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*Connected speech phenomena in Strict CV phonology**

0 Introduction

The fact that the left edge of (phonological) words is a strong position counts as a phonological commonplace. This basically means that the beginning of the word favours fortition processes and disfavours lenition both synchronically and diachronically. Theories have usually attempted to account for this with reference to the word boundary (#) or to foot-initial position. As an alternative, most practitioners of Strict CV Phonology (started by Lowenstamm 1996), which, being a subbranch of Government Phonology, describes fortition and lenition phenomena as the result of the interaction of government and licensing relations (cf. Ségéral & Scheer 1999/2001), assume that each word of a major category begins with a melodically empty CV unit on the skeletal tier, marking the word boundary (after Lowenstamm 1999). One of the functions of the boundary-marker in a word starting with a single consonant followed by a vowel is to absorb the reductive force of government emanating from the first vowel of the word, thus the empty vowel in the boundary-marker will be prevented from being pronounced, and the word-initial consonant will not be negatively affected, i.e., it will not lenite.

So far, the study of this boundary-marker has concentrated on the behaviour of consonant-initial words, therefore this paper has two main aims. On the one hand, it investigates whether or not vowel-initial words also possess a boundary-marker; on the other hand, it looks into what happens to the boundary-marker post-lexically, i.e., in connected speech.

1 Strict CV phonology and the empty cv unit

Strict CV Phonology or CVCV Phonology (henceforth CV phonology) is a radical subbranch of Government Phonology (GP; cf. Kaye et al. 1985, 1990; Kaye 1990; Charette 1991; Harris 1994, among others). It accepts certain basic tenets of GP, including the claim that phonotactic and procedural facts are (largely) due to asymmetrical relationships like government and licensing contracted by phonological units. However, CV phonology (Lowenstamm 1996; Balogné 1997; Ségéral & Scheer 1999/2001; Szigetvári 2000, etc.) represents pioneering work representation-wise; it hypothesises that prosodic structure is universally composed of strictly alternating CV units, and clusters of adjacent consonants or vowels arise when a language licenses domain-internal empty skeletal positions via (proper) govern-

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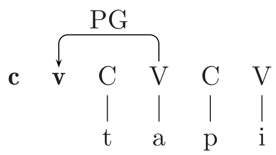
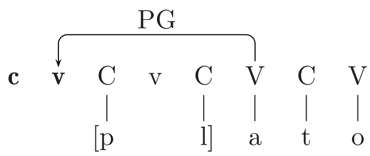
ment (PG) (familiar from GP). Domain-finally, the empty nucleus is parametrically licensed in languages which allow for consonant-final words (cf. Kaye 1990).

A further innovation introduced by Lowenstamm (1999) and under close scrutiny in the present paper is the empty CV unit posited to the left edge of each major category, marking the beginning of the word and serving as the phonological embodiment of traditional # (henceforth the boundary-marker). As argued in Lowenstamm (1999) and Ségéral & Scheer (1999/2001), this boundary-marker can be used to explain certain phonotactic and lenition facts characteristic of the left edge. This is illustrated in (1): the Proper Government (PG) emanating from non-empty V positions[1] licenses/silences the empty vocalic position of the boundary-marker of words starting with a single pronounced consonant (1a) or a cluster which forms a closed domain (indicated by bracketing) (cf. Scheer 1996) (1b), as opposed to words starting with consonants unable to enter into this special relationship (1c), where the empty v straddled by the consonants consumes the PG coming from the first pronounced V, becomes unable to govern, and thus the boundary-marker is left unlicensed (the impossibility of contracting PG between the two empty v's is shown by the crossed arrow).

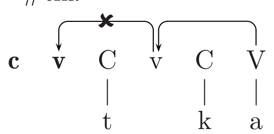
(1) a. French *tapis* [tapi] 'rug'



b. French *plateau* [plato] 'tray'



c. *#tka



If government is generally considered as a destructive force silencing vowels and causing the lenition of consonants (as suggested in the Coda Mirror and further elaborated on in Dienes & Szigetvári 1999; Szigetvári 1999), the configurations in (1), especially (1a), also account for the fact that the beginning of the word systematically resists lenition: the v position of the boundary-marker distracts this reductive force and the word-initial C escapes weakening.

According to the workings of the boundary-marker, two basic language types are predicted. On the one hand, modern occidental Afro-Asiatic (Algerian, Tunesian, Moroccan Arabic, Berber), Slavic and Greek have been shown to allow for any combination of consonants as well as lenition word-initially (see, e.g., Scheer 2001 for Slavic, and Seigneur-Froli 2004 for Greek). Such languages will henceforth be referred to as "permissive" (Scheer 2001 uses the name "anything-goes" languages, which is even more expressive). Other languages like French or English, however,

[1] Lower-case c's and v's symbolise empty positions while capital letters indicate non-empty positions, and the boundary-marker is given in bold.

display a strong preference for rising sonority clusters word-initially (abbreviated by some to #TR), as illustrated in (1), and no lenition is expected at that location. We can call these languages “strict” (Scheer’s “#TR-only” languages).

The proper way to distinguish these two language types is one of the main concerns of the present paper. So far, two options have been pursued in the literature. Lowenstamm (1999) represents the original stance claiming that the boundary-marker is *always* licensed (i.e., it always requires PG) in “strict” languages like French (that is why certain clusters such as the one in (1c) are prohibited word-initially) whereas it is *not always* licensed in “permissive” languages like Biblical Hebrew (depending on the cluster in question) (2). Accordingly, the initial cv is licensed in (2a), but it is not in (2b).

(2) Biblical Hebrew (data from Lowenstamm 1999 : 159f)

a. [klaβim] ‘dogs’

PG

c v C v C V C V C v

[k l] a β i m

b. [lxaðim] ‘captures (n)’

PG

c v C v C V C V C v

l x a ð i m

In contrast, according to Scheer (2001), the distinction lies in the presence vs. absence of the boundary-marker: in “strict” languages it is present and needs licensing while in “permissive” languages it is absent. The difference between Lowenstamm’s and Scheer’s conceptions of the boundary-marker is apparent in how they analyse word-initial clusters in “permissive” languages. For Scheer, they never form a closed domain. Consequently, the straddled empty v always requires government, which would never reach the boundary-marker should it be there. If we try to adapt Lowenstamm’s Hebrew examples to Scheer’s model, the representations in (3) ensue.

(3) a.

PG

C v C V C V C v

k l a β i m

b.

PG

C v C V C V C v

l x a ð i m

Scheer argues on theoretical grounds: morphological information in phonology should be privative — linguistic objects are either present or absent, and accordingly, the beginning of the word is either projected into phonology or it is not. Clearly, this is a theoretical question, closely connected to our understanding of the nature of grammar.

2 Prosodic domains

It is well-known that all phonological rules apply within certain substrings of the phonological utterance (including the utterance itself) called the domain of the rule.

As the theory of domains, Prosodic Phonology (PP—Nespor & Vogel 1986) claims, there exists a hierarchy of prosodic constituents which serves as the inventory from which the rules choose their domains of application, including, besides a few debated cases, the syllable, the foot, the phonological word, the phonological phrase, the intonational phrase and the utterance. The most convincing piece of evidence for the inevitability of PP comes from cases when the application of a given phonological rule depends on nonphonological (mainly syntactic) information: under the same segmental conditions, for example, French liaison applies in phrases of a certain type (as in (4a), where the final /t/ of *savant* is pronounced)) but fails to do so in phrases of a different type (as in (4b), where the /t/ is not pronounced).

(4) a. un $[\text{savant}]_{\text{A}}$ $[\text{anglais}]_{\text{N}}$ 'a learned Englishman': liaison
b. un $[\text{savant}]_{\text{N}}$ $[\text{anglais}]_{\text{A}}$ 'an English scientist': final consonant deletion

It is also evident that rules select their domains of application arbitrarily. Rules with similar structural descriptions and changes may apply within different domains, as is the case of final consonant liaison in French (within the phonological phrase) as opposed to r-liaison in English (within the utterance). Even the same phonological rule may choose different domains in the dialects of the same language: in English, l-darkening applies within the utterance in RP whereas it applies within the word in several American dialects.

In CV phonology, the left word boundary is marked by the empty CV unit. If it is the boundary-marker that makes the beginning of the word a strong phonological position, it means it blocks the application of lenition rules (where 'rule' of course means something like the interplay of forces like government and licensing). It follows, then, that this empty skeletal unit can be conceived of as a general boundary-marker which circumscribes a given rule's domain of application, at least in the case of segmental alternations,[2] and rules taking constituents larger than the foot as their domain.

3 How does the boundary-marker work?

Connected speech has not been given much attention in CV phonology. Tobias Scheer (2001 and p.c.) has suggested that the boundary-marker is not present in the lexicon but is inserted by the morpho-syntax. The insertion is governed by a simple parameter: in certain languages it applies on the edge of the utterance only, and at all word boundaries in others. This predicts, on the one hand, that phonological rules can apply within the utterance or the word only. On the other hand, it predicts that within a language, either all the rules are bound by the utterance or all of them are bound by the word.

[2] Suprasegmental features such as stress or tone are not analysed in this paper.

Recall the findings of PP and notice that the picture is not as simple as this: constituents between the word and the utterance may also be designated as domains. In addition, in the same utterance boundaries of the same type may block the application of one rule but let go another. Thus we are forced to hypothesise, contrary to Scheer, that the boundary-marker is part of the representation throughout its career, its fate being determined post-syntactically only: certain phonological rules will arbitrarily decide to ignore it and treat it as a kind of extraprosodic skeletal material. The boundary-markers not ignored by a given rule will delimit its domain by blocking its application. Besides accounting for a wider set of empirical observations, this no-insertion analysis represents a mechanism with less brute force.

The chart in (5) compares the insertion (5a) and the extraprosodicity (5b) analyses of two connected speech phenomena in an American English dialect (described in, e.g., Nespor & Vogel 1986). In this dialect, all word-final /l/'s are dark irrespective of the following segment, which means that the domain of application of /l/-allophony is the word, and the boundary-marker of the following word blocks it. The rule of /t/-allophony, on the other hand, appears to operate in a different fashion. Word-final /t/'s, although glottalised in isolation and preconsonantally, change to a flap when followed by a vowel-initial word (up to the end of the utterance). (For a more detailed description of the analysis, see Balogné 2001.)

(5)

	American English /l/-darkening	American English /t/-flapping
	call = *call Anita* blocking effect of boundary-marker	*hit* vs. *hit Anita* no blocking effect (or different—see §**4.2**)
a. insertion:	boundary-marker inserted	not inserted
b. "extra-prosodicity":	it is present and has a blocking effect	it is present but flapping ignores it

In Scheer's framework (5a), the boundary-marker is expected to be projected to phonology in a phrase like *call Anita*, since its blocking effect is observed, as opposed to a phrase like *hit Anita*, where the status of the word-final consonant appears to have changed due to a following vowel, so the boundary-marker is not assumed to be active. Therefore, Scheer predicts that in identical syntactic positions, the boundary-marker may be present or absent depending on the quality of the final segment of the first word, which is not completely compatible with the basic principles of GP.

In contrast, in the "extraprosodicity" approach (5b), the boundary-marker is analysed as present and active in *call Anita* (since the domain of /l/-darkening is the word so no occurrences of the empty cv can be ignored by it), but it is analysed as present but inactive (invisible, "extraprosodic") in *hit Anita*, the domain of application of /t/-flapping being the utterance, thus all boundary-markers but utterance-initial ones will go unnoticed.

4 A typology of the effects of the extraprosodic boundary-marker

4.1 Consonant-initial words

In the table in (6), the four possible combinations of words followed by a consonant-initial word are sketched out, showing the patterning of empty and nonempty positions on the CV-tier in each case, assuming that the segment occupying the underlined position is affected by some phonological rule ignoring the boundary-marker. At the bottom, for ease of comparison, the corresponding word-internal structures are given.

(6) Consonant-initial words

a. $\underline{\mathrm{V}}$#C	b. V#$\underline{\mathrm{C}}$	c. $\underline{\mathrm{C}}$#C	d. C#$\underline{\mathrm{C}}$
… C$\underline{\mathrm{V}}$ ⟨cv⟩CV …	… CV ⟨cv⟩$\underline{\mathrm{C}}$V …	… $\underline{\mathrm{C}}$v ⟨cv⟩$\underline{\mathrm{C}}$V …	… Cv ⟨cv⟩$\underline{\mathrm{C}}$V …
…CVCV…		…CvCV…	

The fact that CV phonology predicts all these situations to be identical is borne out by the data. For example, (6b), an intervocalic consonant affected by the phonology in the same way in both cross-word word-initial and word-internal positions is illustrated by Italian intervocalic spirantisation (Nespor & Vogel 1986: 209), whereby all the underlined /ʧ/'s (spelt ⟨c⟩) in the following example sentence turn into /ʃ/, irrespective of whether at the beginning or in the middle of a word: *Il mio criceto cerca il suo cibo negli angoli della gabbia* 'My hamster looks for its food in the corners of the cage'.[3]

Hungarian regressive voicing assimilation exemplifies the configuration in (6c): it exists as a static phonotactic constraint (*/zk/ morpheme-internally), and it applies across morpheme (*tízkor* 'at ten' with /sk/) as well as word boundaries (*tíz kör* 'ten circles' with /sk/).

In sum, in all the situations in (6), it is correctly predicted that the cross-linguistic tendency is for the extraprosodicity of the boundary-marker to create the same picture as there is word-internally.

In addition, however, a parameter reveals itself. In certain languages, e.g., English, the word-initial consonant (of lexical words) will always be in a strong phonological position (i.e., licensed but ungoverned), as opposed to other languages, e.g., Italian (cf. the rule of intervocalic spirantisation, described above), with word-initial consonants changing shape post-lexically, which suggests that in languages of the English type the boundary-marker resists extraprosodicity in the case of consonant-initial words—an observation whose true nature is still unclear, but obviously this distinction is independent of the strict/permissive dichotomy mentioned above, both English and Italian belonging to the strict type.

[3] The voiced affricate /ʤ/ undergoes spirantisation in the same way (and becomes /ʒ/).

4.2 Vowel-initial words

Consider the table in (7), the vowel-initial equivalent of (6). (7a) and (b) show the two subtypes of cross-word hiatus: it is clear that again, CV phonology predicts total identity, which is supported by plenty of data, at least for (7a); in cases of hiatus resolution via vowel deletion, for example, it has been shown that there is a general tendency for deleting the first vowel in all morphosyntactic environments (Casali 1997).

(7) Vowel-initial words

a. $\underline{\text{V}}$#V	b. V#$\underline{\text{V}}$	c. $\underline{\text{C}}$#V	d. C#$\underline{\text{V}}$
... C$\underline{\text{V}}$ ⟨cv⟩cV ...	... CV ⟨cv⟩$\underline{\text{cV}}$ ...	... $\underline{\text{C}}$v ⟨cv⟩cV ...	... Cv ⟨cv⟩c$\underline{\text{V}}$ ...
...CVcV...		...CV...	

In (7c) and (d), however, even if the boundary-marker is extraprosodic, there remain some empty skeletal material between the full positions, and as a result, the cross-word configuration is not identical to the simple word-medial CV string. Unfortunately, I have only come across few examples of vowels undergoing a process as in (7d), one of them being vowel centralisation in Nawuri and related languages (Casali 1997 : 502). Here high vowels become central in interconsonantal position, in both "closed" and "open" syllables (in Strict CV Phonology, CVCv and CVCV, respectively, which suggests that the trigger is the two nonempty consonants sandwiching the vowel). What is of interest here is what happens to vowels at word edges. As Casali reports (unfortunately, without any examples), word-final vowels in the CV#C environment may be affected by the change in the same way as word-medial vowels (as predicted in (6a)) as opposed to word-initial vowels, i.e., C#VC, which never get centralised. This difference between (6a) and (7d) is quite unexpected in any framework except CV (and Classical Government) Phonology. In fact, Casali uses the Nawuri example to argue for an asymmetry existing between word-initial and noninitial positions—an observation which naturally follows from strict CV representations.

If we turn our attention to (7c), we discover a number of cases illustrating it, a close inspection of which leads to a three-way classification. *First*, the underlined C in (7c) may resyllabify completely into a licensed position and behave as any other "onset". Recall that this is the situation which is straight against CV Phonology's predictions, which turns out to be a strength rather than a weakness of the theory since, as argued in Kenstowicz (1994 : 281), there are very few examples of this kind; in fact, phonological resyllabification counts rather as an exception. One example described by Kenstowicz comes from Spanish: a "coda" /r/ is trilled in emphatic speech in both word-internal and word-final position (in CV phonological terms, when followed by an empty v, which cannot license it), may be trilled when followed by a consonant-initial word, but cannot be trilled before a vowel-initial one. What is particularly intriguing here is that all those many other phonological rules of Spanish affecting "coda" consonants (e.g., s-aspiration or n-velarisation) apply differently, so this pattern seems to be the odd one out even within the system of Spanish.

Another example is /l/-darkening in certain dialects of English, e.g., RP, whereby "coda" /l/'s become velarised, as in (8a–b), with the exception of word-final /l/'s followed by a vowel-initial word (or suffix), which are pronounced as "clear" as their word-internal onset peers (8c).

(8) Clear and dark /l/'s in RP

a. clear /l/'s: leap, sleep, fellow, mylord

b. dark /l/'s: spell, spelt, shelter

c. clear /l/'s: spell it, call Ann, spelling

It will be argued below that no convincing evidence has been found that these consonants do in fact resyllabify completely rather than taking an intermediate position (traditionally referred to as ambisyllabicity).

The *second* strategy that a word-final C may follow is remain a phonological coda, e.g., l-darkening in certain American English dialects exemplified in (5). In these cases we claim that the word-boundary represented by the boundary-marker functions as a blockage for these rules, the (prosodic) word being the domain of rule application—an arbitrary feature of the rules themselves.

Thirdly, the C may behave as neither an onset nor a coda but take a third form: it is "ambisyllabic". English readily illustrates this pattern, containing at least two rules where the cross-word realisation of a consonant differs from both the coda and the word-medial onset. One is the distribution of Standard American /t/-allophones, whose well-documented characteristics are the following (cf. Balogné 2001). Within words, an onset /t/ is flapped if followed by an unstressed vowel, but aspirated if followed by a stressed one ((9a), also in (5)). Word-final /t/'s are (pre-)glottalised pre-pausally and pre-consonantally (9b), but flapped if the next word starts with a vowel, irrespective of whether or not that vowel is stressed (9c). The point is that the cross-word allophone in C#V is different from the word-medial one (in being stress-insensitive), correctly predicted by CV phonology (for an analysis, see Balogné 2001).

(9) General American /t/-allophones

a. á[ɾ]om, a[$\mathrm{t^h}$]ómic

b. hi[^{ʔ}t] me

c. hi[ɾ] Ánn, hi[ɾ] Aníta

Exactly the same happens in (conservative) RP /r/-allophony. /r/ undergoes tapping/flapping, with an output identical to that of /t/-flapping, intervocalically, whenever followed by an unstressed vowel word-internally (compare (10a) and (b)), or any vowel across words (10c).

(10) RP /r/-allophony

a. [ɾ]: courage, very, sorry, baron, laurel

b. [r]: courageous, reduce, red, bright, Henry, walrus

c. [ɾ]: for example, for instance, the other end

These examples illustrate the fact that the situation C#V is special and calls for a theoretical equivalent of cross-word ambisyllabicity. For a possible analysis in Strict CV Phonology, see Balogné (2001), further elaborated on in Balogné (2002). The question is whether the "resyllabifying" rules described above (RP /l/-darkening (8), Spanish trilled /r/) are essentially any different. It may simply be the case that, quite unexpectedly and exceptionally, there is no phonetic difference between the realisations of these consonants in the onset and the ambisyllabic positions, and that is why the superficial impression is that they have become onsets.

5 Further issues

In sum, the boundary-marker is assumed to be present to the left of each (lexical) category, at least in so-called "strict" languages, and the phonological rules spelling out the realisation of sound segments contain information about which prosodic constituents serve as their domains of application. Formulating the syntax–phonology mapping algorithm, i.e., the formation of the constituents of the prosodic hierarchy, is beyond the scope of the present paper, so we simply accept the PP view (e.g., that of Nespor & Vogel 1986).

Neither is the issue of so-called "permissive" languages addressed in this paper. Considering cross-word phenomena, it must be remarked that even in 'permissive' languages there are rules bounded by the prosodic constituents, e.g., Nespor & Vogel (1986 : 213) analyses Greek *s*-voicing as applying within the intonational phrase. This leads us to accept that the boundary-marker is always present, as Lowenstamm says, even in permissive languages, and whether it is considered or ignored during the phonological computation is at the rules' discretion. A closer inspection of the predictions of this analysis of permissive languages is beyond the scope of the present paper.

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