purely phonological notion of nuclearity, and that the domain of syllabicity/nuclearity needs to be redefined.

2. Syllabicity of the liquids

An obvious question to begin with is whether the non-syllabic variants of the liquids have special phonetic properties that distinguish them from the syllabic ones. This was a topic of an experiment designed by Hůrková and Hlaváč (1981). They addressed three questions: (1) whether the syllabicity of the liquids had any demonstrable phonetic nature, (2) whether it was a matter of quantity (as was previously suggested by Novotná, née Hůrková (1972a, 1972b)), and (3) whether in the case of /r/ the difference was in addition a matter of the number of vibrations of the tongue. Although the authors did find some differences in quantity, they were not unambiguous and/or statistically significant. The quantity was, rather than being an inherent property of the syllabic variants, influenced by neighboring sounds. Furthermore, they found no regular dependency between the number of vibrations and the syllabicity of /r/.² In effect, they answered in negative all

1 The paper was supported by the grant of the Czech Grant Agency nr. 13-15361P *Issues in the Phonology of the Word in Czech*.

2 It is not certain whether they considered any influence of stress because they do not provide a full list of words they examined. In fact, no study we are aware of takes into account the effect of stress, that is, whether the liquids have significantly different properties in stressed and unstressed syllables. Let us also note that Czech stress groups are characterized by their overall acoustic cohesion rather than by any specific prominence of the first syllable as is traditionally assumed. As pointed out by Palková

of the three questions concluding that syllabicity was only a phonological and/or perceptual property of the phonological system of Czech, and their particular properties were given by the phonic environment they occurred in.

Without any clear evidence that the syllabicity of the liquids is reflected in their phonetic properties,³ our point of departure will be that syllabicity refers to the phonological function of the liquids. The distribution of the variants is usually generalized in the following manner (cf. Kučera 1961: 75 or Vachek 1968: 48):

The liquids are syllabic

- (1a) Word-internally between two consonants (e.g. *trs* 'bundle', *vlk* 'wolf')
 (1b) Word-finally after a consonant (e.g. (*být*) *hr* '(to be) rush', *uschl* '(he) got dry')

The liquids are non-syllabic

- (1c) Word-internally next to a vowel (e.g. *trus* 'faeces', *vlak* 'train')
 (1d) Word-initially before a consonant (e.g. *rty* 'lips', *lži* 'lies')

The reason why syllabicity must be stated within the domain of a word will become obvious from the following examples (note that blank spaces between the words do not normally correspond to any pause in speech):

Non-syllabic	Syllabic
(2a) <i>Petra Pavel</i> 'Petr (acc.) Pavel [i.e. Pavel (saw) Petr]' <i>snědli polévku</i> '(they) ate the soup'	(a') <i>Petr a Pavel</i> 'Petr and Pavel' <i>snědl i polévku</i> '(he) ate even the soup'
(2b) <i>Vít rval</i> 'Vít tore' <i>říkám lži</i> 'I tell lies'	(b') <i>vytrval</i> '(he) lasted' <i>říká mlži</i> 'he says <i>mlži</i> [i.e. Bivalvia]'

As examples (2a) show, the adjacency of a liquid with a vowel does not necessarily make it non-syllabic: whereas the /r/ in *Petra Pavel* is not syllabic (the phrase corresponds to four syllables), it is syllabic in *Petr a Pavel*. The pair is distinguished by the presence of a glottal stop (or its equivalents) before the initial /a/ in the conjunction *a* (word-initial vowels are often realized so in Czech). This was confirmed by Lehiste (1965) who compared similar pairs, namely sequences /tr+Vp/, /trV+p/ and /t+rVp/ (V = vowel, + = word boundary). She found out that sequences /tr+Vp/ contained a separate boundary signal realized either by

and Volín (2003: 1783), "[t]he stress contrast [in Czech] is not reflected on the segmental level: the components of unstressed syllables are reduced neither in their quality nor in their quantity". The question remains open, though.

3 We do not deny that some phonetic difference may be found in the future. Recently, syllabic liquids have been investigated in Slovak by Pouplier and Beňuš (2011). They have registered some effects in articulatory timing showing that consonants in vowel-less syllables are less overlapped compared to consonants in vocalic syllables.

a glottal stop or, more commonly, by irregular or breathy phonation. Hence, the /r/ in *Petr a Pavel* is syllabic because speakers use certain means to indicate that it is word-final, i.e. that it occurs in a position where liquids are syllabic in Czech.

Furthermore, the examples under (2b) demonstrate that liquids do not acquire the syllabicity function just by being in between any two consonants. A necessary condition is that the neighboring consonants must not belong to different words. The phrase *Vít rval* corresponds to two syllables, while *vytrval* is trisyllabic. Similarly, *říkám lži* and *říká mlži* do not agree in the number of syllables, although they consist of the same segments (i.e. [rɪ:kɑ:mɫʒɪ]). The exact phonetic difference between pairs like these has not so far been described, but Machač and Zíková (2013: 68) note that "perceptually most obvious [in *Vít rval*] is the intervention of a vocalic element between the explosive and the following sonant which probably serves as a perceptual signal of a word boundary, and hence also of non-syllabicity of the sonant" (translated from Czech by AB). To put it simply, speakers again seem to employ certain phonic features to signal a word boundary, namely to indicate that the /r/ in *Vít rval* is word-initial, that is, it occurs in a position where liquids are not syllabic in Czech.

3. Problematic items

Although it is generally assumed that the domain of the syllabicity of the liquids is a word as it is normally understood, i.e. as an orthographic or grammatical entity, this view must be reconsidered in light of the items listed under (3).

- (3a) *stárl* '(he) was getting old' (+ perfective *zestárl*), *Tyrl, Karl* (proper names)⁴
 (3b) *umrlčí* 'dead man's', *umrlce* (gen. sg. of *umrlec* 'dead man'), *štamprka* 'a little jigger', *povrlší* (adj. from the place name *Povrly*), *marlborky* 'Marlboro cigarettes', *Karlštejn* (name of a Czech castle)⁵
 (3c) *zrdousit* 'to choke (imperfective)', *zlhosejnět* 'to become indifferent', *předlhůtní* 'before a deadline (adj.)'

Since /r/ and /l/ are traditionally classified as consonants, the final /l/ should be syllabic in the words under (3a). Similarly, both liquids in examples (3b) should be syllabic because they occur between two consonants. For the very same reason, they should also be syllabic in the words under (3c). However, this is not how the items are perceived and treated.

4 SSJČ also mentions *earl* [ɛ:rl] 'earl', *girl* 'girl', *jarl* (Swedish) 'jarl', *perl* 'measure of height in typography', all borrowed from foreign languages.

5 SSJČ also mentions *charleston* [tʃa:rlstɔn] 'Charleston' and *Vorarlbersko* 'Vorarlberg'.

To test the perception, we created a list of 41 sentences in which some words were underlined. The list was given to our first-year phonetics students in the very first lesson (hence they were not expected to know anything about phonetics). Their task was to write how many syllables the underlined words contained. They were not told what the purpose of the test was, and the list contained many other words to distract their attention. Since the phonetics course is attended by a considerable number of foreign students (mostly from the Slovak Republic), the students were asked to mark whether they were foreigners. 35 tests were marked so, and they were put aside. Removed was also one incomplete test. Finally, we gained 110 tests.⁶

The most interesting results were gained for the items from group (3a). The word *zastárl* was viewed by 93 students (84.5%) as trisyllabic, which means that the final /l/ was syllabic for them here. 17 students (15.5%) viewed it as disyllabic. The results for *Tyrl* and *Karl* were much more diverse. Although the students were inclined to view them as disyllabic (*Tyrl*: 59 students, i.e. 53.6%, *Karl*: 69 students, i.e. 62.7%), the words were monosyllabic for a very significant number of people (*Tyrl*: 51 students, i.e. 46.4%, *Karl* 41 students, i.e. 37.3%). What is more, the perception of the two words was not uniform: Out of the 59 students who viewed *Tyrl* as disyllabic, only 10 (17%) viewed *Karl* as disyllabic, too, while 49 (83%) viewed *Karl* as monosyllabic. Out of the 51 students who viewed *Tyrl* as monosyllabic, 32 (63%) also viewed *Karl* as monosyllabic, while only 19 (37%) viewed it as disyllabic. In other words, *Tyrl* and *Karl* were both monosyllabic for 32 students only (29% of all students), and both of them were disyllabic for 10 students only (9% of all students).

The results show that the perception of word-final /r/ differs among Czechs in *zestárl*, *Tyrl* and *Karl*. We do not have any reason to expect it is a result of different articulation (which will have to be confirmed by future research). It must be a matter of perception, and it is easy to guess why it is so: the final /l/ in *zastárl* is a form of the third person masculine singular past tense suffix, whereas it is part of a stem in *Tyrl* and *Karl*. So *zastárl* is perceived as trisyllabic because the final *l* is identified as a suffix, but it is obvious that the morpheme is confused here with a syllable. In *Tyrl* and *Karl* where there is no support in morphology, the perception is much more at variance.

Our test also contained words from group (3b), namely *umrlčí*, *štamprlky* and *povrlští*. As we have already pointed out, the traditional account (see (1)) predicts that both liquids are syllabic here. Thus, *umrlčí* should contain four syllables, but

this is a wrong prediction. In verse, it is treated as a trisyllabic word (see Bičan 2013, ch. 10), and our test has shown that it is trisyllabic for 92 students (83.6%). The results for *štamprlky* and *povrlští*, which should contain four syllables according to the traditional account, were even more straightforward: the former was trisyllabic for 106 students (96.4%), and the latter was trisyllabic for 104 students (94.5%).

Finally, we tested the perception of the words *zrdousit* and *zlhosejnět* from group (3c). To the same group belongs also *předlhůtní* of which we became aware only after the experiment. All of these words contain a liquid standing in between two consonants, which is a position where it should be syllabic according to the traditional account. However, the liquids are not perceived so. This is confirmed by how they are treated in poetry (see Bičan *ibid.*) and also by our test. The word *zrdousit* was disyllabic (i.e. /r/ was apparently not viewed as syllabic) for 87 students (79%), and only 22 (20%) viewed it as trisyllabic (one student viewed it as monosyllabic). The word *zlhosejněl* (3rd person sg. form of *zlhosejnět*) was trisyllabic for 97 students (88.2%), and only for 12 students (10.9%) it contained four syllables (one student wrote it contained five syllables).

If we accept that the liquids are non-syllabic in *zrdousit* and *zlhosejněl* (and also in *předlhůtní*), it means that there is a phonological difference (at least a potential one) between meaningful units where the liquids are syllabic, and where they are not – see (4).

(4) Non-syllabic	Syllabic
<i>zrdousit</i> 'to choke'	<i>zrcadlit</i> 'to mirror'
<i>zlhosejnět</i> 'to become indifferent'	<i>slza</i> 'tear'
<i>předlhůtní</i> 'before the term (adj.)'	<i>Tkadlčík</i> (surname)

We must also consider one more thing: Czech has four non-syllabic prepositions (*v* 'in', *s* 'in', *z* 'from' and *k* 'to') which adjoin the following word to form one phonetic unit with it (hence *k roku* 'to the year' is homophonous with *kroku* 'step' (gen. sg.)). As mentioned, a word-initial liquid followed by a consonant is not syllabic. If a non-syllabic preposition precedes such a liquid, it happens to stand between two consonants, but apparently it remains non-syllabic. Consequently, the following pairs are distinguished by the syllabicity of the liquids.⁷

(5) Non-syllabic	Syllabic
<i>v rtech</i> 'in the lips'	<i>vrtech</i> 'drill hole (loc. pl.)'
<i>v lněném</i> 'in linen (clothes)'	<i>vlněném</i> 'woolen (loc. sg.)'

6 A full list of the sentences and all results of the test are available at this webpage: <http://www.ujc.cas.cz/phword/>

7 We also tested the perception of these pairs, but since *v rtech* and *v lněném* are grammatically two words, the results were distorted by this fact. Some students tended to view the prepositions as separate syllables.

These examples are not in essence dissimilar to *Vít rval* vs. *vytrval* and *říkám lži* vs. *říká mlži* mentioned under (2) in which the non-syllabicity of the liquids is a consequence of the fact that certain phonic means are used to make them word-initial. What we want to argue for is that the same (or at least very similar) means are utilized not only to distinguish the pairs under (5) as well as those under (4). This can also be supported by the fact that the word *zlhostejnělého*, which is an adjective (in gen. sg.) derived from *zlhostejnět*, is homophonous with the prepositional phrase *z lhostejnělého* where *lhostejnělým* is a similar adjective derived from *lhostejnět*.

It has sometimes been suggested (Short 1985: 40, Ziková 2008: 143, fn. 88)⁸ that the difference between *zlhostejnět* and *slza* etc. is in stress: in the former the /l/ is unstressed (stress being on /o/), whereas in the latter it is stressed. Given the nature of Czech stress and the reported absence of any stable phonetic properties of stressed syllables (see footnote 2), this is something that must be experimentally confirmed first. On the other hand, since Czechs are able to distinguish potentially ambiguous pairs such as *proti vnějším* 'against external' (two stress groups) × *protivnějším* 'bothering' (one stress group) and *světlo v ní mají* '(they) have the light in her' × *světlo vnímají* '(they) perceive the light' (both two stress groups, but with different boundaries),⁹ it is possible that prosodic organization will also play its role in the difference between *Vít rval* (two stress groups) and *vytrval* (one stress group) and between *říkám lži* and *říká mlži* (both two stress groups, but with different boundaries). As we will suggest in section 4, prosodic organization is essential for the analysis of these items.

4. Nuclearity

The traditional description of the syllabicity of /r/ and /l/ falls short in face of the examples mentioned in the previous section. We want to propose a new analysis based on the notion of nuclearity introduced by Mulder (1989) and worked up for a number of languages including Czech (Bičan 2013). Nuclearity does not reflect how a phoneme is realized or perceived; instead, it reflects its function and conditions of its occurrence within phonotactic constructions. It may be isomorphic with syllabicity in the sense that a nuclear phoneme may be syllabic, and a non-nuclear phoneme may be non-syllabic, but syllabicity is not a defining property of nuclearity.

Nuclearity is stated within a phonotactic construction by which we mean a minimum self-contained combination of phonemes, although in some cases it may be formed by just a single phoneme (e.g. /a/ in Czech, cf. *a* 'and'). A combination is self-contained (possible, well-formed) if it is directly attested as a phonological form of a meaningful unit. We will also view as self-contained or possible those combinations which do not violate any distributional rule valid for directly attested combinations. This is crucial because some directly attested combinations can be divided without any residue into smaller self-contained combinations which, though not directly attested, could serve as phonological forms of meaningful units. For example, Czech /perňiK/ *perník* 'ginger bread' can be divided into /per/ and /ňiK/.¹⁰ The former construction is directly attested as a form of *per* 'pencil' (gen. pl.), but the latter is not, yet there is no reason why it could not be a phonological form of some Czech word. On the other hand, some directly attested combinations of phonemes cannot be divided without any residue into smaller self-contained combinations because any such division would produce at least one combination violating some distributional rule. For instance, Czech /svjeT/ *svět* 'world' cannot be divided into /sv/ and /jeT/. Although the latter is attested as a form of *jet* 'to go', the former cannot be regarded as possible because Czech does not have any meaningful units whose phonological forms are just two consonants.

The combinations not further divisible into smaller self-contained combinations are phonotactic constructions. Phonemes within such minimal combinations may be nuclear or non-nuclear. Those not dependent on the function of other phonemes are nuclear, while the dependent ones are non-nuclear. The dependency can be determined by various tests the most important of which is a test of removal: nuclear is not a phoneme which can be removed from a phonotactic construction with the result still being self-contained (hence /n/ in Czech /ven/ *ven* 'outside' is not nuclear because its removal results in self-contained /ve/ attested as a form of *ve* 'in'). It would be absurd to assume that a phoneme whose occurrence is optional is the one upon which the others are dependent. However, it does not mean that a phoneme which cannot be removed must be a nuclear phoneme. Sometimes nuclearity is determined by other tests as in the case of the Czech liquids.

Czech has two types of phonotactic constructions: 1) those containing a phoneme traditionally called a vowel, and 2) those not containing such a phoneme.

⁸ Also by an anonymous reviewer to whom I thank for valuable comments.

⁹ See Palková and Volín (2003, 2004) and Palková (2010).

¹⁰ The capitals are used for obstruents for which voicing is contextually predictable. Czech is a language with neutralization of voicing.

In the first the test of removal reveals that the vowel is nuclear due to the fact that the other phonemes are removable – phonotactic constructions can be formed just by a vowel (cf. /naT̃/ *naT̃* ‘tops’ × /aT̃/ *aT̃* ‘may it be’ × /na/ *na* ‘on’ × /a/ *a* ‘and’). If a liquid occurs in such constructions, it is non-nuclear for the same reason (cf. /rum/ *rum* ‘rum’ × /um/ *um* ‘craftsmanship’ × /u/ *u* ‘at’).

Much more interesting are constructions of the second type, namely vowel-less constructions like /prST/ *prst* ‘finger’ or /plŠ/ *plž* ‘gastropod’. One will quickly realize that they always contain /r/ or /l/ accompanied by another phoneme which is not a vowel. In fact, forms such as /hr/ from *být hr* ‘to be rush’ suggest that a liquid must be preceded by just one non-vowel phoneme, though it need not be followed by any. The preceding phoneme is always present, though. We cannot therefore apply the test of removal, as neither the liquid nor the preceding phoneme can be removed. We have to make recourse to another test: commutation. We assume that nuclear phonemes occur and are commutable in the same (or equivalent) context.

Taking /prST/ as an example, the removal test suggests two candidates for nuclearity, /p/ and /r/. The final /T/ can be removed resulting in /prS/ *prs* ‘breast’, and so can the /S/ provided that we accept /pr/ as a form of an onomatopoeic expression used for stopping horses (cf. also /hr/). The commutation test will show that in /pr/ the /p/ is replaceable by /h/ (cf. /hr/ *hr*), /a/ (cf. /ar/ *ar* ‘are’ (measure)), /ě/ (cf. /ěr/ *ěr*, gen. pl. of *éra* ‘era’), whereas the /r/ is replaceable by /o/ (cf. /po/ *po* ‘after’), /a/ (cf. /pa/ *pa* ‘bye’), /i/ (cf. /pi/ *pí* ‘pi’ (π)). Although other commutants may be found, one fact will become clear: /r/ is replaceable by vowels only, that is, only by the phonemes which has been established as nuclear phonemes. This is also confirmed if we examine commutants of /r/ in the original form /prST/: it can only be replaced by a vowel or by /l/ (cf. /paST/ *past* ‘trap’, /piST/ *píst* ‘piston’, /plST/ *plst* ‘felt’ (n.)), whereas the other phonemes can be replaced, at least potentially, by both vowels and non-vowel phonemes (cf. /prST/ × /pruT/ *prut* ‘rod’, and /prST/ × /erST/ which is unattested, but potentially possible as /verST/ *verst* ‘verst’ (gen. pl.) suggests). To put it otherwise, if the /r/ in /prST/ is replaced by a non-vowel phoneme other than /l/, the result will not be well-formed (e.g. /pmST/) because such constructions are not attested (recall that in Czech a phonotactic construction must either contain a vowel or /r/ or /l/). Considering this and also the fact the vowel-less phonotactic constructions always contain a liquid, it makes sense to regard liquids in such forms as nuclear.

Accordingly, three phoneme classes are established in Czech: 1) phonemes which are always nuclear, 2) those which are always non-nuclear, and 3) those which can be both nuclear and non-nuclear. For convenience, the first may be

called *vowels*, the second *consonants*, and the third will be *semiconsonants*. The liquids /r/ and /l/ are phonemes of the third class.

These classes allow us to state conditions of the occurrence of the liquids (i.e. the semiconsonants) within phonotactic constructions in Czech:

- (6a) In constructions containing a vowel, liquids are non-nuclear (removable and commutable by other non-nuclear phonemes)
- (6b) In constructions not containing a vowel, liquids are nuclear (not removable, but commutable with other nuclear phonemes) and are always preceded by at least one consonant (N.B. not a semiconsonant)

Before going on, let us note that generalization (6b) is more general than it could be because the nuclear semiconsonants are subject to further distributional restrictions (see Bičan 2013). They are not preceded by *any* consonant. Within a single phonotactic construction, they are not preceded by /n/ or /ň/ or by palatal occlusives /t̪/, /d̪/. Furthermore, they are not preceded or followed by /ř/ and by /j/. The case of /j/ is interesting in light of examples such as *detail* [detajl] ‘detail’, *hejl* ‘patsy’ or *chejr* ‘plant of the genus Cheiranthus’. Here a liquid is preceded by /j/ which is usually classified among consonants, but these words are not perceived or treated as disyllabic. In our analysis they correspond to single phonotactic constructions because they cannot be divided into smaller phonotactic units.

5. Analysis

Let us return to the problematic items under (3) and apply the notion nuclearity to them. Their analysis will turn out to be rather very simple. First, in the words *stárl*, *Tyrl* and *Karl* the final /l/ is not nuclear because it is not preceded by a consonant. Remember that /r/ is not a consonant, but a semiconsonant. To put it otherwise, if the final /l/ in these words were nuclear, the words would have to contain two well-formed phonotactic constructions, /Stā/ and /rl/. However, there is no evidence that constructions of the latter type where a semiconsonant is preceded by another semiconsonant are well-formed in Czech. A semiconsonant may be preceded by a vowel (cf. /ül/ *úl* ‘beehive’) or by a consonant (cf. /hr/ *hr* from *být hr*), but never by another semiconsonant. Therefore, *stárl* is phonotactically different from *stáhl* ‘(he) pulled down’ where the final /l/ is nuclear because the latter can be divided into two well-formed constructions /Stā/ and /hl/ (cf. /Stā/ *stá* “100th (fem.)”, *hl*, a substandard variant of *hnul* ‘(he) moved’). In contrast, /Stārl/ must be evaluated as being only a single phonotactic construction. Whether it is perceived disyllabically is another matter. Phonotactically, it is a single unit.

We can also quite easily analyze the words *umrlčí*, *štamprlika* and *povrlští*. The issue is which of the liquids is nuclear. Since /l/ is preceded here by the semiconsonant /r/, it cannot be nuclear. On the other hand, /r/ is preceded by a consonant in these words, and so it complies with the generalizations given under (6) and it is nuclear. Accordingly, /povrlští/, for example, contains three phonotactic constructions and three nuclei, /o/, /r/ and /i/.

Finally, we must deal with the pairs under (4) and (5). Here, we have a phonological difference which must be accounted for, and we propose that it be achieved by an appeal to prosodic organization. The basic unit of the prosodic organization in Czech is a stress group which is traditionally connected with a certain prominence of the first syllable, but as already noted, the research has shown that it is rather delimited by internal cohesion and particularly by a melodic (F0) contour (Palková and Volín 2003). However, another smaller prosodic unit must be recognized in order to account for pairs under (7). Note that obstruents devolve before a glottal stop.

Two phonological words	One phonological word
(7a) z[?]obecní 'he will generalize'	sobec 'egoist'
z[?]analyzovat 'to analyze'	sanatorium 'sanatorium'
(7b) k [?]osám 'to the axes'	kosám 'scythe' (dat. pl.)
v [?]aktech 'in acta'	faktech 'fact' (loc. pl.)
(7c) před[?]oční 'preocular'	přetočit 'to rewind'
nej[?]evidentnější 'most evident'	nejednotnější 'more non-uniform'
(7d) pod [?]okem 'under the eye'	potokem 'through the rivulet'
od [?]esa 'from the ace'	otesat 'to hew'

All items are examples of single stress groups, but the left-hand ones may be pronounced with a glottal stop as indicated, and the occurrence of the glottal stop cannot be predicted just from their segmental phonological structure. The function of the glottal stop is obviously to signal that there are two constituents instead of one. Therefore, we suggest that the items in the first column correspond to two prosodic constituents which may be called *phonological words*. In most cases phonological words coincide with stress groups, but in the examples like these, stress groups consist of two phonological words.¹¹

If the glottal stop is understood as a signal of a phonological-word boundary, then we have here stress groups consisting of two phonological words put in contrast with stress groups consisting of one phonological word. For example,

zobecnit and *zanalyzovat* are prosodically two phonological words (z)_ω (*obecnit*_ω and (z)_ω (*analyzovat*)_ω. The same analysis is proposed for all left-hand items under (7). Phonologically, it is of no consequence that some of the items correspond to two grammatical words because the grammatical difference is not reflected in pronunciation. Thus, *zobecní* '(he) will generalize' is homophonous with *z obecní* 'from municipal', both being pronounced as [sʔobetsɲi:].

Now, *zrdousit*, *zlhosejtnět*, *předlhůtní*, *v rtech*, *v lněném* and similar items may be treated alike, i.e. as corresponding to two phonological words. Again, it is phonologically irrelevant whether some of them are instances of two grammatical words because, as already mentioned, *zlhosejtnělého* is homophonous with *z lhosejtnělého*, for example. Added could also be *před lhůtou* 'before the deadline' or *pod rtem* 'under the lip' which are single stress groups, too. The former is not prosodically distinct from *předlhůtní*, and the latter could be put in contrast with *podrtit* 'to crush up'. The proposed prosodic analysis is shown under (8). The prosodic pattern of (8a) and (8b) corresponds to that of (7a) and (7b), and the pattern of (8c) and (8d) to that of (7c) and (7d), respectively.

Two PhWs (/r/, /l/ non-nuclear)	One PhW (/r/, /l/ nuclear)
(8a) (z) _ω (<i>rdousit</i>) _ω	(zrcadlit) _ω
(z) _ω (<i>lhosejtnět</i>) _ω	(slza) _ω
(8b) (v) _ω (<i>rtech</i>) _ω	(vrtech) _ω
(v) _ω (<i>lněném</i>) _ω	(vlněném) _ω
(8c) (před) _ω (<i>lhůtní</i>) _ω	(Tkadlčik) _ω
(8d) (před) _ω (<i>lhůtou</i>) _ω	(Tkadlčik) _ω
(pod) _ω (<i>rtem</i>) _ω	(podrtit) _ω

6. Conclusion

We are now in a position to summarize conditions of the occurrence of the Czech liquids/semiconsonants as an alternative to the traditional account outlined in (1). They function as nuclei of phonotactic constructions if they are, *within a phonological word*, preceded by a non-sonant (a necessary condition) and if one of the following conditions holds: 1) they are followed by a consonant (as in /prST)/ *prst*, /vlK)/ *vlk* 'wolf'), or 2) they are followed by a semiconsonant (as in /povrlšči)/ *povrlští*), or 3) they occur at the end of a phonological word (as in /vitr)/ *vitr* 'wind', /mysl)/ *mysl* 'mind'). "It is necessary to stipulate that the semiconsonants must be preceded by a son-sonant (an occlusive, a fricative or a nasal) because they are not nuclear in words like *chejř* and *hejř* (see above)." In all other situations they are non-nuclear including /stárl)/ *stárl* '(he) was getting old' and /z)/ (*lhosejtněT*)_ω / *zlhosejtnět*.

¹¹ They may consist of more phonological words, for example, *pra[?]indo[?]evropský* "Proto-Indo-European" or *dva[?]a[?]osmdesát* "82".

To conclude this paper, let us note that the occurrence of the nuclear semiconsonants is much more restricted in comparison to the non-nuclear ones. Returning to the three distributional classes of phonemes established at the end of section 3, we can say that in the Czech lexicon there are approximately 39.1% of vowels (i.e. always nuclear phonemes), 52.4% of consonants (i.e. always non-nuclear phonemes), and 8.5% of semiconsonants. Out of the semiconsonants only 6.2% are nuclear. Nuclear /r/ is much commoner than nuclear /l/, the ratio being approximately 4:1, i.e. 80% for /r/ and 20% for /l/. The figures are based on the Lexical Phonological Corpus of Czech,¹² namely on the vocabulary recorded in SSČ and SSJČ, two major dictionaries of Czech, containing 178,860 items. In actual texts the figures may be slightly different because nuclear /l/ occurs as a form of the 3rd person singular masculine past tense suffix (e.g. /vedl/ *vedl* '(he) led').

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¹² See <http://www.ujc.cas.cz/phword>. The corpus has been created by the present author.

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