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Syllabic and Trapped Consonants in the Light of Branching Onsets and Licensing Scales

1. Introduction

The following pages make a contribution to the ongoing debate of how syllabic and trapped consonants should be represented. Efforts are made to introduce basic empirical facts and previous analyses, but space restrictions may impede full autonomy of the article in this respect. While syllabic consonants are fairly standard in phonological description, a few words are in order regarding trapped consonants. Their distribution is about the same as the one of syllabic consonants. That is, their immediate left and right neighbours are only non-vocalic (consonants and word boundaries: #_C_C_C_#). While syllabic consonants, as indicated by their name, behave like vowels and are counted as the centre of an independent syllable (e.g., the rhotic in Czech *trvat* 'to last', which bears stress), trapped consonants show the exact opposite behaviour: they do not exhibit any vocalic property (e.g., the rhotic in Polish *trwać* 'to last', which is penultimate but does not bear stress).

In Scheer (2004: §240, 2008), an analysis of syllabic and trapped consonants was proposed that relies much on (diachronic) evidence from Slavic languages. The main line of attack was the insight that nothing can be said about syllabic consonants in absence of an analysis of their trapped cousins, and vice-versa. This was a new perspective inasmuch as the literature has always treated either type of cluster-building consonants in complete absence of consideration of the other (and on many occasions actually does not even make a difference between syllabic and trapped consonants, mistaking the latter for the former).

An important observation was that syllabic consonants are always a reaction on the absence of a preceding, rather than of a following vowel; this is true for synchronic (free) variation as, e.g., in German *leben* [leeβən] – [leeβm] 'to live', as well as in diachronic evolution. In the development of Slavic, it is striking to observe that Western Slavic syllabic consonants arise through the loss of a preceding yer, while trapped consonants are the result of the loss of a following yer (see Scheer 2004: §277, 2008; the demonstration is quite space-consuming).

Four empirical criteria have been established in order to identify syllabic and trapped consonants: 1) syllabic consonants are counted in verse and by natives, while their trapped cousins are not; 2) syllabic consonants can bear stress, trapped consonants cannot; 3) trapped consonants are 'transparent' for voicing (i.e. act as if they were not there: the two Ts in a TRT sequence where R is trapped always agree in voicing, and T in a TR# cluster where R is trapped devoices in languages with final devoicing),¹ whereas syllabic consonants are not; 4) syllabic consonants provoke the non-vocalisation of preceding alternation sites (i.e. where a vowel alternates with zero), as opposed to trapped consonants, which produce vocalisation.²

These pieces of evidence were bundled into an analysis whose driving force is the vacancy of a nucleus (that has been produced by synchronic alternation, or diachronically by the senility of a vowel that fades away). This vacancy needs to be 'repaired', and in absence of vocalic content the neighbouring consonant provides surrogate melody.

* Laboratoire BCL, Université de Nice – Sophia Antipolis, CNRS ; MSH de Nice, 98 bd E. Herriot, 06200 NICE. The text has been greatly improved by perspicuous comments from Eugeniusz Cyran and an anonymous reviewer. Many thanks to them.

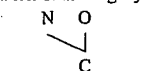
¹ T is shorthand for obstruents, R for sonorants.

² While the non-vocalization of prefixes before roots that contain a syllabic consonant (e.g. Cz *roz-dřít* 'to crush') is absolutely exceptionless, the vocalization of prefixes before roots that contain a trapped consonant is subject to variation: some words do (Po *roze-drgać* (*sie*) 'to become vibrating'), others do not vocalize (Po *roz-trwonić* 'to squander'). This is doubled with inter-speaker variation. The only hard fact is that trapped roots allow for vocalized prefixes, while syllabic roots do not (see Scheer 2004: §246f, 2008: 151ff).

There were two major reasons to believe that the repair strategy for the consonant is to directly supply melody for the nucleus that is in demand: on the one hand, the Slavic evidence shows that the position of the yer determines whether a syllabic or a trapped consonant is produced; on the other, the fact that syllabic consonants always appear to originate in the absence of a preceding, rather than of a following vowel. The result, then, was as under (1): both syllabic and trapped consonants branch on neighbouring vocalic slots – on the preceding nucleus in the former, on the following nucleus in the latter case.

(1) representation of syllabic and trapped consonants in Scheer (2004:§240, 2008)

a. left-branching: syllabic



Czech *trvat* 'to last'

b. right-branching: trapped



Polish *trwać* 'to last'

Syllabic consonants have been understood as consonants that branch on a neighbouring nucleus in earlier literature (e.g., Hall 1992: 35-36; Harris 1994: 184-185; Wiese 1986, 1996; Rowicka 1999: 261ff., 2003; Szigetvári 1999: 117ff.; Blaho 2001, 2004). This accounts for their hermaphrodite identity: their body is consonantal, but their behaviour is vocalic. The advantage of the solution under (1) is the symmetric representation of syllabic and trapped consonants, which echoes their systematically opposite behaviour (see the four criteria mentioned). Also, it anchors syllabic consonants in the preceding nucleus, which covers the fact that they seem to consistently be produced by the absence of a preceding vowel.

The analysis under (1) cannot be correct, though. Scheer (2004:§298, 2008) points out two main shortcomings: consonant clusters freely occur in the right periphery of syllabic consonants, and trapped consonants should be able to bear stress given that they are associated to a nucleus. If stress is a nuclear property indeed (i.e. algorithms count only nuclei, see Szigetvári and Scheer 2005), the fact that syllabic consonants may bear stress is accounted for by their association to a nucleus – nothing more need to be said. Following this line of reasoning, though, the inability of trapped consonants to bear stress begs the question: they are as much associated to a nucleus as their syllabic cousins. A solution is warranted where syllabic consonants branch on nuclei, but their trapped sisters do not.

Also, the right periphery of syllabic consonants does not behave as if an empty nucleus needs to be covered. If syllabic consonants are left-branching as under (1a), they are always followed by an empty nucleus which is in need of government. Everything is fine when the syllabic consonant is followed by just one other consonant as in Cz *srna* 'roe': the *-a* governs \emptyset_2 in *sø1rø2na* (while the *r* branches on \emptyset_1). In cases such as Cz *brnknout* 'to stink', *vľhký* 'humid' or *blb-øc-e* ('idiot GENsg', compare with *blb-ec* 'idiot NOMsg'), however, sequences of (internal) empty nuclei are produced, one of which will always remain orphan. *Vľhký* for example identifies as *vø1lø2hø3ký*, where the lateral branches on \emptyset_1 , *-ý* governs \emptyset_3 , but \emptyset_2 remains ungoverned. The structure should thus be ill-formed.³

For these and other reasons, Blaho (2001, 2004) and Ziková (2007, 2008a) have proposed different representations for syllabic consonants: while Blaho argues that they are uniformly right-branching, Ziková advocates a split solution where root-final syllabic consonants branch to their left, while their root-internal peers are right-branching.

This article makes a contribution that takes advantage of a previously unexplored element: the role played by the consonant that precedes trapped and syllabic consonants. That is, in a

repair-based perspective, sonorants that seek to become syllabic in fact try to improve the situation of the branching onset in which they are involved, rather than just their own fate. Significantly, syllabic and trapped consonants are always involved in branching onsets, except in word-initial position where no consonant precedes. I argue that this fact, rather than the context itself, explains the asymmetry between word-initial and other trapped consonants that is repeatedly observed. Relevant evidence is documented by Rubach and Booij (1990a) for Polish; another case in point regarding the evolution from Old to Modern Czech (where all trapped consonants have become syllabic except those that occur word-initially) is discussed in section 7 below.

Following Blaho (2001, 2004), I conclude that syllabic consonants are uniformly right-branching, while trapped consonants do not branch at all. This analysis requires assumptions regarding the parametric licensing ability of different nuclear categories that were originally made by Charette (1992) and have been expanded by Cyran (2001, 2003, forthcoming). On this count and at variance with Scheer (2004), even the weakest nuclear category, internal empty nuclei, are able to license TR clusters in some systems. The consequences of such a move are evaluated in the final section.

2. Branching Onsets and Licensing Scales

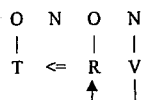
Let us first define the object that we will be talking about: branching onsets. There are several ways of representing obstruent-liquid sequences, to which it is reasonable to restrict inquiry.⁴ Namely, ongoing debate discusses the number of positions that TR clusters occupy: the regular view is that they are bi-positional, but a number of voices also considers a mono-positional alternative, that is where TRs are some kind of affricate (Hirst 1985; Steriade 1994; Rennison 1998; Rennison and Neubarth 2003; Lowenstamm 2003; Ségéral and Scheer 2005). The two options are not necessarily incompatible, even within a given language. The present article has got little to contribute to this debate. The phenomena considered provide evidence to the end that the TRs involved are bi-positional, which thus is only incompatible with those mono-positional perspectives that deny the existence of bi-positional branching onsets. That is, we will see that the R of trapped TRs is prone to damage of various kinds: loss, devoicing or demotion to an obstruent. Also, of all clusters that occur in the languages considered, TRs appear to be those that are the most difficult to maintain, i.e. which need the strongest care from the following nucleus (Cyran 2001, 2003, forthcoming). All this is nothing that an affricate is expected to do: mono-positional items should be just as stable as other singleton consonants.

Below the bi-positional identity of TR clusters is thus taken for granted. Within Government Phonology in general and CVCV in particular (see note 3), there are again several options of representing branching onsets. The only thing that is really critical for the demonstration is the relationship between the integrity of the TR and the 'strength' of the following nucleus (Cyran 2001, 2003; Scheer 2004: §555). In this context, the following representation will be used.

³ The present article follows the tenets of Government Phonology in general, and of so-called CVCV (Lowenstamm 1996) in particular. The latter namely supposes that all surface consonant clusters are separated by an unpronounced empty nucleus at the syllabic level. Relevant literature includes Szigetvári (1999, 2001), Cyran (2003), Rowicka (1999, 2003), Szigetvári and Scheer (2005), Scheer (1999, 2004).

⁴ Obstruent-nasal sequences clearly stand aside, not withstanding the fact that they may behave like obstruent-liquid clusters in systems where they occur. In actual fact, there is reason to even further restrict 'true' branching onsets to stop-liquid clusters. While the debate regarding different classes of branching onsets and the associated phenomenologies lies beyond the scope of the article, the question whether there should be a cross-linguistically uniform definition of branching onsets is discussed in section 5.

(2) representation of bi-positional TR clusters

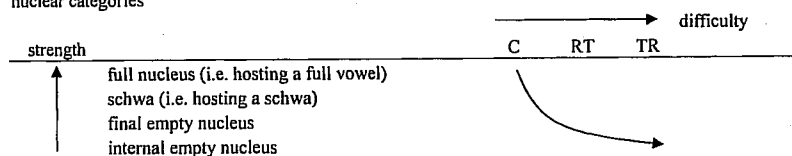


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The idea is that the obstruent and the sonorant contract a lateral relation (called Infrasegmental Government, depicted by '<=>') which is headed by the latter (Scheer 1999b, 2004: §14). In order for the sonorant to be able to head the structure, it needs to be licensed by its nucleus (this condition expresses Charette's 1990 Government Licensing).

Another element of interest is the well-known fact that nuclei are able to lend support of varying strength according to their position and content. At least four nuclear categories need to be distinguished.

(3) nuclear categories



That is, nuclei which are associated to melody are stronger than empty nuclei: they can offer more licensing power. Both categories require further differentiation: the former regarding 'true' (full vowels) vs. 'fake' (schwa) melody, the latter according to their final vs. internal position (internal empty nuclei are the weakest licenser). The distinction of different nuclear categories whose variable licensing power expresses parametric choices is a genuine tradition in Government Phonology: relevant literature includes Kaye (1990), Charette (1992, 2003), Rizzolo (2002) and Scheer (2004: §266). The most developed offspring of this perspective is found in Cyran's (2001, 2003, forthcoming) work. Cyran argues that different consonantal structures are inherently more or less demanding in regard of their nucleus: a singleton consonant is the easiest object to license, coda-onset sequences (RT, RR, TT) are more demanding, while branching onsets are the most difficult structure to satisfy.

According to Cyran, the negotiation between consonantal objects and licensing-providing nuclei (the two licensing scales depicted under (3)) is a matter of a language-specific, that is parametric choice. Every language sets its own thresholds for each consonantal structure: a singleton consonant may be able to be licensed by a final empty nucleus (FEN) or not. This parameter setting differentiates between languages that do vs. do not tolerate word-final consonants. Languages that allow for word-final consonants then fall into those that also grant the existence of word-final RT clusters, and those that do not. In the former, FEN are strong enough to license RTs, while in the latter they are not. Finally, languages which tolerate both Cs and RTs word-finally may or may not provide for the most difficult object, TR.

The threshold of licensing power is thus defined by a language-specific parameter setting for each consonantal object. The two licensing scales themselves, however, are cross-linguistically stable: full vowels can always license at least as much as final empty nuclei, which are able to license at least the same consonantal structures as internal empty nuclei. In the same way, a language that allows TR clusters in a given position will also provide for all weaker objects (RT and C) in the same position. Both scales are thus universal and implicational.

3. Reaction of TR Clusters on Following Empty Nuclei

Let us now look at the parametric situation of TR clusters. Cross-linguistically, branching onsets are already marked as such: not many languages have them in the first place. Among the rare systems that provide for them at all, those that allow for their existence before a FEN (i.e. word-finally) are only a small minority, and still fewer languages tolerate them before an internal empty nucleus (i.e. in a TR \emptyset C configuration as in Po *trwać* 'to last').

Of particular interest is the price that TR clusters have to pay in order to exist in the two hostile environments mentioned, i.e. when they are not backed up by a contentful nucleus. The reactions of TR clusters on a following empty nucleus are variable across languages, but as far as I can see, all systems react in one way or another. Effects observed concern the sonorant: R may devoice, become syllabic or be lost altogether. These effects witness the extreme shakiness of TR \emptyset , which either produces damage (loss or devoicing of R) or a reaction that aims at making the structure more solid (R becomes syllabic).

Let us look at some patterns that are on record. Czech is on the 'don't give in' side: conditions are created for the TR to escape damage. Both before internal and final empty nuclei, the R is syllabic (e.g. *srna* 'roe', *Petr* 'Peter'). While the syllabicity before internal empty nuclei is hardwired, in final position the syllabic version alternates with a non-syllabic instantiation in case a full vowel follows: e.g. *Petr* - *Petr-a* 'Peter NOMsg, GENsg' (more on this alternation in section 6 below).

In Polish, the R of root-final TR clusters also alternates according to whether it occurs in absolute word-final position or before a vowel – but instead of strengthening to a syllabic status, it gives in to the pressure and devoices. The classical example known from Jerzy Rubach's work is *kadra* 'staff NOMsg', where the underlying /d/ devoices in absence of the case marker: *katr* 'id., GENpl' (see Bethin 1984; Rubach and Booij 1987, 1990a,b; Gussmann 1992; Rubach 1996, 1997).⁵ The R in word-final position is trapped, extrasyllabic on Rubach's (1997) analysis. Therefore the phenomenon at hand is usually referred to as the transparency of extrasyllabic consonants for voicing. What fails to be sometimes reported, though, is that the underlying /d/ is not the only item that devoices: the sonorant also does. This is made explicit, e.g., in Biedrzycki (1978: 83s) and Gussmann (1992).⁶ An alternative analysis to Rubach's transparency of extrasyllabic consonants therefore builds on the obvious obstruent identity of the devoiced R (Scheer 2004: §271, 2008): the second consonant of TR# is not extrasyllabic but trapped; trapped consonants lose their sonorant status and become obstruents. The word-final cluster is thus a cluster of obstruents, which devoices as a whole, just like all other obstruent clusters in the language (which must agree in voicing).⁷

Polish TR clusters display the same behaviour in word-internal position: the R of TR \emptyset C sequences is 'transparent' to voicing, to the effect that the entire triconsonantal cluster agrees

⁵ Polish has no syllabic consonants at all, except perhaps in fast speech (Rubach 1974): the liquids in question fail all tests for syllabicity that have been mentioned in section 1.

⁶ Even if realizations are somewhat variable. According to Rubach and Booij (1990a: 441, note 14), 'there is a distinction between liquids and nasals: while liquids devoice, nasals may but do not have to'. Elsewhere, Rubach (1997: 558) points out that the predictions made by his analysis produce the most consistently observed voiceless result. The massive prominence of devoiced realizations also coincides with my own observation.

⁷ Talking about the demotion of a sonorant to an obstruent of course is shorthand for a modification of the internal structure of the consonant. In standard element theory (e.g., Harris and Lindsey 1995), this implies the adjunction of a melodic prime (the noise element). Interestingly, this adjunction perspective (rather than a lenition scenario where melodic primes are lost) is consistent with other known cases where sonorants become obstruents: rhotic r has been uvularized in (standard varieties of) French, German, Norwegian and Sorbian (without context), and it has become /r/ in Czech and Polish, respectively, under the influence of palatalization (more on /r/ in section 4). In all cases quoted, the modification of place is concomitant with obstruentization: uvular r and palatal /r/ have voiced and voiceless variants and participate in final devoicing. A relevant generalization thus appears to be that rhotics which take on an additional melodic prime cannot maintain their sonorant status.

in voicing.⁸ On the analysis mentioned, this is all regular and automatic: obstruent clusters always agree in voicing.

In sum, thus, Polish gives in to the pressure that TR clusters experience due to the weak licensing power of following empty nuclei, internal and final alike: in both contexts the sonorant is demoted to an obstruent and therefore exposed to the swinging fate of final devoicing and voice assimilation. In both cases, it ends up as a trapped consonant (according to the four diagnostics mentioned in section 1).

Finally, let us consider the case of French. Like Polish, French is on the defensive side. Like English and German (on which more below), it does not allow for internal TRC sequences at all. These do not exist lexically and could only arise through the alternation of schwa with zero. In permissive varieties of French, schwa may be left unpronounced in case a CC or an RTR cluster is produced (*devenir* [dəvənir] or [dəvnir] 'to become', *forteresse* [fɔrtəres] or [fɔrtres] 'fortress'), but there is no way to achieve a TRC cluster: *autrement* 'otherwise' may be pronounced with the full TRø [otrəmā], but not *[otr̥mā]. If schwa goes, the R is also lost: [otr̥mā] is a possible realization as well.⁹ Relevant literature regarding French includes Dell (1973: 224ff, 1976) and Scheer (1999a, 2000).

Dell (1973: 223, 1976) also describes the word-final situation: words like *quatre* 'four', *autre* 'other' or *livre* 'book' may be pronounced with a 'weak' R ([kat̥r, otr, liv̥r]), which however may also be left out ([kat, ot, liv]).¹⁰ This is true for the absolute sentence-final position (i.e. where no following word can bear on the realization). Elsewhere it depends much on the following word (and on the syntactic relationship at hand): a following consonant favours the loss of R, while a following vowel facilitates its retention (liaison), e.g., *un* [liv] *d'art* 'an art book' vs. *un* [liv̥r] *intéressant* 'an interesting book'. In any event, French R is never syllabic; it is thus trapped in case it survives in word-final TR# clusters – the diagnostics mentioned in section 1 also identifies it as such.

In sum, thus, the following picture is produced by the patterns reviewed.

(4) TR clusters followed by an empty nucleus: reactions observed

	internal TRø			final TRø		
	strengthening syllabic R	damage devoiced R	R lost	strengthening syllabic R	damage devoiced R	R lost
Czech	yes	–	–	yes	–	–
Polish	–	yes	–	–	yes	–
French	–	–	yes	–	–	yes

Another instance of the Polish devoicing pattern is Romansch, a Romance language described by Montreuil (1999: 541ff) where sonorants are also trapped and 'transparent' to voicing (see also Scheer 2004: §275).

4. The Right Periphery of Syllabic and Trapped TR Clusters

It was mentioned in section 1 that Czech allows for two or more consonants in the right periphery of syllabic consonants (*vĕhký* 'humid', *brnknout* 'to stink'); also, vowels may regularly alternate with zero as in *blb-ec* - *blb-ec-e* 'idiot NOMsg, GENsg'. It may therefore

⁸ The assimilation is left-headed: compare *krew* [kref] 'blood NOMsg' and *krew-ny* [kref-ni] 'relative' (which guarantees an underlying /v/) with *krv-i* [kr̥f-i] 'blood GENsg'.

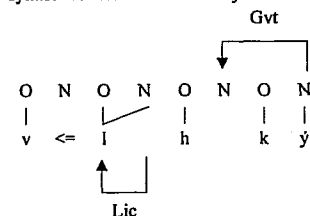
⁹ As was mentioned in note 7, French 'r' is a uvular fricative, not a rhotic. It comes out as either voiced [ʁ] or voiceless [ʁ̥] according to the voicing of adjacent obstruents, in absence of which the voiced version appears. The mismatch of the phonetic realization of the 'r', which makes it an obstruent, and its phonotactic behavior that points to a sonorant, is an issue that is raised by French and other 'continentally uvularized' languages such as German, Norwegian and Sorbian. It lies beyond the scope of the present article.

¹⁰ Pronunciations with final schwa are also possible, pending much on register and geography: [kat̥rə, otr̥ə, liv̥rə].

be concluded that the distribution of vowels and syllabic consonants is identical: the same clusters can occur to their right (Scheer 2004: §296).

Following Ziková (2007), I take this to be inescapable evidence to the end that syllabic consonants are right-branching. The representation of *vĕhký* is thus as under (5) below.

(5) syllabic consonant followed by a TT cluster

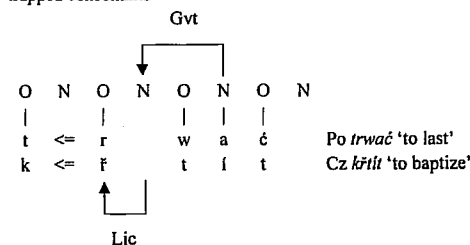


The tolerance of an additional empty nucleus in the right periphery thus referees the direction of branching: syllabic consonants must be associated to their own nucleus. Following this example, the diagnostic based on clusters in the right periphery may also be applied to trapped consonants. Of all languages discussed, only Polish is an appropriate testing ground: French does not feature TRC clusters at all, and Czech always makes the R syllabic.

However, Czech provides for a different category of trapped consonants: ř, a typologically very rare palatal trill (which synchronically and diachronically represents the palatalized version of [r]), is an obstruent, rather than a sonorant. Recall from note 7 that this is witnessed by the fact that ř has a voiced and a voiceless version: it participates in final devoicing and, just like the French uvular 'r', takes on the voicing of adjacent obstruents. Unlike French where TrC sequences are banned, however, Czech tolerates TrC clusters: *hřbitov*, *křítit*, *řpítit*, *hřbet*, *pepř*, *vnitř* 'cemetery, to baptize, to glance, back (body), pepper, interior' and so forth. In these words, the trapped character of ř is guaranteed by the fact that it does not count in poetry, and that natives do not identify it as a syllabic peak (*hřbitov* for example has two peaks); also, ř is unable to bear stress (stress always falls on the first vowel in Czech, but *hřbitov* is stressed on the [i]).

On the distributional side, Polish and Czech trapped consonants are characterized by the fact that consonant clusters never appear to their right. This is at variance with (Czech) syllabic consonants, which tolerate following clusters. Applying the same reasoning as before, this means that trapped consonants do not branch on their own nucleus, which therefore requires government from the following vowel. Table (6) below shows relevant representations (where vowel length remains unrepresented).

(6) trapped consonants



This analysis requires that even internal (and hence governed) empty nuclei be able to license branching onsets. In Cyran's (2003) terms and following Charette (1992), both Polish and

Czech thus belong to the far end of the markedness scale where the weakest licenser, internal empty nuclei, are able to license the most demanding type of cluster, branching onsets. This covers the Polish situation, but not quite the Czech pattern since, recall, real sonorants are never trapped word-internally (*syna* 'roe') or word-finally (*Petr* 'Peter') in this language (more on the word-initial situation in section 7 below). The question, then, is why these sonorants bother reacting and seek syllabic status at all: since Czech provides for the possibility of trapped TRs, they could as well remain trapped. Also, if sonorants 'want' to escape the trapped trap, why does *r* not go down the same road? The answer to the latter question is fairly obvious: because only sonorants can be syllabic in Czech.¹¹ The former issue relates to the maximal discomfort of the parametric situation where internal empty nuclei license TR clusters: a language may provide for this option, but this does not mean that the clusters which are exposed to this kind of hostile conditions are happy with their fate. In Czech, then, sonorant TRs that can get away do get away by becoming syllabic. *Tr* clusters do not qualify for syllabicity and are therefore stuck in their trap.

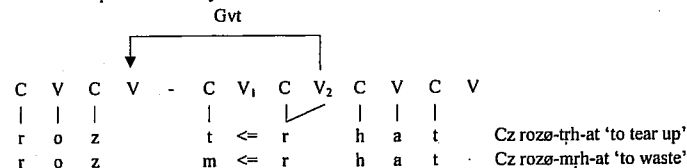
5. Syllabic Roots and the Vocalization of Prefixes

Let us now look at three issues regarding syllabic and trapped consonants that have been discussed in the literature. These concern the vocalization of consonant-final prefixes that are followed by a root with a trapped/syllabic consonant (this section), cases where a vowel-zero alternation appears in the midst of a final TR# cluster (Cz *patr-o* - *pater* 'floor NOMsg, GENpl') (section 6), and the evolution of Old Czech trapped consonants which have become syllabic across the board except in word-initial position (section 7).

The vocalization of prefixes has been discussed in Scheer (2004:§§246s, 2008), where the empirical situation in Polish and Czech is exposed. The observation is that CRC roots provoke unvocalized prefixes if the R is syllabic (Cz *rozø-trh-at* 'to tear up'), while vocalized prefixes occur in case the R is trapped (Po *roze-drgać* (*się*) 'to become vibrating', but see note 2 on the variation encountered). According to the scenario under (1), syllabic consonants branch on the preceding nucleus, while their trapped cousins are associated to the following vocalic slot. On this count, the R in Cz *rozø₁-tø₂rø₃h-at* branches on ø₂, which is thus contentful and may govern ø₁, which therefore remains unvocalized. By contrast in Po *roze-dø₁rø₂gac*, the R branches on ø₂, which governs ø₁; the prefix-final empty nucleus therefore remains un-governed and vocalizes.

Blaho (2001, 2004) points out that there is an alternative analysis which relies on a right-branching identity of syllabic consonants (see also Ziková 2007, 2008b): the R in *rozø-trh-at* could be right-branching, in which case its own nucleus would govern the prefix-final nucleus.

(7) unvocalized prefix before syllabic consonants



This analysis supposes that V₁ is silenced by the relation between the T and the R, which form a branching onset. The trouble is that the first consonant of what is supposed to be a

¹¹ Whether there are syllabic obstruents at all is a question open to debate. Typical candidates mentioned in the literature are Berber (Dell and Elmedlaoui 1985, 1988) and Salish (Bagemihl 1991). The evidence at hand needs to be appraised in the light of the contrast between syllabic and trapped consonants. See Scheer (2004: §376) for discussion.

branching onset is not always an obstruent: *mr-* and *ml-* as in *rozø-mřhat* 'to waste' and *oda-mřštit* 'to reject' also occur. The analysis under (7) thus needs to recognize unorthodox branching onsets (which in fact in Czech reduce to *mR-* clusters). Regarding this issue, Blaho (2001, 2004) argues that *ml-* and *mr-* clusters also behave like branching onsets elsewhere in the language: prefixes remain systematically unvocalized when followed by an mRV sequence: *oda-mlouvat* 'to contradict', *rozø-mlátit* 'to demolish' *oda-mrazit* 'de-ice', *podø-mračný* 'cloudy' and so forth. They thus appear to qualify as branching onsets in Czech even though they do not fulfil sonority requirements.

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It may appear undesirable to abandon a strict and cross-linguistically stable definition of what a branching onset can be: it is not clear to which extremes a language-specific definition of branching onsets could be taken, i.e. how heavily onset clusters would be allowed to violate sonority sequencing. This question is discussed by Cyran (2003), who argues that a cross-linguistically variable definition of branching onsets is workable (and actually desirable).

Ziková (2007, 2008b) goes even further into this direction. She has made the following previously unreleased observation: in Czech, the vocalization of prefixes is entirely independent of the sonority profile of following consonant clusters. Table (8) below provides some illustration (from Ziková 2007).

(8) Czech: any cluster may be transparent for government

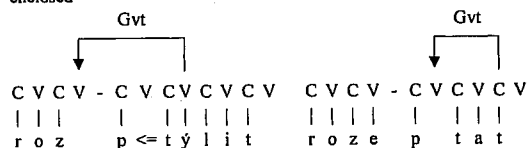
a. √RTV-	b. √RT-	gloss
zø-lhostejn-ět	roze-lk-at	to become indifferent, to start to moan
rozø-mžik-at	roze-mž-it	to start to wink, to start to drizzle
bezø-rtuť-ový	roze-rd-it	mercuryless, to start to flush
zø-rdous-it		to strangle (pf)
rozø-mňouk-at	roze-mnout	to start to mew, to crumble
rozø-ptýl-it	roze-pt-at	to spread out, to start to ask
oda-čpavk-ovat	ode-čp-it	to de-ammonize, to reek
rozø-kdák-at	roze-tk-at	to start to cluck, to start to weave

As may be seen, the only thing that counts is the morphological status of the first phonetically expressed vowel to the right of the cluster: prefixes vocalize if this vowel is the thematic vowel, but remain unvocalized in case the vowel at hand is the root vowel. While this generalization was known in another coat (prefix vocalization occurs iff the root vowel is zero, non-vocalization is observed before expressed root vowels, cf. Scheer 1996, 1997), the fact that prefixes may remain unvocalized even before RT and TT clusters is new (Scheer 1996, 1997 thought that root-initial RT clusters always provoke prefix vocalization because they enclose a governed empty nucleus). In this light, Ziková's morphological definition of the triggering context (root- vs. thematic vowel) is certainly more meaningful than the reference to the root vowel (zero vs. expressed).

That is, phonology alone is clearly out of business here: the clusters that produce vocalized and unvocalized prefixes are identical. The critical contrast is of morphological nature: empty nuclei absorb government from the following vowel if they represent the root vowel, i.e. if the root is in zero grade ((8b), e.g., *roze-pot-at*); they are transparent to government in case they do not have this quality ((8a), e.g., *rozø-potýl-it*). Or, in other words, the same consonants may or may not contract a branching onset-type relationship according to whether the empty

nucleus enclosed hosts the root vowel (relationship impossible) or not (relationship possible). This is depicted under (9) below (where vowel length is left unrepresented).

- (9) identical clusters are branching onsets or not according to the morphological status of the nucleus enclosed



Of course phonology is unable to distinguish (empty) nuclei according to their morphological affiliation; the question thus is how this extra-phonological contrast produces a phonological effect. Ziková's (2007) analysis builds on the idea that branching onsets can only be established in the lexicon, and that two consonants can only contract the branching onset-type relationship (\Leftarrow) in presence of a following vowel (which must provide licensing, see (2)). That is, root-initial #CC clusters can only become a branching onset if they are followed by a (root) vowel in the lexicon. The #pt cluster of *rozø-ptýl-* may thus build a branching onset, but the #pt of *roze-pt-* may not since the thematic vowel is absent from the lexical recording of the root.

This analysis has the enjoyable effect of not making the ability of identical consonants to acquire branching onset status depend on the morphological affiliation of the nucleus enclosed: /pət/ can always be a branching onset – but this is not what the vocalization of the prefix depends upon.

Ziková's analysis is well suited to express the phonological impact of a morphological contrast without abandoning the principle of Indirect Reference (which guarantees modularity: phonology can make reference to morpho-syntactic objects only if they have been translated into phonological vocabulary beforehand, e.g., Selkirk 1984; Nespor and Vogel 1986). The price to pay is the aforementioned weakening of the concept of branching onset; different clusters in different languages qualify for branching onset status: only stop-liquid clusters here, obstruent-liquid clusters there, obstruent-nasal clusters in a third language, and clusters of whatever sonority in Czech.

Prefixal vowel-zero alternations in Czech thus allow for Blaho's (2001, 2004) right-branching analysis of syllabic consonants if one is willing to accept that *ml* and *mr* are branching onsets in this language. This direction paves the way for more radical approaches to the parameterization of what a good branching onset is. Even though one should certainly think twice before allowing clusters of any sonority slope to be branching onsets, the option is worth consideration – I leave this an open question here.

6. Morpheme-Final TR Clusters

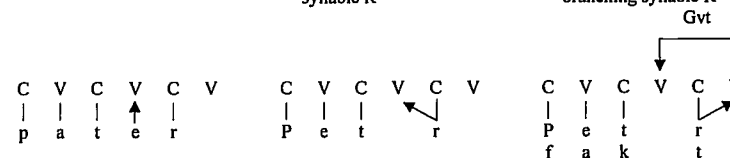
Ziková (2007) also argues that syllabic consonants are right-branching everywhere except in root-final (morpheme-final) position, where they branch on the preceding nucleus. Her analysis is based on the contrast between two patterns: one where syllabic TR# (*Petr* 'Peter NOMsg') alternates with non-syllabic TR-V (Cz *Petr-a* 'id., GENsg'), another where root-final TR is broken up by a vowel when it appears in final position: Cz *patr-o* 'floor NOMsg' – *pater* 'id., GENpl'.¹²

¹² German and English root-final TR clusters instantiate the *patr-o* – *pater* pattern, except that the appearance of a vowel in the midst of the cluster is only optional (because vowel-zero alternations are optional in these languages): the other solution is to make the R# syllabic. Both strategies are in free variation. Thus English *twinkle*, *bottle* may come out as *twin[kəl]*, *bo[təl]* or *twin[kl]*, *bo[tl]* (e.g. Toft 2002), and German *Hantel* 'barbell', *Gabel* 'fork' may appear as *Han[təl]*, *Ga[bəl]* or *Han[tl]*, *Ga[bl]*. That the TR clusters in question are

The uncontroversial representation of cases where root-final TR clusters enclose a vowel-zero alternation (*pater*) is shown under (10)a: the nucleus enclosed by the root-final TR cluster hosts a piece of melody in the lexicon, which however is unassociated (*pater/*). By contrast, no vowel can surface in the root-final TR cluster of *Petr* because the intervening nucleus is truly empty: there is no floating piece of melody in the lexicon (*/Petr/*). The question is about the representation of *Petr*: the R could be left-branching as under (10b1), or it could be right-branching as under (10b2).

- (10) representation of the *patr-o* – *pater* pattern

- a. root-final TR broken up: *pater*
 b. root-final TR becomes syllabic (rather than being broken up): *Petr*
 1. solution 1: left-branching syllabic R
 2. solution 2: right-branching syllabic R



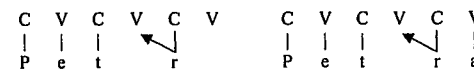
On the take of (10b2), *Petr* has the same representation as word-final RT# and TT# clusters such as in *čert* 'devil' or *fakt* 'fact'. Or rather, the representation would be identical if the *-t* of *fakt* and *čert* were syllabic, which of course it is not (only liquids can be syllabic in Czech). Therefore, *čert* and *fakt* can only be well-formed if the empty nucleus that is enclosed in the final cluster is governed by the final empty nucleus – which however does not receive any melody through branching from the preceding *-t*. We thus know that final empty nuclei are able to govern in Czech.

In this case, Ziková argues, there is no reason why the reaction of */Petr/* on the absence of a vowel to its right should be any different from the one shown by *fakt*: the final empty nucleus could simply govern the empty nucleus enclosed in the cluster. The result would be a non-syllabic R, which has no reason to bother: the structure is well-formed and does not need any repair – there is no reason for the R to try to become syllabic.

Also, goes the argument, if final empty nuclei can govern, they should be able to govern the nucleus that hosts the vowel-zero alternation in *patr-o* – *pater*; that is, the predicted GENpl would be *patr* (again with no particular reason for the R to become syllabic).

In sum, Ziková rejects the repair-based analysis. Since final empty nuclei govern whenever they can, the only way to account for the syllabic R# in *Petr*, she argues, is to anchor its syllabicity in the lexicon. Since the final empty nucleus must be free to host vowel-initial suffixes (e.g., case markers), the R cannot be right-branching; the only solution is thus a lexically left-branching R. This is shown under (11) below.

- (11) Ziková's (2007) analysis of /TəR#/
 a. *Petr* 'Peter NOMsg'
 b. *Petr-a* 'Peter GENsg'



not branching onsets is guaranteed by the fact that some of them do not occur word-initially: #tl is not possible in either language. What this means is just that whenever there is a vowel appearing in the midst of a TR cluster (be that in Czech, English, German or elsewhere), the cluster in question is not a branching onset, and whatever phenomena are observed (including the syllabicity of the R), they are not a reaction on the uncomfortable situation of a branching onset.

This scenario is problematic because it makes the bisyllabic *Petr-a* under (11) an item that possesses three contentful nuclei. It is true that sonorants which branch on a nucleus are not automatically syllabic: this is how the weakness of consonants that occur in post-sonorant position is explained. While all post-coda consonants are strong in many languages (Ségéral and Scheer 2001; Scheer 2004: §110), they may be strong or weak according to whether the preceding consonant is a sonorant or not: in languages like Greek, T is strong in VTøTV, but weak in CRøTV. In CVCV, this is explained by the branching of R (but not of T, which is unable to branch) on the following nucleus in Greek-type languages (Seigneur-Froli 2006; Ségéral and Scheer 2008).

Syllabicity thus is not a necessary corollary of the fact that a sonorant branches on a nucleus. A contentful nucleus, however, is supposed to be visible for suprasegmental phenomena such as stress (Szigetvári and Scheer 2005). In this respect, the bisyllabic *Petr-a* should thus count for three units. Unfortunately, fixed word-initial stress in Czech does not allow to test this prediction; languages with word-final syllabic consonants and a more subtle stress-assigning algorithm may offer an appropriate diagnostic.

In any event, an alternative to the lexical anchoring of the branchingness of syllabic consonants is suggested by the repair-based approach that is followed in this article. What needs to be repaired, though, is the shaky situation of a TR cluster in a hostile environment, rather than the simple vacancy of an empty nucleus. That is, root-final TR clusters like in *Petr* are regular branching onsets in the lexicon: the T and the R are related by IG, and the R does not branch. If the final empty nucleus is filled by a case marker as in *Petr-a*, nothing happens: a full vowel is strong enough a licenser in order to support the TR cluster. In case the licensing nucleus remains empty, though, the TR cluster is in a difficult situation. The branching of the R on the following final empty nucleus is the response: the TR cluster provides content to its own licenser. This improves its position since it now experiences the same conditions as TR clusters before full vowels.

The critical element of this analysis is the fact that sonorants do not become syllabic on their own: they do because they are involved in a branching onset relationship. What needs to be improved is the situation of the entire cluster, not of the sonorant itself. On this take, then, following Blaho (2001, 2004), syllabic consonants are uniformly right-branching in all positions.

7. Why All Old Czech Trapped Consonants Became Syllabic Except in Word-Initial Position

The last issue to be considered is the 'spontaneous' evolution of Old Czech (OCz) trapped consonants, which have become syllabic in Modern Czech (MCz) everywhere except in word-initial position.

Old Czech features both trapped and syllabic consonants: while the latter continue Common Slavic (CS) *tr̥rt*, the former appear in place of CS *trst*. Even though both origins produce CRC clusters in OCz script, these CRC were clearly distinct according to their diachronic identity. This is guaranteed by OCz verse where CRC < *tr̥rt* counts as a syllabic peak, while CRC < *trst* does not. The existence of a minimal pair has led Trubetzkoy (1939:199) to establish a 'correlation of syllabicity' for OCz: syllabic *dr̥žeti* 'to hold' (< CS *držati*, cf. Po *dzierżyć*, MCz *držet*) vs. trapped *dr̥žeti* 'to tremble' (< CS *dr̥žati*, cf. Po *drzeć*, MCz extinct).¹³

The CS contrast between *tr̥rt* and *trst* that was preserved in OCz in the syllabic vs. trapped coat, however, is abandoned in Modern Czech: all trapped consonants become syllabic (e.g.,

¹³ This is regular textbook evidence reported for example by Komárek (1969:82) and Liewehr (1933:94). For instance, syllabic *dr̥žeti* 'to hold' (< CS *držati*) counts for 3 syllables in typical 8-peak Old Czech Alexandrine verse (to *jmě drzal takým kmenem*, Kat. verse 24), while trapped *dr̥žeti* 'to tremble' (< CS *dr̥žati*) weighs only 2 syllables (*všecko pohanstvo drzezalo*, Kat. verse 2803). The philological basis of this distinction is discussed at greater length in Scheer (2004:§277).

Trávníček 1935: 57f, 111ff, 226ff; Lehr-Splawiński and Stieber 1957: 97ff; Komárek 1969: 60f, 82, 97ff, 127ff; Liewehr 1933: 93f, 162f). This evolution is observed across the board, with two exceptions: palatalized trapped 'ř' remains trapped to date (e.g. *křtít* 'to baptize', see section 4), and so do word-initial trapped liquids. Hence OCz trapped *trvati*, *bratr* > MCz syllabic *trvat*, *bratr* 'to last, brother', against OCz trapped *rdieti*, *lháti* > MCz trapped *rdít se*, *lhát* 'to go red, to lie' (the situation is exposed at greater length in Scheer 2004: §277).

While there is good reason why ř cannot become syllabic (it is an obstruent, see section 4), the positional bias of liquids is intriguing. At first sight, it seems that the word-initial context prevents trapped consonants from becoming syllabic. Why should that be? I submit that the solution has got nothing to do with the left edge of the word – or rather, only very indirectly. What is really at stake is the absence of another consonant to the left of the trapped item. Everywhere but word-initially, trapped consonants are engaged in a branching onset. The preceding section has argued for a scenario whereby sonorants become syllabic because the structure that they are involved in, a branching onset, experiences difficult conditions, i.e. an empty nucleus to its right. Applied to the OCz situation, this mechanism produces precisely the MCz picture: TR clusters followed by an empty nucleus (internal or final) are trapped in OCz; they escape this shaky situation by becoming syllabic. Word-initial trapped consonants do not experience the same discomfort since they are singletons. They therefore have no reason to react.¹⁴

8. Conclusion and Outlook

As in earlier work, I have argued that trapped and syllabic consonants can only be understood when both categories are compared. The new element is their involvement in branching onsets, a previously unconsidered fact that I submit is critical. This opens the way for a uniformly right-branching analysis of syllabic consonants (Blaho 2001, 2004) 1) in root-internal position regarding the analysis of prefix vocalization, 2) in root-final position where they alternate with non-syllabic liquids, and 3) in the evolution of trapped consonants from Old to Modern Czech.

The right-branching analysis produces two additional benefits: a solution for the problem that left-branching analyses have in the right periphery of syllabic consonants, and an explanation for the fact that trapped consonants cannot bear stress (they are not associated to a nucleus).

The price to pay is a softening of the definition of branching onsets (reintroduction of the debate regarding relative sonority). Also, internal empty nuclei must be granted lateral actorship: they are able to license TR clusters at least in some systems.

The latter take follows Charette (1992) and Cyran (2003). It raises the question of the lateral actorship of internal empty nuclei. Final empty nuclei are silent for a reason that is different from Government (i.e. their domain-final position although this is not a very illuminating concept). Internal empty nuclei are unpronounced because they are either governed or enclosed in a branching onset. Among other things, the absolute inability of governed empty nuclei to be lateral actors (i.e. to either govern or license) guarantees the non-proliferation of consonant clusters. The notorious *s+C* sequences lain aside, the maximal internal cluster that such a grammar can derive is *Rø₁Tø₂RV* (where *ø₁* is governed by *V*, and *ø₂* enclosed in a branching onset). Any additional empty nucleus would remain orphan: the sonorant of an additional branching onset needs to be licensed, and an additional empty

¹⁴ Note, however, that the diachronic movement at hand cannot be triggered by a change in the parameter setting regarding the licensing power of empty nuclei (which on this hypothesis could license TR clusters in OCz, but cannot anymore in MCz). This scenario is not viable for, recall, trapped TR clusters continue to exist with ř: *křtít*, *pepř* 'to baptize, pepper' etc. While TR clusters are trapped in their trappedness because ř, being an obstruent, cannot become syllabic, TR clusters may improve their situation by becoming syllabic. The fact that they could also remain trapped in the modern system, which tolerates trapped TR clusters, does not mean that they do not try to be better off.

nucleus that is enclosed by a non-TR cluster needs to be governed. By and large, the pattern derived is what the most permissive languages allow for.

Now it looks like this fairly good match is abandoned by Charette's (1992) and Cyran's (2003) tolerance of governed internal empty nuclei that license TR clusters. Endless TRØTRØTRØ... sequences seem to be possible: if governed empty nuclei can license, some systems should also allow them to govern. Else, a distinction would have to be made between government, to which governed empty nuclei have no access whatsoever, and licensing, which they may be able to dispense.

The conclusion of an article is certainly not the place to dive into this kind of discussion. Let me just hint at a way in which the different elements could be bundled into a consistent system. In all versions of Government Phonology since 1990, there has been an – explicit or implicit – distinction between two types of lateral forces: those that decide which clusters are well-formed (Constituent Government, Interconstituent Government, Government-Licensing in the 1990 model), and those that produce segmental effects such as vowel-zero alternations, lenition etc. (Proper Government in the 1990 model). The Coda Mirror (Ségéral and Scheer 2001, 2005, 2008; Scheer 2004: §110) has set out to unify both, that is to build a system where cluster well-formedness and segmental effects are controlled by just two lateral forces, government and licensing. This ambition may have struck beyond the mark. In any event, even in this system a version of government-licensing is left whose only purpose is to control the well-formedness of branching onsets (the R of a TR cluster must be licensed by its nucleus); Scheer (2004: §149) has identified its alien character in the system: government-licensing does not produce any segmental effect.

Cyran's (2003) theory only concerns cluster well-formedness (even though Cyran also attempts at maintaining the unity of licensing with alternation-relevant lateral forces). If the ambition to boil down the set of lateral relations to just government and licensing is abandoned, the old division of labour could solve the problem that we are left with at the end of this article: Cyran's licensing is only about cluster well-formedness – call it cluster-licensing; the lateral forces of the Coda Mirror are only about the segmental expression of syllabic constituents: Ségéral and Scheer's licensing may be called segment-licensing (while Government does not need to be renamed). Lateral actorship of nuclear categories, then, is defined at both levels: whether a constituent can govern and seg-license or not is calculated as before in the Coda Mirror; whether it can clu-license is decided independently of its being governed or not.

In such a system, TRØCV is possible because Government (from V) silences the empty nucleus, which nonetheless is able to clu-license the TR (a parametric decision made for the entire language, i.e. in disregard of particular phonological derivations). On the other hand, endless TRØTRØTRØ... sequences are impossible: the empty nuclei will always be able to clu-license their TR cluster, but all except the last one will remain ungoverned – the structure is thus ill-formed.

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