Syllabic complexity and licensing

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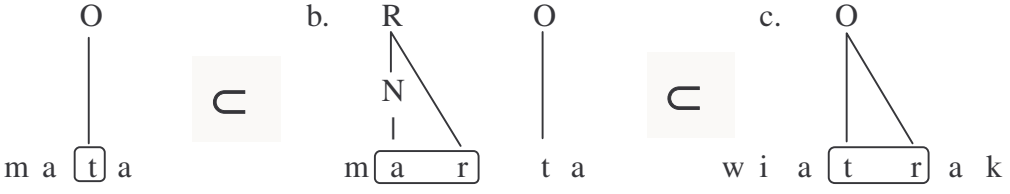
Introduction

This paper attempts to demonstrate how a slightly modified model of Government Phonology (Kaye, Lowenstamm and Vergnaud, 1990; Harris, 1990, 1994) is able to account for syllabification types across languages. In particular, we will look at the implicational relationship, which was observed between the structures of branching rhyme and branching onset (Kaye and Lowenstamm, 1981) and the way the revised model of Government Phonology (GP) deals with the distribution of consonantal strings at the right edge of the word.

1. Syllabic complexity

Kaye and Lowenstamm (1981) observed an implicational relationship that seems to hold cross-linguistically between branching rhymes and branching onsets. The observation stipulates that a language which has branching onsets must also possess in its syllabic inventory the structure of a branching rhyme. Since the implication cannot be reversed, the following scale of progressively marked syllabic structures is derived.

(1) a. b. c.



“mat” “name” “windmill”

The Polish words in (1) demonstrate that the branching onset in (1c) is assumed to be the most marked syllabic structure, and hence, its presence implies (1b) and consequently (1a). Kaye and Lowenstamm divide the syllabic complexities into three major levels corresponding to the choices which languages make concerning their syllable structure.

(2) *Three levels of syllable markedness*

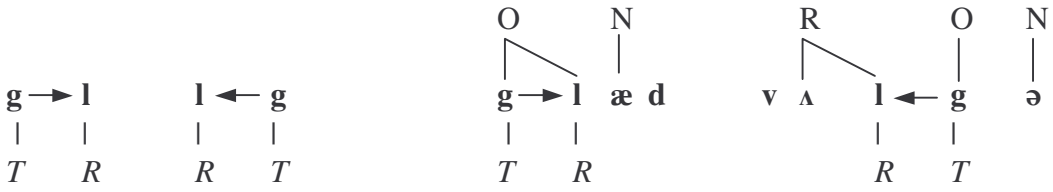
I	CV	Zulu, Desano	= (1a)
II	CV, CVC	Hungarian, Japanese	= (1b)
III	CV, CVC, CCV	Polish, English	= (1c)

The question that we must answer concerns the theoretical relationship between the branching onset and the branching rhyme, which must be established for the purpose of accounting for the markedness scale in a non-arbitrary fashion. This is what we will attempt to do now.

2. Syllabification in Government Phonology

Syllabification in GP proceeds from governing relations contracted between consonants. Whether a consonant is a *governor-(T)* or a *governee-(R)* in such relations is determined by their sonority differential. This means that a less sonorous segment governs the more sonorous one regardless of their linear order, as illustrated below in (3a). In terms of the actual syllabic configurations (3b), the rightward governing relation defines branching onsets and the leftward direction specifies a relation between an onset and the preceding non-vocalic complement of a branching rhyme, that is, the coda.

(3) a. b.

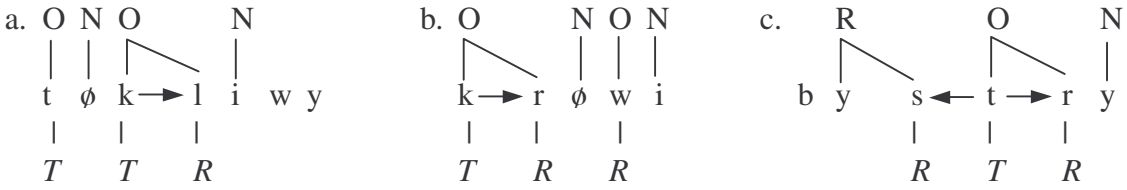


(⇄) = direction of government, *T* = governor, *R* = governee

The nature of government restricts possible syllabic types because in any given direction only two positions may contract a governing relation. This, effectively, allows only for maximally binary branching constituents.

Languages like Polish, however, may begin their words with clusters exceeding the number of two consonants. The forms such as those in (4a) and (4b) are not treated as ternary branching onsets but rather as a sequence of two well-formed onsets, which are separated by an empty nucleus.

(4)



As seen in (4a), the only two consonants with a sufficient sonority differential are /k/ and /l/, and they may contract a governing relation, while the first consonant must form a separate onset. In (4b) on the other hand, the first two consonants form a branching onset, while the third consonant forms a simplex onset. It must be mentioned that the above analysis of the three-consonantal clusters is very much in the spirit of Kuryłowicz (1952), who also proposed to treat such forms as sequences of onsets. The only difference is that in GP these onsets must be separated by an empty nucleus.

The configuration illustrated in (4c) is the only possible cluster of three consonants which does not contain empty nuclei in the phonological representation. Note that the arrangement of the segments is such that a governor is flanked by governees on both sides. In syllabic terms, we are dealing with a branching rhyme followed by a branching onset.

Below we will look at the way in which GP captures typological variation in syllabic structures and point to some problems, which in turn can be refined if a different view is taken on the source of the variation.

3. Syllable Typology in Government Phonology

Only three types of constituents are accepted in GP, that is, *onset*, *nucleus* and *rhyme*. From the discussion above it follows that the maximal structure of syllabic constituents in GP is binary branching. Thus, the choice that a given language has in defining its syllables is that between a simplex constituent and a branching one. For this reason the model employs parameters to define typological variation of syllabic structures.

In (5) below, we define the syllable structure of English and Polish in terms of such parameters. Note that the only formal difference between these two languages is that Polish has no branching nuclei, that is, long vowels or diphthongs.

(5)

Parameter	*English*	*Polish*
BRANCHONSET	ON	ON
BRANCHRHYME	ON	ON
BRANCHNUCLEUS	ON	OFF

One should add that the other crucial difference between English and Polish lies in the fact that Polish allows for empty nuclei to appear in initial clusters, which we saw in (4), while English does not.

The parameters appear to provide a useful descriptive tool for capturing linguistic variation. However, it seems that their grammatical status is not devoid of problems. Let us concentrate on the parameters on branching rhyme and branching onset. It will be recalled that the observation made by Kaye and Lowenstamm (1981) refers to these very structures. Thus, what we should expect is that some mechanism will be found, which connects the two parameters in such a way that the desired outcome is achieved. That is, the implication that a language will have branching onsets only if it already has branching rhymes will be possible to state in formal terms.

Given the nature of the parameters – they are separate entities referring to disparate fragments of phonological representation – the model of GP predicts that all possible permutations of the two parameters should be attested. As illustrated below in (6), this is not the case. The settings in (6d) are not attested, and there seems to be no way to exclude them.

(6)

	a.	b.	c.	d.
BRANCHONSET	ON	OFF	OFF	ON
BRANCHRHYME	ON	OFF	ON	OFF
	Polish	*Zulu*	*Hungarian*	*???*

What we need is a mechanism which would ban the settings in (6d), or at least one which would make such settings highly marked. The question however is how we can decide that a particular setting of two independent parameters should be ruled out?

Below, we present a different view on syllable typology. In this approach we eliminate parameters and replace them with a non-rerankable scale referring to the complexity of particular syllabic types. Their presence in a given language will be allowed if such progressively more complex structures can be licensed. First let us look at the role of licensing in GP and at the basis which will serve to determine a particular complexity type for a given structure.

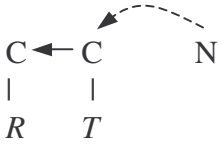
4. Licensing in Government Phonology

The relevant aspect of licensing on which we want to concentrate here is the relation between the onset and the following nucleus. Thus, the primary function of nuclei in the phonological representation is to license the preceding onset. We must add that this onset will find itself in different configurations, depending on the direction of its relation with another consonant, and each configuration requires different amount of licensing from the following nucleus as illustrated below.

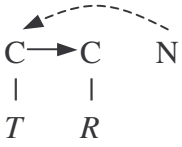
(7)

a. *Licensing*

b. *Direct Government Licensing*



c. *Indirect Government Licensing*

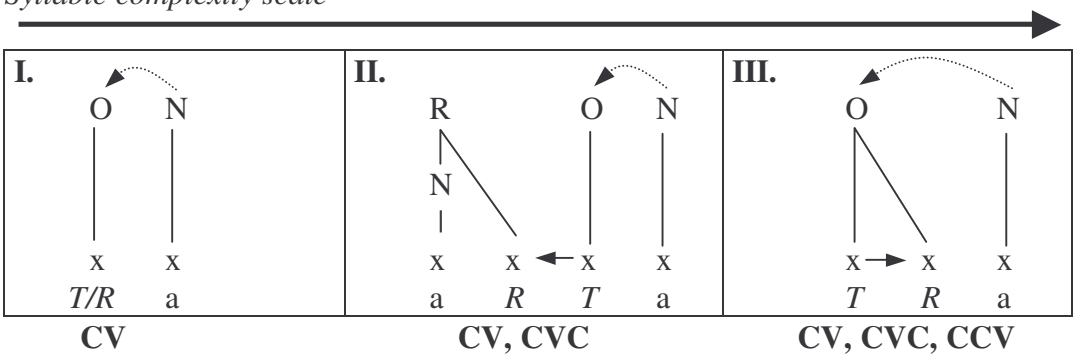


In (7), we illustrate formal differences between particular configurations of onset licensing. (7a) represents the simplest arrangement, where a nucleus licenses a simplex onset of any substantive make-up. (7b) and (7c) are formally more complex structures because the onset, which receives licensing from its nucleus, is itself in a relation with another consonant.

It is clear that the latter two structures are more demanding in terms of licensing than (7a). However, the question is if there is any formal way to distinguish between the licensing demands imposed by (7b) and (7c) on the nucleus. For brevity of the argument, we will assume after Charette (1990) that the relevant distinction derives from the fact that in (7b) the nucleus is directly adjacent to the governor and therefore this structure is formally easier to license than (7c), in which the onset head is separated from the nucleus by the complement of the governing relation.

This formal difference should alone suffice to establish the relative markedness of the structures in (7). The syllabic complexity scale given below corresponds to the levels of markedness proposed by Kaye and Lowenstamm (1981), which we saw in (2) above.

(8) *Syllabic complexity scale*



The common formal denominator in establishing the complexity scale is the fact that each time the licensing goes to an onset. The growing licensing demand at particular levels depends strictly on the function of the onset, that is, whether it is simplex or whether it is a governor. In the latter case it is the direction of government that determines the formal difference in the complexity of levels II and III. Thus the markedness levels above appear to act like quantal regions in syllable complexity and correspond to the relative licensing strength of the nuclei by which they are sanctioned.

To summarise the proposal so far, it seems that the recourse to the relationship between the licensing potential of nuclei and the licensing demand of particular syllabic types allows us to account for the markedness relationship between branching onsets and branching rhymes. Level III (Branching Onset) must imply that the nuclei are also able to license level II and I, thus, we capture Kaye and Lowenstamm's observation. There is no need for separate parameters referring to particular levels – flexibility and relativity of markedness. Complex syllabic structures are not violations of markedness constraints but logical possibilities constrained only by the nature of government and licensing – branching rhyme just happens to be easier to license than branching onset.

Linguistic variation in this model consists in languages choosing arbitrarily how much their nuclei will license along the non-arbitrary complexity scale as illustrated in (9) below.

(9) *Licensing strength of nuclei*

		example	*language*
I	C<u>a</u>	ci**ty**	Desano
II	C.C<u>a</u> (*RT*)	wi**nte**r	Hungarian
III	CC<u>a</u> (*TR*)	**tra**p	English, Polish

C = any consonant
T = governor
R = governee
a = any vowel

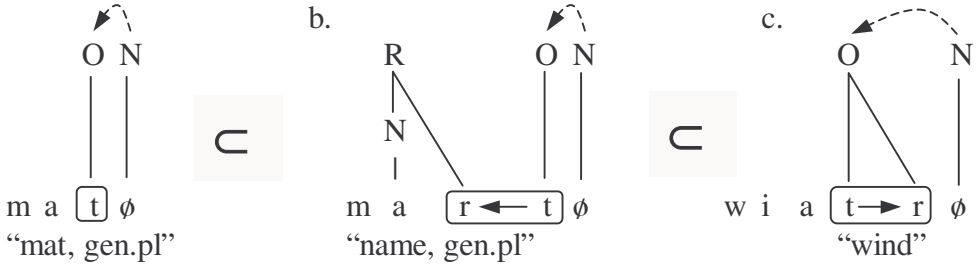
Note that Polish vowels license all formal syllabic configurations. Since, as we saw earlier, GP also recognises melodically empty nuclei, and Polish is one of the languages that seems to employ them in the phonological representation, we will now look at the licensing properties of

this type of nuclei in Polish. We will see that even though the empty nuclei seem to license the same formal structures as the full vowels, there are certain melodic restrictions on the possible strings in any of the three configurations, with the most complex structure, that is, the branching onset, being the most constrained.

5. Right edge of the word in Polish

In GP, surface word-final consonants are always followed by an empty nucleus phonologically. We stipulate that this nucleus can be employed only if it is able to discharge its duties as a licensor.

(10) a. b. c.



Thus, it seems that in Polish, the empty nucleus is able to license the same formal structures as melodically filled vowels. However, there are some substantive differences. An empty nucleus, by definition, is a weaker licensor than its melodically filled congener. For example, it is unable to license voice in the word-final obstruents, or the secondary place of articulation in all consonants except coronals. These effects of weaker licensing are observed at each level of syllabic complexity.

Since the empty nucleus licenses only a subset of the strings licensed by a full vowel in all positions, the question is if the restrictions are greater at some levels than others. Note that what we predict is that the level III of syllabic complexity should exhibit the strongest effects of weak licensing coming from empty nuclei. Excluding the neutralisations of voice and secondary articulation from this consideration, let us look at the comparison between word-initial (11a) and word-final (11b) branching onsets.

(11) a. b.

płot	‘fence’	ośle**pł**	‘he went blind’
plon	‘crop’	ocie**pl**	‘warm-up, imp.’
praca	‘work’	Cy**pr**	‘country’
tlen	‘oxygen’	rozświe**tl**	‘lighten up, imp.’
tło	‘background’	pló**tł**	‘he waffled’
trawa	‘grass’	wia**tr**	‘wind’
kłos	‘ear of corn’	pie**kł**	‘he backed’
klon	‘maple tree’	cy**kl**	‘cycle’
krowa	‘cow’	a**kr**	‘acre’

At first glance it looks like all the basic types of branching onsets, which are found word-initially are also possible word-finally. However, this is not a correct observation. Of the word-final clusters in (11b) only /tr/ appears to be unproblematic. The other clusters are either found exclusively in words of foreign origin and proper names, e.g. *akr, cykl* and *Cypr*, or they involve morphological concatenation. In the latter case, we are dealing with the past tense suffix /-ł/ as in *oślepł* and *piekł*, where the final sonorant is typically elided in speech, or the imperative ending /-l/ as in *ociepl*. If we exclude these contexts from consideration, then it turns out that the word-final clusters of the branching onset type are severely restricted, an observation which we expected.

In addition to the melodic restrictions on the final *TR* clusters in Polish we may add that the clusters of the reversed order of segments, that is, *RT*, which are much less restricted, show another interesting feature. Namely, it is rare that final *RT* clusters are broken up in vowel-zero alternations, whereas the *TR* clusters are the typical strings participating in this process (12b).

(12)

a. karta - kart (*karet) ‘sheet, nom.sg./gen.pl.’

skarpa - skarp (*skarep) ‘slope, nom.sg./gen.pl.’

b. swetra - sweter ‘sweater, gen.sg./nom.pl.’

cukru - cukier ‘sugar, gen,sg./nom.sg.’

Thus, the *RT* clusters are not only less restricted in occurrence but also exhibit stronger integrity as clusters than the branching onsets. This, we claim, is due to the fact that *RT* clusters are less complex and require less licensing from their nuclei as opposed to *TR*, that is, branching onsets.

Thus it seems that the licensing properties of empty nuclei not only support the complexity scale of syllabic structures discussed in this paper, but also allow us to understand the phonotactic tendencies at the right edge of the word in Polish.

Conclusion

We have introduced a coherent model of syllable markedness based on the interaction between complexity and licensing. The two types of governing relations, that is, *R<T* (right-to left) and *T>R* (left-to-right), which must be licensed by the following vowel, display an asymmetry as regards their licensing demand. The “quantal” regions on the complexity scale of syllabic configurations are levels I (CV) – II (C.CV) – III (CCV). Intersecting the complexity regions is another scale of vowel types ([a – ɸ]), each of which is characterised by different licensing potential. The empty nucleus plays a pivotal role in the hierarchy of licensers, but more importantly, its presence in the model affords a fresh view on word-final consonants which may

be viewed as onsets and be integrated into the system of preference scales in a straightforward fashion.

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