On constraints vs. non-circular approaches to word-initial clusters

Tobias Scheer

Abstract

Co-occurrence restrictions on word-initial consonant clusters are traditionally viewed as a consequence of the relative sonority of both members of the cluster. In the first part of this paper, I aim to show that the reasoning underlying this approach is circular. The **observation** that sonority does increase in word-initial clusters is relabelled **explanation** in saying that sonority **must** increase. Since the crucial part of this circular argumentation is expressed by a constraint ("sonority must increase within word-initial clusters"), I address the more general issue of constraints in linguistic theory. Apart from being circular, the approach based on sonority constraints is not explanatory: it could just as well account for the reverse phenomenology. Indeed, if word-initial clusters were always of decreasing sonority, the constraint would simply say "sonority must decrease within word-initial clusters". If it is assumed that the world is as it is for precise reasons and not simply by chance, scientific investigation can hope to discover those reasons and their effects. It follows that theories should be unable to deal with the reverse phenomenology if it is never attested. Actually, an important feature of theories is to predict the non-existence of objects that do not occur.

In the second part of the paper, I propose a constraint-free approach where restrictions on word-initial clusters follow from the interaction of more general principles, especially Government Licensing (Charette, 1990), segmental complexity (Harris, 1990) and a strict CVCV syllable-structure (Lowenstamm, 1996). A theory of consonantal interaction built on the mentioned principles is presented. This theory is shown to account for word-initial restrictions in a non-circular way. Unlike constraint-based approaches, it is unable to deal with the reverse phenomenology, predicting that word-initial sonorant-obstruent clusters are impossible in languages of the Indo-European type.

1. *Word-initial consonant clusters and circularity*

If a language exhibits word-initial consonant clusters, either there are no restrictions on possible combinations (like in certain Afro-Asiatic languages), or only #TR-clusters (where T = obstruent, R = sonorant) exist, as in Indo-European (IE) languages. There is no language where only RT-clusters occur word-initially. The usual way of accounting for the exclusion of #RT clusters might be summarized as follows:[1]

1) Words cannot begin with a Coda. Thus, the context "word-initial" corresponds to "Onset" on the syllabic level.
2) In languages of the IE type, consonant clusters are not free word-initially, but both ...TR... and ...RT... occur word-internally. This distribution matches that of syllabic constituents: "only Onsets in #__" vs. "both Onsets and Codas word-internally". Thus, syllabic structure is responsible for the observed restrictions.
3) The sonority value for each segment can be established independently. Word-initially, i.e. within a branching Onset, sonority must increase.
4) #RT clusters do not exist because their sonority falls. Hence, they cannot occur within a branching Onset. They cannot be interpreted as a Coda-Onset sequence either because there are no word-initial Codas. Moreover, in typical syllabification algorithms of the Kahnian kind that rely on the maximal cluster approach, the set of existing initial consonant clusters defines the very set of possible branching Onsets for the whole language: "a possible branching Onset is all and only the consonant clusters found in the context # __" (cf. Kahn, 1976; Lowenstamm, 1981).

This approach is circular: it puts the word "because" between two **observations**.

(1)	a.	observation:	"sonority always increases within initial consonant clusters"
	b.	syllabic interpretation:	"TR = branching Onset"
	c.	explanation:	"there are no initial RT clusters because sonority must increase within branching Onsets"

Circularity is introduced by the word "must": the only thing the statement "sonority must increase" follows from is precisely the **observation** "sonor-

[1] For more discussion of this approach, see for example Clements (1990), Selkirk (1984) and references therein.

ity increases". Thus, the whole approach simply says "X is the way it is because it is the way it is."

This kind of reasoning is unsatisfactory. The question "why do RT-clusters not occur word-initially in some languages" still requires an answer. Before turning to a different approach based on more general principles, I should like to discuss the concept of constraints that is crucially involved in the circularity of the reasoning.

2. *Constraints are observations, not explanations*

As has been illustrated above, circularity is induced by the word "must". Constraints crucially rely on this word, turning an observation into a necessity. Consider the prototypical example in (2).

(2)	a.	observation	trees grow straight up
	b.	the observed facts are not random	trees always grow straight up
	c.	they **must** be as they are	there is a constraint: GR.UP "trees **must** grow straight up"
	d.	WHY do we observe these facts? Because there is a constraint.	trees grow straight up because GR.UP forces them to do so

Circularity is an intrinsic property of constraints. The observed facts are never viewed as the consequence of something independent of the observation made, such as a more general principle. Uttering the "must" merely says "the observed facts are as they are because I observe that they are as they are". Instead of observing "X is like that", using the word "constraint" in order to refer to an observation suggests that "X is like that, and it cannot be any other way since it must be like that". If X is constrained, something or somebody must be at the origin of its constrainedness. However, the quest for this origin is never undertaken.

Still more oddly, constraints inhibit further investigation. Since the answer to the question "why?" is the constraint, there is no more need to look out for an explanation of the facts. In the case of the tree example, no one will have the idea of connecting the observations to a conditioning factor such as sunlight because the constraint has already explained why trees grow straight up. Or let us take the example of the peach falling down. If Isaac Newton had considered that the peach does not go up or zigzag around because there is a constraint saying that peaches must fall down, no relation would ever have been established between falling peaches, their mass and the mass of the earth. In the same way, the moon would be said to

turn around the earth because of a constraint that prevents it from drifting away. No relation between the peach, the moon and something like gravitation would ever have been proposed.

Finally, one major goal of scientific theories is to predict what cannot possibly exist. For example, once physicists have observed the behaviour of falling peaches, the phenomenon of gravitation extends to anything that has a mass. Namely, a prediction is made to the effect that there is no possible world where masses repel each other. Nor is it possible for masses to remain without effect on each other. Thus, the successive pieces of evidence adduced by Isaac Newton (masses attract each other), Yuri Gagarin (but not in space) and Neil Armstrong (they do on the moon, but not so much) showed different manifestations of the universally true principle "masses attract each other". There was no way for physicists to elude a unified account by positing three different constraints (1. On earth, masses attract each other strongly, 2. On the moon, attraction is poor, 3. In space, there is no attraction) or three different rankings thereof. Anyone can imagine the state of our understanding of physics if they had done so.

Returning to initial consonant clusters, no prediction of any kind is made by the constraint "sonority must increase within a branching Onset". If a planet were discovered where the reverse phenomenology was found, nothing would prohibit explaining the new data by a constraint "sonority must decrease within branching Onsets". A theory that can cope with all possible data and their reverse is not a theory at all, but a notational artefact enumerating observations. The interpretation of the restrictions on word-initial clusters I develop in the remaining sections cannot possibly deal with the existence of such a planet.

3. *Questions*

If word-initial restrictions on consonant clusters are viewed as a consequence of the constraint "sonority must increase within a branching Onset", the problem has found an answer. The linguist is not bothered by any further questions.

The questions I would like to ask arise on taking a closer look at the correct observation "word-initial restrictions on consonant clusters are related to sonority". As a matter of fact, impossible word-initial clusters belong to two different types:

(3) a. *Syntagmatic restrictions*
Initial consonant clusters that do or do not occur depending on the syntagmatic order of their members: #TR is ok, but #RT out. In clusters of this type, the consonants always contrast in sonority.

b. *Segmental/paradigmatic restrictions*
There are also consonant clusters of non-contrasting sonority that do not occur word-initially: e.g. *#lr, rl, nl, ln, tp. In these cases, the syntagmatic order of the members does not matter: they are unattested in any order.

The property "consonant cluster of contrasting sonority" seems to be related to syntagmatic restrictions, whereas the non-occurrence of initial consonant clusters of non-contrasting sonority has nothing to do with syntagmatic ordering. Rather, it is the consequence of the cohabitation of two equally sonorant consonants. An explanation for the former is to be sought in lateral relations holding among segments, while the latter must be due to the genuine identity of the consonants involved.

4. *Consonantal interaction: Paradigmatic aspect*

Let us first address the issue in (3b). In order to represent the situation obtaining within a cluster of two consonants, some model of the internal structure of consonants must be used. The phonological identity of consonants is a classical issue under debate. Various theories have put forward very different and partly incompatible models for consonantal representation. Representations diverge as to the phonological primitives they use. Feature Geometry (e.g. Clements, 1993; Sagey, 1986) assumes multi-valued features whereas Particle Phonology (Schane, 1984), Dependency Phonology (Anderson & Ewen, 1987) as well as Government Phonology (KLV, 1985) rely on bigger, monovalent objects. They contrast with respect to the relations that are supposed to hold between these primitives, i.e. arborescence (Feature Geometry) vs. a dependency-type of relation (the other models mentioned). But even within a given framework, the various proposals are far from being consensual. Space restrictions preclude a detailed exposition of the empirical evidence that grounds the consonantal representations used below. This evidence may be recovered from Scheer (in press, 1996, 1998c). I assume primitives of monovalent nature that reside on autosegmental lines. More specifically, the model of consonantal representation used here is couched within Government Phonology. It makes reference to work that has been carried out on consonants within this framework, including Harris

(1990; 1994), Harris & Lindsey (1995), Cyran (1994), Weijer (1994), Rennison (this volume).

Consider the situation obtaining for the melodic lines hosting A, I and U when two consonants occur in a row. "□" indicates the absence of any primitive. The juxtaposition of an empty and a filled position is noted by "⇐".[2]

(4) a.

	p	r	t	r	k	l	f	r
I/U	□⇐	I	□⇐	I	U	I	□⇐	I
	|	|	|	|	|	|	|	|
A	□⇐	A	□⇐	A	□⇐	A	A	A

b.

	n	r	s	r	ł	r	t	p
I/U	I	I	I	I	U	I	□	□
	|	|	|	|	|	|	|	|
A	A	A	A	A	A	A	□	□

Typical branching Onsets as in (4a) oppose at least one empty and one filled position on a given line. By contrast, the consonant clusters in (4b), which do not occur word-initially for the paradigmatic reasons mentioned (they are *#__ in any order), never oppose an empty and a filled position on a given line. The representations in (4) of course are only a choice of possible combinations of two consonants. Place restrictions preclude an exhaustive survey. The reader may verify that the above statements have general value in Scheer (1996: 320ff).

This distribution relating possible initial consonant clusters to the opposition between filled and empty positions leads me to propose the following definition of consonantal interaction:

(5) I*nfrasegmental Government* (IG)
Iff a phonological primitive faces an empty position on a given autosegmental line, it may govern that position.

According to (5), the consonant clusters in (4b) can contract no infrasegmental governing relation because either both positions on a given line are occupied ([nr], [sr], [łr]) or both are empty ([tp]). Note that the consonantal identities shown are established on the grounds of segmental alternation that make no reference to phonotactics at all.

IG can be viewed as a development of Harris's (1990) notion of segmental complexity. Harris argues that interconsonantal relations depend on the number of phonological primes the head and the dependent are made of.

[2] Labiality/roundness is represented by an extra prime, B. U contributes velarity with no implication of lip rounding.

The more complex a consonant (i.e. the more primes it is made of), the better head of a consonantal domain it is, and vice versa. Obviously, IG relies on this notion: a consonant C_1 may govern another consonant C_2 iff C_1 is more complex than C_2.

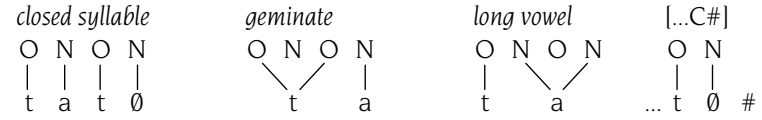
However, this approach would not be any better than the one based on sonority constraints if it could not say **why** possible initial consonant clusters should depend on consonantal interaction. The distributional relation between the possible interaction of consonant clusters occurring word-initially and the impossible interaction of consonant clusters that are banned from this context is nothing more than an **observation**.

Therefore, the next section examines how IG interacts with lateral relations holding between phonological categories.

5. T*he phonological* ECP, CVCV *and the beginning of the word*

In recent work, the hypothesis assuming a strict CVCV syllable structure has been evaluated for particular analyses in various languages.[3] The CVCV model (Lowenstamm, 1996; this volume) views syllabic structure as a strict sequence of non-branching Onsets and non-branching Nuclei (i.e. no branching constituents, no Codas). For the sake of clarity, consider the representation of closed syllables, geminates, long vowels and the right edge of consonant-final words within this framework, exemplified in (6) with the consonant [t] and the vowel [a].

(6)



All structural information contained in traditional syllabic approaches is preserved. For instance, the site of "closed-syllable" phenomena such as devoicing, lenition, shortening etc. that occur word-finally and before consonants usually receives the uniform description "Coda". In a CVCV approach, these phenomena are referred to as occurring "before an empty Nucleus". The difference between these two descriptively equivalent statements is the causal relation obtaining between the relevant environment and the observed phenomena. Apart from the general **observation** that

[3] See e.g. Lowenstamm (1988; 1996), Guerssel & Lowenstamm (in prep.), Bendjaballah (1995), Creissels (1989), Bonvino (1995), Ségéral (1995), Hérault (1989), Nikiema (1989), Ségéral & Scheer (in press), Larsen (1994; 1995), Heo (1994), Scheer (1996; 1997; 1998a,b).

Codas are "weak" because e.g. they admit only a subset of possible consonants, there is no reason why segments should devoice, deaspirate, lenite, in short decomplexify in this specific position. The correct cross-linguistic observation pointing to the weakness of Codas can only lead to a less surprised reaction when devoicing etc. occurs once more in a Coda-position. It can hardly explain this fact. By contrast, if the Onset is universally viewed as a dependent of the Nucleus like e.g. in Government Phonology, then the fact that objects decomplexify before an empty Nucleus stands in a direct causal relation with the emptiness of the latter. That is, the licensing power of an empty category is less than that of a filled category.

A CVCV structure multiplies the number of empty positions, namely of empty Nuclei. This situation raises the more general question of the status of empty categories in linguistics. It seems to be consensual that "you cannot get an empty position for free". This idea is encoded within the Empty Category Principle, which states that an empty position may remain unexpressed if and only if precise conditions are met. These conditions are defined in terms of the relation the empty position contracts with a filled position that is laterally distant. In syntax, it was proposed that movement could only take place if the trace of the moved object in its now empty base-position is properly governed by this object in its new position. Proper Government (PG) was defined by the structural relation which the filled and the empty position contracted (c-command, barriers). This example provides the kind of motivation that is typical for the existence of empty categories. If there were no structure preservation, i.e. if the position the object was moved from were deleted or even lexically absent, no explanation along the above lines would be available.

Empty positions do burden the grammar because they require special care (defined e.g. as PG). Nevertheless, their existence is a necessary condition for an explanatory account. Hence, the burdening of the grammar with more empty categories should not be seen as an undesirable overload, but rather as a welcome source of explanation. If grammar is not free in its moves because it must create or maintain the conditions required for the existence of empty categories, a step towards more constrainedness is taken. The challenge, as for any other scientific theory, is to propose a model that is as constrained as possible while covering all relevant data.

The same reasoning holds for phonology. KLV (1990: 219) proposed phonological PG based on the same kind of lateral long-distance phenomena involving an empty and a filled position that led to syntactic PG. In their view, empty categories are subject to the ECP in phonology as well as in syntax. An adapted version of their phonological ECP is given in (7).

(7) E*mpty Category Principle*
An empty Nucleus remains unexpressed iff it is properly governed.

The long-distance phenomena mentioned are vowel-zero alternations that are typically sensitive to the object(s) occurring between the zero (empty Nucleus) and the vowel (filled Nucleus) to its right. Consider vowel-zero alternations from various genetically unrelated languages given in (8).[4]

(8)

	zero CeC-V	*vowel* CeC-Ø	*vowel* CeC-CV	*glosses*
Moroccan Arabic	kɨtØb-u	kØtɨb-Ø	kɨttɨb-Ø	'write PERF.ACT.3PL./3SG./3SG.CAUSATIVE'
German (opt. elision)	innØr-e	inner-Ø	inner-lich	'inner+INFL./inner/internal'
Tangale (Chadic)	dobØ-go	dobe	dobu-n-go	'called/call/called me'
Somali (Cushitic)	nirØg-o	nirig-Ø	nirig-ta	'young female camel PL./SG.INDEF./SG.DEF.'
Turkish	devØr-i	devir-Ø	devir-den	'transfer ACC./NOM./ABL.'
Slavic (e.g. Czech)	lokØt-e	loket-Ø	loket-ní	'elbow GEN./NOM./ADJ.'
Hungarian	majØm-on	majom-Ø	majom-ra	'monkey SUPERESSIVE./NOM./SUBLATIVE'

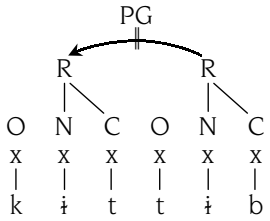
If the alternation site and the following vowel are separated by more than one consonant, as in the grey-shaded column, the expected zero surfaces as a vowel. The intervening consonant cluster is viewed as a barrier that does not allow the filled Nucleus to properly govern the empty Nucleus, which must therefore appear on the surface.[5]

However, the blocking effect of the barrier consonant cluster is a purely observational fact that does not follow from anything, see (9a). By contrast, the multiplication of empty Nuclei when assuming a CVCV structure offers an immediate answer to the question "why do intervening consonant clusters block Proper Government?", namely (9b).

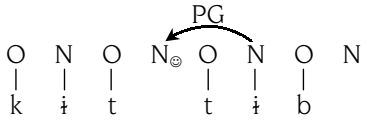
[4] See e.g. Kaye (1989; 1990), Charette (1990), Scheer (1996; 1997; 1998b) for data and analyses concerning vowel-zero alternations. References for the data given in (8) can be found in Scheer (1997, 1998a).

[5] See e.g. KLV (1990), Kaye (1990), Charette (1990), Scheer (1996; 1998a,b,d) on PG.

(9) a. N*on*-CVCV: W*hy do intervening consonant clusters block* PG?

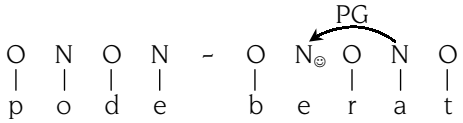


b. CVCV: why do intervening consonant clusters block PG? Because the [CC] encloses an empty Nucleus $N_{\odot}$, /$CN_{\odot}C$/, that seeks PG. PG is not blocked, it simply cannot reach the first [i̶].



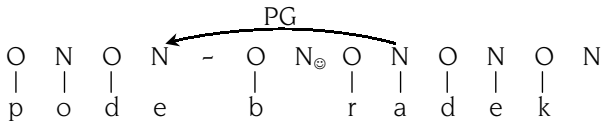
However, intervening consonant clusters do not block PG in all circumstances. In Czech prefixes, for instance, -e- alternates with zero: *pod**e**-brat* 'seize from below' vs. *pod**Ø**-bradek* 'double chin'. The alternation corresponds to a contrast in the lexical structure of the roots involved: /ber/ for [*-br-at*] where -e- is properly governable (cf. 1SG. [*-b**e**r-u*]) vs. /brad/ for [*-brad-ek*] where -a- is not properly governable (see Scheer, 1996; 1997 for a complete demonstration). In the former case, -a- properly governs the -e- of /ber/. As a consequence, the prefixal -e- fails to undergo PG. It therefore appears on the surface. (Unassociated segments are inaudible.)

(10)



By contrast, in the case of *pod**Ø**-bradek*, -a- properly governs the prefixal *-Ø-* although the consonant cluster [-br-] stands in between the governor and the governee.

(11)



So far, only two phonological operations that are able to satisfy the ECP have been identified: 1) PG and, in extension of the above definition, 2)

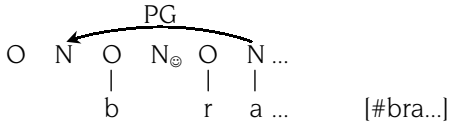
Licensing of final empty Nuclei (cf. Kaye, 1990). Assuming a CVCV structure, the empty Nucleus $N_{\odot}$ in cases such as (11) is neither final nor involved in PG (the -a- governs the prefixal -e-). Nevertheless, it does not surface. Hence, the ECP must be satisfied by another phonological operation. I propose that consonantal interaction as described above can close its domain to the effect that the ECP is satisfied:

(12) *Phonological operations satisfying the* ECP[6]
   a. Proper Government
   b. Licensing of final empty Nuclei
   c. Infrasegmental Government:
      The empty Nucleus $N_{\odot}$ of a domain /$CN_{\odot}C$/ may remain unexpressed if a relation of Infrasegmental Government holds between its surrounding consonants.

Under these provisos, PG can apply over /$bN_{\odot}r$/ (in *pod∅-bradek*) because the cluster constitutes a domain of IG. By contrast, no domain of IG can be established within the cluster /ber/ (in *pode-brat*) since the properly governable -e- prohibits consonantal communication. In this case, PG applies to the nearest available target, which is the -e- under focus. As a consequence, this prefixal Nucleus fails to undergo PG and receives phonetic interpretation.

In cases like *pod∅-bradek*, PG by -a- cannot be held responsible for the muteness of $N_{\odot}$ in /-$bN_{\odot}r$-/ because its effect can be seen on the prefix. Lowenstamm (this volume) argues that this situation in fact is general even if there is no prefix involved: the first vowel of a word governs what is generally referred to as "#". The phonological identity of the non-linguistic object "#" is an empty Onset followed by an empty Nucleus:

(13) *The beginning of the word: "#" is an empty* CV

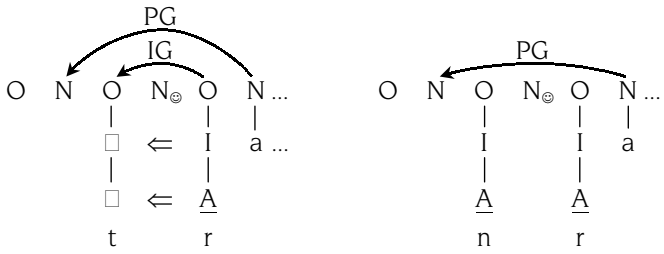


The initial Nucleus being subject to the ECP, it seeks PG from the first vowel of the word. Hence, the first vowel can never properly govern $N_{\odot}$.

[6] Other proposals such as Interonset Government and magic licensing, which are discussed in Gussmann & Kaye (1993), Cyran & Gussmann (forthcoming) and Kaye (1992), are not relevant for the purpose of this paper. See Scheer (1998b) for discussion of Interonset Government.

We have now reached the point where an answer to the question raised at the end of the previous section can be provided. There we saw that impossible word-initial clusters such as #nl, #tp are precisely the ones within which no relation of Infrasegmental Government may hold. Hence, it was tempting to establish a causal relation between both facts saying "a word-initial consonant cluster can exist only if it constitutes a domain of Infrasegmental Government". Nevertheless, there was no apparent reason why Infrasegmental Government should be a condition on possible word-initial consonant clusters. Assuming CVCV, and the phonological identity of "#" and CV, the question "why are consonant clusters within which no IG holds not possible word-initial clusters?" receives the answer "because the empty Nucleus they enclose is subject to the ECP and IG the only way to satisfy it". As an example, consider the situation for possible #tr as opposed to impossible *#nr:

(14) a. #tr b. *#nr



In both cases (14a–b), the ECP concerning the initial empty Nucleus is satisfied through PG by the first vowel of the word. In contrast, only the ECP applying to the $N_{☺}$ of (14a) is satisfied: [tr] can interact and close their domain, whereas [nr] cannot. The cluster (14b) is ruled out because it contains an empty Nucleus, $N_{☺}$, that is not licensed by any of the phonological operations that may satisfy the ECP.

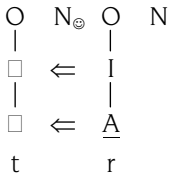
6. *Consonantal interaction*: S*yntagmatic aspect*

Up to this point, it has been argued that the set of consonant clusters that do not occur word-initially for **paradigmatic** reasons coincides with the set of consonant clusters within which no Infrasegmental Government may hold. Moreover, a causal relation between impossible IG and the non-occurrence of consonant clusters in word-initial position has been established.

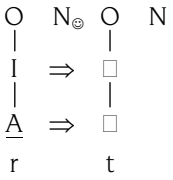
I now wish to address the syntagmatic aspect of the restrictions on word-initial clusters: why do consonant clusters of the #TR-kind occur word-

initially, but not their mirror-image *#RT? The particular identities of the consonants involved do not matter here because they are identical for the occurring as well as for the non-occurring consonant clusters. In theory, Infrasegmental Government is possible for both #TR (right-to-left) and *#RT (left-to-right):

(15) H*ead-final* IG



H*ead-initial* IG

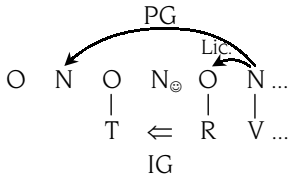


Based on independent evidence, Charette (1990) has noted that interconsonantal relations depend on the availability of a vocalic support for the head of the consonantal domain. The generalisation she arrives at is given under (16).

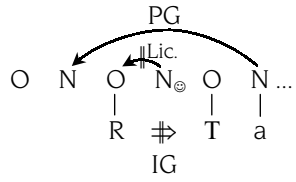
(16) *Government Licensing* (adapted from Charette, 1990)
A consonant C_1 can govern another consonant C_2 iff C_1 is licensed to do so by its Nucleus.

Government Licensing was developed within a non-CVCV frame where interconsonantal relations are expressed by means other than Infrasegmental Government and the consonantal identities differ from the ones assumed here. However, the idea expressed by Government Licensing is theory-neutral: in order for a consonantal cluster to exist, its head needs vocalic support. Let us now see, in (17), what predictions are made by Government Licensing as to word-initial clusters:

(17) a. *Well-formed structure*



b. *Ill-formed structure*



Under the assumption of Infrasegmental Government, R is always the head of the domain of consonantal interaction, and T is the dependent. According to Government Licensing, R needs to be licensed by its Nucleus in order to be able to govern T. In (17a), the Nucleus following R hosts the first vowel

of the word. This vowel can license R so that R is able to establish IG over T. In (17b), however, the Nucleus $N_{\odot}$ following R is empty in any event. Hence, it can never license R, which, in turn, is unable to govern T. Although the two members of #RT fulfil segmental requirements for an Infrasegmental Government relation, no such relation can be established for syntagmatic reasons. As a consequence, $N_{\odot}$ does not satisfy the ECP, and (17b) is ill-formed.

Charette's Government Licensing thus correctly predicts the non-occurrence of initial *#RT clusters.[7]

7. *Conclusion*

In this article, I have tried to develop a non-circular alternative to the standard way of handling the distributional restrictions on word-initial consonant clusters. At no point of the argumentation does a constraint intervene. Rather, the set of **observations** expressed by commonly used constraints such as "within a branching Onset, sonority must increase" follow from more general principles. According to the view advocated in this article, restrictions on word-initial consonant clusters follow from the interplay of the factors in (18).

(18) a. Government Licensing (Charette, 1990),
b. segmental complexity (Harris, 1990),
c. the phonological ECP (KLV, 1990),
d. CVCV and "#"=CV (Lowenstamm, 1996; this volume),
e. the consonantal identities developed in Scheer (1996; 1998c; in press).

All of these devices are assumed to be generally operative in Phonology. None of them makes special reference to the particular issue discussed, viz. word-initial consonant clusters. For this reason, the approach presented is not circular.

[7] Domains of IG are defined in the lexicon. Accordingly, in languages where consonants are lexically unrelated to syllabic constituents, IG does not occur. It is interesting to note that languages allowing for both #TR and #RT clusters are precisely representatives of Afro-Asiatic. These languages have a templatic structure, i.e. syllabic constituents and segmental information do not co-habit in the lexicon. Lowenstamm (this volume) argues for a different status of the initial CV in this kind of language. According to his analysis, the initial empty Nucleus is not always subject to PG in templatic systems. If this view is correct, then the possible occurrence of both #TR and #RT clusters in templatic languages follows: in $\#CN_{\odot}CV$, V properly governs $N_{\odot}$, not the initial CV. Consequently, the surrounding consonants are subject to no co-occurrence restrictions.

Finally, the theory of consonantal interaction presented, unlike constraint-based models, makes the prediction that a world where only word-initial clusters of decreasing sonority occur could not possibly exist.

Acknowledgements

This article is an abridged version of Scheer (in press). I am grateful to Krisztina Polgárdi, Honoré Kamany, Patricia Cabredo-Hofherr, Ferdinand Žblabuňka, Joaquim Brandão de Carvalho, John Rennison and an anonymous reviewer for valuable comments.

References

Anderson, J.M. & C.J. Ewen (1987). *Principles of Dependency Phonology.* Cambridge: Cambridge University Press.

Bendjaballah, S. (1995). Aspects apophoniques de la vocalisation du verbe berbère (kabyle) *Langues et Grammaire* II-III, *Phonologie,* edited by P. Sauzet, 5–24. Paris: Université Paris 8.

Bonvino, E. (1995). *Aspects de l'article défini en romanesco.* MA thesis, Université Paris 7.

Charette, M. (1990). Licence to govern. *Phonology Yearbook* **7**, 233–253.

Clements, G.N. (1990). The role of the sonority cycle in core syllabification. *Papers in Laboratory Phonology,* I: *Between the Grammar and Physics of Speech,* edited by J. Kingston & M. Beckman, 283–333. Cambridge: CUP.

Clements, G.N. (1993). Lieu d'articulation des consonnes et des voyelles: une théorie unifiée. L'architecture des représentations phonologiques, edited by B. Laks & A. Rialland, 101–145. Paris: CNRS Editions.

Creissels, D. (1989). Structures syllabiques du dialonké de Faléya. *Mandekan* **18**, 1–30.

Cyran, E. (1994). *Vocalic Elements in Phonology: A study in Munster Irish.* Doctoral dissertation, University of Lublin.

Cyran, E. & E. Gussmann (forthcoming). Consonant clusters and governing relations: Polish initial consonant sequences. *The syllable: views and facts,* edited by H. van der Hulst & N. Ritter. Berlin, New York: de Gruyter.

Guerssel, M. & J. Lowenstamm (in prep.). *The derivational morphology of the Classical Arabic Verb.* Ms., Université Paris 7 & UQAM.

Gussmann, E. & J. Kaye (1993). Polish Notes from a Dubrovnik Café. *SOAS Working Papers in Linguistics and Phonetics* **3**, 427–462.

Harris, J. (1990). Segmental complexity and phonological government. *Phonology Yearbook* **7**, 255–300.

Harris, J. (1994). *English sound structure.* Oxford: Blackwell.

Harris, J. & G. Lindsey (1995). The elements of phonological representation. *Frontiers of Phonology,* edited by J. Durand & F. Katamba, 34–79. London: Longman.

Heo, Y. (1994). *Empty categories and Korean Phonology.* Doctoral dissertation, SOAS, London.

Hérault, G. (1989). Les rections syllabiques en soninké. *Linguistique Africaine* **3**, 43–90.

Kahn, D. (1976). *Syllable based generalizations in English Phonology.* Doctoral dissertation, MIT.

Kaye, J. (1989). Government in Phonology: The case of Moroccan Arabic. *The Linguistic Review* **6**, 131–159.

Kaye, J. (1990). 'Coda' licensing. *Phonology Yearbook* **7**, 301–330.

Kaye, J. (1992). Do you believe in magic? The story of s+C sequences. SOAS *Working Papers in Linguistics and Phonetics* **2**, 293–313.
Kaye, J., J. Lowenstamm & J-R. Vergnaud (1985). The internal structure of phonological representations: A theory of Charm and Government. *Phonology Yearbook* **2**, 305–328.
Kaye, J., J. Lowenstamm & J-R. Vergnaud (1990). Constituent structure and government in phonology. *Phonology Yearbook* **7**, 193–231.
Larsen, B.U. (1994). *Some aspects of vowel length and stød in modern Danish.* MA thesis, Université Paris 7.
Larsen, B.U. (1995). Italian vowel length, Raddoppiamento Sintattico and the selection of the definite article in modern Italian. *Langues et Grammaire* II-III, *Phonologie*, edited by P. Sauzet, 87–102. Paris: Université Paris 8.
Lowenstamm, J. (1981). On the maximal cluster approach to syllable structure. *Linguistic Inquiry* **12**, 575-604.
Lowenstamm, J. (1988). Another look at Ngizim syllable structure. Talk given at the 19èmeconférence de linguistique africaniste, Boston University, April 1988.
Lowenstamm, J. (1996). CV as the only syllable type: Full interpretability in phonology. *Current trends in Phonology: Models and Methods*, edited by J. Durand & B. Laks, 419–441. Salford: ESRI.
Nikiema, E. (1989). Gouvernement Propre et licenciement en phonologie: le cas du Tangale. *Langues Orientales Anciennes, Philologie et Linguistique* **2**, 225–251.
Rennison, J.R. (this volume). Can there be empty phonological elements? On empty heads and empty operators.
Sagey, E. (1986). *The representation of features and relations in non-linear phonology* PhD dissertation, MIT.
Schane, S.S. (1984). The fundamentals of Particle Phonology. *Phonology Yearbook* **1**, 129–155.
Scheer, T. (1996). *Une théorie de l'interaction directe entre consonnes.* Doctoral dissertation, Université Paris 7.
Scheer, T. (1997). Vowel-zero alternations and their support for a theory of consonantal interaction. *Certamen Phonologicum* III, edited by P.M. Bertinetto, L. Gaeta, G. Jetchev & D. Michaels, 67-88. Torino: Rosenberg & Sellier.
Scheer, T. (1998a). A unified model of Proper Government. *The Linguistic Review* **15.1**, 41-67.
Scheer, T. (1998b). Governing domains are head-final. *Structure and Interpretation. Studies in Phonology*, edited by E. Cyran, 261-285. Lublin: Folium.
Scheer, T. (1998c). La structure interne des consonnes. *Langues et Grammaire* II-III, *Phonologie*, edited by P. Sauzet, 140–172. Paris: Université Paris 8.
Scheer, T. (in press). A theory of consonantal interaction. *Folia Linguistica.*
Ségéral, P. (1995). *Une théorie généralisée de l'apophonie.* Doctoral dissertation, Université Paris 7.
Ségéral, P. & T. Scheer (in press). A generalized theory of Ablaut: The case of Modern German Strong Verbs. *Models of Inflection*, edited by A. Ortmann, R. Fabri & T. Parodi. Tübingen: Niemeyer.
Selkirk, E. (1984). On the major class features and syllable theory. *Language Sound Structure*, edited by M. Aronoff & R.T. Oehrle, 107–136. Cambridge, Mass.: MIT Press.
van de Weijer, J.M. (1994). *Segmental structure and complex segments.* Doctoral dissertation, Rijksuniversiteit te Leiden.