

Vowel-zero alternation in Hungarian nominal stems: a strict CV analysis*

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0. Introduction

This paper examines vowel-zero alternation in Hungarian nominal stems. My aim is to demonstrate that Hungarian is best analysed as a strict CV language and that the data can be handled without recourse to left-to-right coda licensing and right-to-left onset licensing. These structural relations are introduced by Rebrus (2000), the latter also appearing in Dienes & Szigetvári (1999) and Szigetvári (1999). The majority of the data are taken from Rebrus (2000). For a recent non-CV analysis of vowel-zero alternation in Hungarian cf. Siptár & Törkenczy (2000).

Section 1 presents the background while in section 2 we will turn to stem-internal vowel-zero alternation, the subject of this paper. In 2.1 we examine the properties of nominal stems exhibiting vowel-zero alternation along the lines of Rebrus (2000). Section 2.2 introduces the analysis of Rebrus (2000), while in 2.3 the representation of epenthetic stems is discussed. Section 2.4 is devoted to the licensing relations involved in the process. The difference between analytic and synthetic suffixation is examined in 2.5. Section 3 concludes the paper summing the analysis.

1. Background assumptions

Hungarian has an intricate system of vowel-zero alternation. Following Siptár & Törkenczy (2000) we will refer to any vowel that alternates with zero as 'unstable'¹ but contrary to Siptár & Törkenczy (2000) we will indicate it with a lower-case *v*². The unstable vowel may occur inside the stem or between the stem and the suffix, (Nádasdy & Siptár 1994, Siptár & Törkenczy 2000:214). The focus of this paper is on the former case, i.e., when vowel-zero alternation occurs inside the stem and we will refer to it as stem-internal vowel-zero alternation (Siptár & Törkenczy 2000) or syncope (Rebrus 2000). This type of alternation is restricted to an unproductive, closed class of stems and is referred to by Vago (1980) as epenthetic stems. Rebrus (2000:804) notes that the phenomenon of stem-internal vowel-zero alternation affects more than a hundred Hungarian nominal and verbal stems. Very broadly, the unstable vowel of the stem is phonetically realized if the stem occurs in isolation, or is followed by a consonant-initial suffix, but remains phonetically null if followed by a

* The research reported here was supported by the Hungarian State Eötvös Fellowship. I would like to thank Monik Charette for her help and hospitality. I am also grateful to Katalin Balogné Bérces for reading a draft version of this paper and making useful comments. Note that the examples are given in standard Hungarian orthography: spelling conventions are as follows: acute accents indicate that the given vowel is long. Furthermore, *ny*=[c], *gy*=[j], *ny*=[ɲ], *ly*=*j*=[j], *sz*=[s], *s*=[ʃ], *zs*=[ʒ], *cs*=[tʃ], *c*=[ts].

¹ The term 'unstable' is meant to be neutral with respect to whether the behaviour of this vowel is considered to be the result of epenthesis or deletion. This aspect of the process will be discussed in section 2.1.

² The convention of indicating empty consonantal and vocalic positions by lower-case letters, in fact, goes back to Dienes & Szigetvári (1999), Szigetvári (1999), Dienes (2000). This notation has been adopted by Csides (2000). Notice that non-epenthetic empty (dead/buried) vocalic and consonantal positions are also indicated by lower-case letters.

vowel-initial suffix.³ The stems exhibiting stem-internal vowel-zero alternation will be referred to as 'epenthetic stems'⁴

Polgárdi (to appear) uses two main arguments to support the claim that Hungarian is a strict CV language. First, there are hardly any phonotactic constraints on the adjacent members of word-internal consonant clusters.⁵ This means that if a sequence of consonants is permitted as a word-internal cluster in Hungarian then its reverse is also possible word-internally: for the details with exemplification cf. Törkenczy (1994:361), Polgárdi (2000:230). In Government Phonology (GP) the lack of phonotactic dependencies on adjacent consonants has been used as an argument that they are, in fact, separated by an inaudible nucleus (KLV 1990, Charette 1991, Harris 1990, 1992, 1994, 1997).⁶

Second, long vowels in Hungarian are prohibited from preceding consonant clusters regardless of which consonants constitute these clusters.⁷ This immediately renders all 'closed syllable shortening' analyses hopeless. This can also be viewed as an argument that all consonant clusters are separated by an empty vocalic position. For arguments against complex constituents in Hungarian cf. Törkenczy & Siptár (1999) and Polgárdi (2000, to appear). Polgárdi (2000:232) argues that the lack of long vowels before consonant clusters can be accounted for in the manner of Lowenstamm (1996) as follows: since in a CV framework all consonant clusters enclose an empty vocalic position, the lack of long vowels before consonant clusters boils down to 'a lack of long vowels before an empty vocalic position'. This, so the argument goes, is due to the fact that the second vocalic position of long vowels is filled in by spreading and spreading can only target a licensed position.

(1) Ill-formed spreading of vocalic material, Polgárdi (2000:232)⁸



³ We will see that this is a crude generalization since there are vowel-initial suffixes that do not condition vowel-zero alternation.

⁴ This is Vago's (1980) term but we shall actually argue against an epenthetic view. Recent analyses have shown that neither epenthesis nor deletion is a satisfactory solution to this problem, cf. Törkenczy (1992), Siptár & Törkenczy (2000) and Polgárdi (2000).

⁵ The constraints holding between the members of clusters are mostly negative. One of these is a ban on homorganic consonants (with the exception of alveolars and partial geminates). The other prohibits clusters to which obligatory assimilation rules can apply.

⁶ KLV (1990) propose that if in a given language there are no phonotactic dependencies between consonants then all clusters of that language should be analysed as bogus.

⁷ Two of the long vowels, *á* and *é*, display a special behaviour because they occur before consonant clusters. These vowels, however, differ from the other long vowels of the system in that they take part in alternations that the other long vowels do not, e.g., Low Vowel Lengthening, (Nádasdy & Siptár 1994, Siptár & Törkenczy 2000). Polgárdi (to appear) argues that all these peculiarities of long vowels stem from their representation and she chooses to represent them as a sequence of two short vowels. Notice that this restriction is only true of monomorphemic items, i.e., stem-final long vowels do not shorten before suffixes that begin with a consonant cluster even if this suffix is synthetic, i.e., forms a single phonological domain with the stem, (Kaye 1995), e.g., *hajó-hajónként* 'ship' (nom-distr.) *cső-csőstal* 'pipe' (nom-assoc.). This generalization thus holds only in the very basic layers of the lexicon. Furthermore, besides *á* and *é* there are a handful of counterexamples all containing a long *ó*.

⁸ For a similar analysis in Italian cf. Larsen (1995).

Since spreading of the vocalic material in (1) could only be licensed by proper government and since empty vocalic positions are unable to properly govern, long vowels before consonant clusters are ill-formed.

Notice, however, that the above analysis is not entirely satisfactory in that it is quite at odds with the generally recognized function of proper government. It would be very surprising to see that proper government can play two entirely different, rather antagonistic roles. Proper government has been viewed as a force that keeps an empty vocalic position silent, i.e., what Dienes & Szigetvári (1999) call the destruction of the of why should successful proper government (if it were available) legalize the interpretation of some vocalic melody in the second vocalic position of a long vowel. This would amount to saying that proper government, this time (rather exceptionally), is responsible for the realization of an empty vocalic position and not for its absence.

Moreover, this analysis predicts that long vowels can only occur when followed by a single consonant plus a pronounced vowel: unfortunately this prediction is not borne out. It remains then unclear why could spreading of vocalic material take place only under proper government word-internally while such a structural relation is not required when the long vowel is followed by a consonant plus the word-final empty vocalic position, cf. *nyúk* 'hen', for example.

Furthermore, Polgárdi (2000) argues that in a CV analysis vowel-zero alternation cannot be represented in the usual GP way of interpreting an unlicensed empty vocalic position. This is so because word-final stable consonant clusters, as e.g., in *park* 'id.' cannot be distinguished from items containing an alternating vowel flanked by the same consonants, e.g., *torok* 'throat' since both will end in a CvCv sequence.⁹

2. Stem-internal vowel-zero alternation

2.1. The properties of nominal stems

The phenomenon of stem-internal vowel-zero alternation affects more than a hundred noun and verb stems besides forms suffixed with the derivational suffixes *-alom*, *-elem*, *-adalom*, *-edelem*,¹⁰ which also yield epenthetic stems like *fogadalom* ~ *fogadalmak* 'pledge' (sing.-pl.) *riadalom* ~ *riadalmat*, 'fright' (nom.-acc.) *irodalom* ~ *irodalmat*, 'literature' (nom.-acc.) *forradalom* ~ *forradalmár* 'revolution' ~ 'revolutionary' etc., (Polgárdi 2000:233, Rebrus 2000:804). The most important aspect of the process is that the last vowel of the stem remains uninterpreted before vowel-initial synthetic suffixes, e.g. *tükrös* 'mirror' (denom. adjective forming)

⁹ The two types can naturally be distinguished by postulating some sort of a structural relationship in what is usually referred to as a real cluster. For example, Dienes & Szigetvári (1999), Szigetvári (1999), Dienes (2000), Rebrus (2000), Csides (2000) postulate a CV version of interconstituent government to 'bury' the empty vocalic position inside a real cluster. This relationship is termed C-to-C government or coda government and implements the notion of coda-onset government into a CV framework. But even if such a relationship is recognized, it is hard to see why C-to-C government is manifest in *park* burying (creating a non-alternating, silent) the internal empty vocalic position, while in *torok* 'throat' the same consonants do not enter into such a relationship leaving the internal empty vocalic position alternating which thus requires proper government to be silenced. Obviously, it is a lexical property of stems whether they are epenthetic or not, thus, we can postulate that *torok* 'throat' will contain a lexically marked alternating empty vocalic position. Alternatively, we may assume that it is the presence versus absence of C-to-C government that is defined lexically.

¹⁰ These are derivational suffixes forming abstract nouns from verbs.

tükröm 'mirror' (1sg. poss.), *tükröd* 'mirror' (2sg. poss.), while it surfaces before other suffixes, e.g., *tükröben* 'mirror' (inessive), *tükrőig* 'mirror' (terminative), *tükröként* 'mirror' (essive) or when unsuffixed *tükrö*. Further examples involving noun stems are given in (2), taken from Polgárdi (2000:233). The first item in each case shows nominative singular while the second item illustrates nominative plural.

(2)

	liquid ending	nasal ending	obstruent ending
o	<i>bagoly-baglyok</i> 'owl'	<i>torony-tornyok</i> 'tower'	<i>kapocs-kapcsok</i> 'staple'
ö	<i>ököl-öklök</i> 'fist'	<i>köröm-körnök</i> 'fingernail'	<i>tücsök-tücsökök</i> 'cricket'
e	<i>eper-eprek</i> 'strawberry'	<i>selyem-selyemek</i> 'silk'	<i>nyereg-nyergek</i> 'saddle'

The question now is whether this process is best analysed as deletion or epenthesis. As Polgárdi (2000:233) points out the traditional name 'syncopating stem' suggests that we are faced with a deletion process. Recent analyses, however, tend to argue for epenthesis rather than deletion on the following grounds. As can be seen in (2) the unstable vowel is generally a mid vowel; however, not all stems ending in a mid vowel display alternation before those suffixes that condition vowel-zero alternation in epenthetic stems. This is illustrated in (3).

(3) Stems ending in a stable mid vowel

Singular	plural
<i>motor</i> 'engine'	<i>motorok</i> 'id'
<i>török</i> 'Turkish'	<i>törökök</i> 'id'
<i>elem</i> 'battery'	<i>elemek</i> 'id'

Proponents of the epenthetic solution argue that the deletion approach is untenable since it boils down to the lexical marking of alternating stems. As a result they resort to epenthesis, which is not unproblematic either since there are a lot of consonant pairs flanking an unstable vowel that also show up as stable word-final consonant clusters. These clusters, however, are impossible to break up with an epenthetic vowel. Polgárdi (2000:234) illustrates this phenomenon with the examples in (4).

(4) Stems ending in a stable word-final consonant cluster

stable word-final clusters		epenthetic stems	
singular	Plural	singular	plural
<i>film</i> 'id.'	<i>filmek</i>	<i>malom</i> 'mill'	<i>malmok</i>
<i>palack</i> 'flask'	<i>palackok</i>	<i>pocok</i> 'vole'	<i>pockok</i>
<i>farm</i> 'id.'	<i>farmok</i>	<i>barom</i> 'brute'	<i>barmok</i>

The examples in (4) illustrate that proponents of the epenthetic solution are also forced to resort to lexical marking. This time again, they will have to mark stems requiring an epenthetic vowel when they occur in isolation or before any suffix that does not condition vowel-zero alternation.

Lexical marking can be avoided if the unstable vowel is represented in a GP-like manner, i.e., by postulating an empty vocalic position.¹¹ A further advantage of this approach is that the projection principle is not violated, i.e., no resyllabification is required. An analysis of this type is provided by Törkenczy (1992), and is illustrated in (5).

(5) (a)	C V C V C V	(b)	C V C V C V C V
	b o k r		b o k r k
	<i>bokor</i> 'bush'		<i>bokrok</i> 'bush' (pl.)

The representations in five are regulated by the phonological ECP and require no further comment.

As far as conditioning suffixes are concerned Rebrus (2000:805) notes that there is no strict connection between the morphology of the suffixes and that alternation. The data show the morphological diversity of conditioning suffixes: e.g. we find roughly an identical number of inflectional and derivational morphemes amongst conditioning suffixes. Furthermore, Rebrus (ibid.) observes the following general tendencies among inflectional morphemes.

- (6) The morphological characterization of vowel-zero alternation (2000:806)¹²
- Inflectional non-conditioning suffixes are case endings.
 - Case endings are non-conditioning suffixes.

There is, however an important phonological property of vowel-zero stems. Epenthetic stems are at least disyllabic and end in a V(V)CvC sequence, i.e., the unstable vowel cannot be preceded or followed by more than one consonant. In the suffixed forms showing alternation the unstable vowel is the last vowel of the stem and is followed by at least the stem final consonant and another vowel. This latter may be part of the suffix or may be a linking vowel. Furthermore, if the non-epenthetic vowel of the stem (i.e., the one preceding the alternating one) is long, it can only be *á* or *é*.¹³

- (7) If the last stable vowel of an epenthetic stem is long it can only be *á* or *é*.

This, however, does not mean that all the morphemes conforming to the above pattern are epenthetic stems. As we have seen the Hungarian lexicon contains a lot of morphemes conforming to the above pattern that are non-epenthetic. If, however, we consider the quality of the unstable vowel we arrive at the following conclusion.

- (8) The epenthetic vowel of the stem is [-high, -low] i.e., mid; *o*, *ö*, *e*.

¹¹ It must be noted though that this is, too, a lexical marking of some sort. The lexical mark in such an approach will be the empty vocalic position itself.

¹² These tendencies are not without exceptions; e.g., the *-é* anaphoric possessive suffix does not condition vowel-zero alternation (*bokoré*), but is an inflectional suffix which is not a case-ending. There are two case endings which condition vowel-zero alternation; the accusative and the superessive (*bokrot*, *bokron*), (Rebrus 2000).

¹³ There are two exceptions to this generalization; *sályom* 'falcon' and *álmom* 'lead' (n.). This property of epenthetic stems can be connected to the general lack of long vowels before consonant clusters, as noted above. As we have seen *á* and *é* are exceptions since they may occur before consonant clusters. Polgárdi (to appear) analyses long *á* and *é* as two consecutive short vowels to distinguish them from other long vowels that cannot occur before consonant clusters.

Notice that even the quality of the unstable vowel cannot isolate stems containing an unstable vowel from those that do not contain one, though it is interesting to note that there are only a handful of stems containing an unstable vowel which is not mid. According to Rebrus (2000:807), there are seven exceptions to this generalization amongst nominal stems. This is shown in table (9) below.

(9) Non-mid-vowelled vowel-zero alternation: exhaustive nominal list.

Vowel	Stem	Plural	Accusative	Superessive
ʉ	<i>bajusz</i> 'moustache'	<i>baj(u)szok</i>	<i>bajszot/bajuszt</i>	<i>baj(u)szon</i>
A	<i>vacak</i> 'trashy'	<i>vac(a)kok</i>	<i>vac(a)kot</i>	<i>vac(a)kon</i>
	<i>kazal</i> 'stack'	<i>kazlak</i>	<i>kazlat</i>	<i>kazon</i>
	<i>ajak</i> 'lip'	<i>ajakak</i>	<i>ajkat</i>	<i>ajakon</i>
open e ¹⁴	<i>telek</i> 'building plot'	<i>telek</i>	<i>telket</i>	<i>tel(e)ken</i>
	<i>lepel</i> 'veil'	<i>leplek</i>	<i>leplet, lepelt</i>	<i>lep(e)len</i>
	<i>kebel</i> 'breast'	<i>keblek</i>	<i>keblet</i>	<i>kebe(len)</i>

Epenthetic stems, as we have seen, cannot be identified by inspecting their last vowel even if their syllable structure is taken into account. Not all V(V)CoC ending stems are epenthetic, cf. (3) above. Stems having identical syllable structure to epenthetic stems but having a stable vowel are generally referred to as CVC stems. To supplement (3) some further examples are quoted from Rebrus (2000:807) in (10) below.

(10) Non-epenthetic stems having a mid vowel.

	Singular	Plural	Accusative	Superessive
o	<i>motor</i> (cf. <i>sátor</i> 'tent')	<i>motorok</i>	<i>motort</i>	<i>motoron</i>
e	<i>perem</i> (cf. <i>terem</i> 'hall')	<i>peremek</i>	<i>peremet</i>	<i>peremen</i>
ö	<i>csömör</i> (cf. <i>vödör</i> 'bucket')	<i>csömörök</i>	<i>csömört</i>	<i>csömörön</i>

Rebrus (*ibid*) gives a formal definition to the generalization concerning the phonological shape of epenthetic stems in the following manner: with conditioning suffixes there is always a vowel after the stem (11b).

(11) Phonological characterization of vowel-zero alternation¹⁵

- (a) epenthetic stem $\Rightarrow \sim V(V)CoC$ (VV=Á)
 (b) with a conditioning suffix $\Rightarrow \sim V(V)C CV-$

It seems that we have good reasons to lexically differentiate between epenthetic and non-epenthetic stems. Examining the rest of the epenthetic stems, it is obvious that epenthetic stems cannot be identified by reference to the quality of the consonants flanking the epenthetic site: *sátor* 'tent' ~ *motor* 'engine', *torony* 'tower' ~ *szurony* 'bayonet', *terem* 'hall' ~ *perem* 'edge', *gyomor* 'stomach' ~ *csömör* 'revulsion'. In each of these pairs the first item is epenthetic while the second one is not.

¹⁴ The last three examples in the table apply only to those dialects that make a phonemic distinction between closed e and open e. Only in these dialects can we consider these examples exceptional.

¹⁵ The symbol '⇒' shows that the characterization is one-way, i.e., that the given form is a sufficient but not a satisfactory condition on vowel-zero alternation.

According to Rebrus (2000:808), consonants can also be examined by comparing the clusters occurring at the end of the bound form of epenthetic stems to those occurring at the end of stable CC stems enclosing a non-epenthetic (dead) empty vocalic position. This approach presupposes an epenthetic view: since there are a lot of restrictions on word-final consonant clusters it is worth examining whether similar constraints are imposed on the final CC combination of the bound form of epenthetic stems.

As Rebrus (2000:808-811) points out, the comparison of the consonant combinations appearing at the end of stable CC-stems, epenthetic stems and CVC stems reveals three important facts about Hungarian epenthetic stems. First, there are no restrictions on the consonants flanking the vowel-zero alternation site in epenthetic stems similar to those found in stable CC-stems. So a CC cluster resulting from vowel-zero alternation might otherwise be a legal word-final cluster or might also be illegal word-finally. As a result then, epenthetic stems cannot be identified by reference to the consonant cluster enclosing the unstable vocalic position. This is illustrated by the examples in (12).

(12) The stem-final CC-s of epenthetic stems in non-epenthetic stems. Rebrus (2000:809).¹⁶

CC-stem	Epenthetic stem	CVC-stem
<i>barack</i> 'peach'	<i>vacok</i> 'vacok'	<i>pocak</i> 'belly'
<i>halk</i> 'quiet'	<i>telek</i> 'building plot'	<i>balek</i> 'dupe'
<i>sark</i> 'pole'	<i>sarok</i> 'corner'	<i>gyerek</i> 'child'
<i>sejk</i> 'sheik'	<i>ajak</i> 'lip'	(<i>homok</i> 'sand')
<i>dramaturg</i> 'id.'	<i>horog</i> 'hook'	(<i>zálog</i> 'pawn')
<i>film</i> 'film'	<i>majom</i> 'monkey'	<i>elem</i> 'battery'
<i>farm</i> 'id.'	<i>Barom</i> 'beast'	<i>perem</i> 'edge'
<i>slejm</i> 'phlegm'	<i>sefjlem</i> 'silk'	<i>suffjom</i> 'water plant'
<i>szárny</i> 'wing'	<i>torony</i> 'tower'	<i>szurony</i> 'bayonet'

Secondly, with a few exceptions there are no epenthetic stems ending in homorganic clusters. The exceptions (*jászol* 'crib', *kazal* 'stack', *haszon* 'profit', *vászón* 'linen') all contain a coronal fricative (*sz*, *z*, *s*, *zs*) whose behaviour is exceptional in other respects, too; e.g., they may violate the sonority sequencing generalisation; *taps* 'applause', *voks* 'vote', *keksz* 'biscuit', *skála* 'scale', *sport* 'sport', *sztereó* 'stereo', *e/kszport* 'export', *obstruens* 'obstruent', (Rebrus 2000:810).

Thirdly, Rebrus demonstrates that if one chooses to interpret vowel-zero alternation as deletion then deletion cannot be accompanied by assimilation. This latter generalization also holds of voice assimilation: the end of the stem may not contain two obstruents differing in voicing. Rebrus (2000:810) summarizes his observations concerning the consonants of epenthetic stems as given in (13) below.

(13) The last two consonants of epenthetic stems

- can be a legal or an illegal word-final cluster.
- disregarding the exceptional behaviour of coronal fricatives the cluster cannot consist of homorganic segments.
- cannot form a cluster which would be subject to assimilation rules.

¹⁶ I have included *pocak* 'belly' in the table, which is missing from the table appearing in the original source.

(17) The interpretation of a coda-government domain

If C_2 governs C_1 in a C_1vC_2 sequence then C_1 and v are licensed, that is C_1 is interpreted while the empty v -position remains silent.²⁵

(18) The representation of real clusters²⁶

<p>a. stem-internally (coda-government applies)</p> <table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>v</td><td>C</td><td>V</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>z</td><td>o</td><td>[m</td><td>b]</td><td>i</td><td></td></tr> <tr><td>z</td><td>o</td><td>m</td><td>b</td><td>i</td><td></td></tr> </table> <p><i>zombi</i> 'zombie'</p>	C	V	C	v	C	V							z	o	[m	b]	i		z	o	m	b	i		<p>b. stem-finally (coda-government applies)</p> <table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>v</td><td>C</td><td>v</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>g</td><td>o</td><td>[m</td><td>b]</td><td></td><td></td></tr> <tr><td>g</td><td>o</td><td>m</td><td>b</td><td>*</td><td></td></tr> </table> <p><i>gomb</i> 'button'</p>	C	V	C	v	C	v							g	o	[m	b]			g	o	m	b	*	
C	V	C	v	C	V																																												
z	o	[m	b]	i																																													
z	o	m	b	i																																													
C	V	C	v	C	v																																												
g	o	[m	b]																																														
g	o	m	b	*																																													

In bogus clusters, however, (17) is inapplicable due to the lack of a governing relation between C_1 and C_2 . In bogus clusters the grammaticality of the structure depends on whether the vowel following the bogus cluster is interpreted or not. The distribution of bogus clusters will be regulated by the CV version of Proper Government as stated in (19) below; cf. Rebrus (2000:815).

(19) a. Proper Government.

In a C_1vC_2V sequence the interpreted vocalic position properly governs the empty vocalic position if C_1 and C_2 do not form a coda-governing domain. Otherwise the empty vocalic position receives phonetic interpretation.

b. Licensing of the empty v -position:

A properly governed empty vocalic position remains phonetically uninterpreted.

As illustrated by the structures in (20) a word-final bogus cluster cannot be interpreted since neither proper government nor coda government is available to silence the empty vocalic position flanked by the two C-positions. Therefore, the intervening empty vocalic position must receive phonetic interpretation and the structure in (20b) is thus ungrammatical.

(20) The representation of bogus clusters

<p>a. stem-internally (proper government applies)</p>	<p>b. stem-finally (proper government does not apply)</p>
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<table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>[v₁</td><td>C</td><td>V₂]</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>v</td><td>e</td><td>k</td><td>n</td><td>i</td><td></td></tr> <tr><td>v</td><td>e</td><td>k</td><td>n</td><td>i</td><td></td></tr> </table> <p><i>vekn</i> 'loaf'</p>	C	V	C	[v ₁	C	V ₂]							v	e	k	n	i		v	e	k	n	i		<table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>v₁</td><td>C</td><td>v₂]</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>v</td><td>e</td><td>k</td><td>n</td><td></td><td></td></tr> <tr><td>v</td><td>e</td><td>k</td><td>n</td><td>*</td><td></td></tr> </table> <p>*<i>vekn</i></p>	C	V	C	v ₁	C	v ₂]							v	e	k	n			v	e	k	n	*	
C	V	C	[v ₁	C	V ₂]																																												
v	e	k	n	i																																													
v	e	k	n	i																																													
C	V	C	v ₁	C	v ₂]																																												
v	e	k	n																																														
v	e	k	n	*																																													

²⁵ This interpretation of licensing follows from Dienes and Szigetvári's approach to the default interpretation of vocalicness versus consonantalness. For the exact details of this proposal cf. the sources listed in footnote 24. Briefly, the interpretation of C_1 is made possible by the fact that it is governed (a governed c-position loses its inherent muteness), while the silence of the intervening empty v -position is guaranteed by virtue of its being buried.

²⁶ Coda government is indicated by square brackets on the segmental tier, while '*' indicates an empty vocalic position. By using these conventions, I follow Rebrus (2000) for typographical convenience. Notice that in Csides (2000), I indicated C-to-C government by a solid line ending in a pointed arrow.

2.3. The representation of epenthetic stems

It is generally assumed in the GP literature that a vocalic position which alternates with zero is to be represented as an empty vocalic position, whose interpretation is regulated by proper government and the phonological ECP. We assume therefore that suffixed epenthetic stems contain a bogus cluster, cf. (21).

(21) Suffixed forms

<p>a. epenthetic stem (prop.gov.)</p> <table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>[v₁</td><td>C</td><td>V₂]</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>t</td><td>e</td><td>r</td><td>m</td><td>e</td><td></td></tr> <tr><td>t</td><td>e</td><td>r</td><td>m</td><td>e</td><td></td></tr> </table> <p><i>terme</i> 'hall' 3sg.poss.</p>	C	V	C	[v ₁	C	V ₂]							t	e	r	m	e		t	e	r	m	e		<p>b. CVC-stem (no prop.gov.)</p> <table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>v₁</td><td>C</td><td>v₂]</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>p</td><td>e</td><td>r</td><td>e</td><td>m</td><td>e</td></tr> <tr><td>p</td><td>e</td><td>r</td><td>e</td><td>m</td><td>e</td></tr> </table> <p><i>pereme</i> 'edge' 3sg.poss.</p>	C	V	C	v ₁	C	v ₂]							p	e	r	e	m	e	p	e	r	e	m	e
C	V	C	[v ₁	C	V ₂]																																												
t	e	r	m	e																																													
t	e	r	m	e																																													
C	V	C	v ₁	C	v ₂]																																												
p	e	r	e	m	e																																												
p	e	r	e	m	e																																												

Proper government readily accounts for the interpretation of the unstable vowel in the stem form. Since in the nominative case form the word-final empty v -position remains uninterpreted it cannot properly govern v_1 , the preceding empty v -position, which, in turn, must receive phonetic interpretation, *terem* 'hall'. The quality of the unstable vowel can also be predicted: it will be a mid-vowel²⁷ whose frontness and roundness will be determined by the process of Vowel Harmony²⁸. As opposed to this, in a non-epenthetic stem containing a word-final CC cluster the last consonant governs the preceding one through coda government and v_1 thus gets buried hence uninterpreted (22b).

(22) Stem-forms

<p>a. epenthetic stem</p> <table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>v₁</td><td>C</td><td>v₂]</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>t</td><td>e</td><td>r</td><td>m</td><td></td><td></td></tr> <tr><td>t</td><td>e</td><td>r</td><td>m</td><td>*</td><td></td></tr> </table> <p><i>terem</i> 'hall'</p>	C	V	C	v ₁	C	v ₂]							t	e	r	m			t	e	r	m	*		<p>b. CC-stem</p> <table border="0"> <tr><td>C</td><td>V</td><td>C</td><td>v₁</td><td>C</td><td>v₂]</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>f</td><td>a</td><td>[r</td><td>m]</td><td></td><td></td></tr> <tr><td>f</td><td>a</td><td>r</td><td>m</td><td>*</td><td></td></tr> </table> <p><i>farm</i> 'id'</p>	C	V	C	v ₁	C	v ₂]							f	a	[r	m]			f	a	r	m	*	
C	V	C	v ₁	C	v ₂]																																												
t	e	r	m																																														
t	e	r	m	*																																													
C	V	C	v ₁	C	v ₂]																																												
f	a	[r	m]																																														
f	a	r	m	*																																													

The representations in (22) illustrate that coda government is not established in epenthetic stems even if it were phonotactically possible. Lack of coda government indicates the markedness of epenthetic stems: these stems belong to a closed lexical class. This special stem class is distinguished from non-epenthetic stems by a) the lack of government (cf. CC stems: *szörny* 'monster', *gomb* 'button'), and b) by the presence of a stem internal empty vocalic position (cf. that in *perem* 'edge' there is no internal empty vocalic position).

The above representations also indicate that melodic constraints are a necessary but not a sufficient condition on establishing a governing relation. If government is given in the lexicon then it remains intact throughout the course of interpretation. If,

²⁷ Of course, there are seven exceptions to this generalization: non-mid vowels occur in the examples of (9) above.

²⁸ For the details of Hungarian vowel harmony cf. Vago (1976, 1980), Ringen & Vago (1995), Nádasdy and Siptár (1994), Siptár and Törkenczy (2000), Polgárdi (1998), Polgárdi & Rebrus (1998), Ritter (1995).

however, government is not established in the lexical representation of an entry it will not be established later either.

Stems containing an internal empty vocalic position fall into two groups on the basis of the quality of flanking consonants: if the second cannot govern the first one only a bogus cluster may be attested since no burial domain may be established over the empty vocalic position. As Rebrus points out, in this case there are two choices: either the form does not exist (**vekn*), or we get an epenthetic stem, e.g. *bokor* 'bush'; if the second consonant can govern the first and if government is lexically given then the stem ends in a CC cluster (*gomb* 'button', *szörny* 'monster'); if, however, this governing relation is not established in the lexicon we end up with an epenthetic stem again, e.g. *torony*. This also means that the satisfaction of conditions (melodic restrictions) does not necessarily mean that the lexical item contains coda government. If it does not contain such a structural relation it is not established later and we get an epenthetic stem. Thus it is quite natural to propose that coda governing relations are given in the lexicon and remain constant throughout interpretation. The principle responsible for this is quite familiar from the GP literature and is given in (23).²⁹

(23) Projection principle

Governing relations are established at the level of lexical representation and remain constant throughout the derivation.

2.4. Licensing relations

It has long been established that governing relations are not enough to account for syllable structure constraints; government theories of all kinds generally recognize another structural relation called licensing.³⁰ C and V positions behave differently with respect to licensing. Furthermore, different vocalic positions may have different degree of licensing potential, cf. Csides (2000). An empty vocalic position is interpreted when it is not licensed, i.e., when it is neither governed nor buried (enclosed inside a C-to-C governing domain). Consonantal positions are interpreted when licensed because they are better equipped to hold their melodic elements in licensed positions.³¹ There are conditions on possible licensors: a full vocalic position is the best licensor; it licenses the preceding consonantal position.³²

(24)
$$\begin{array}{cccc} C \Leftarrow V & C \Leftarrow V & & \\ | & | & | & | \\ p & a & p & a \end{array} \quad \text{papa 'daddy'}$$

²⁹ Cf. Rebrus (2000:818) for a similar analysis.

³⁰ It must be noted that there is not even a near consensus as to the exact interpretation and function of licensing. For example, while for Harris (1992, 1997) even government is one form of licensing for Dienes & Szigetvári (1999), Szigetvári (1999), Csides (2000), these are two opposing forces that have entirely different roles to play.

³¹ These assumptions follow from the specific interpretation of government and licensing originally proposed by Dienes & Szigetvári, viz., that governed consonants undergo vocalic lenition, while unlicensed consonants undergo consonantal lenition. Licensed and ungoverned consonants are interpreted as real consonant-like consonants. Contrary to this, a governed vocalic position loses its inherent loudness and becomes silent. For the details cf. Dienes & Szigetvári (1999) and Szigetvári (1999).

³² Cf. the sources in footnote 24 and also Csides (2000).

It is generally held that an uninterpreted word-internal vocalic position is unable to license but an empty domain final vocalic position is able to license.³³ According to Rebrus (2000:825) the licensed domain-final C-position may thus surface. Furthermore, Rebrus claims that in languages where the domain final empty vocalic position is not a licensor there are no words ending in a consonant.³⁴ In some languages there are restrictions on what may be licensed at the end of a word:³⁵ sonorant coronals are the least marked. In Hungarian the final empty vocalic position may license virtually any segmental complexity at the end of the word.

(25) Licensing of word-final C-position

$$\begin{array}{ccc} C \Leftarrow V & C \Leftarrow v] \\ | & | & | \\ p & a & p \end{array} \quad \text{pap 'priest'}$$

However, one view that is commonly held nowadays is that a stem-internal empty vocalic position cannot license the preceding consonantal position, cf., Dienes & Szigetvári (1999), Szigetvári (1999). If, however, we assume that only governed empty vocalic positions are unable to license, i.e., that only a governed empty vocalic position loses its inherent licensing capacity we arrive at a different conclusion. Under this view, empty vocalic positions landlocked between an onset cluster or a coda-onset cluster retain their licensing capacity. This licensing charge, however, is rejected by the first consonantal position of a coda-onset cluster since this particular position is also governed. A governed consonantal position rejects the licensing charge emanating from the following empty vocalic position. This follows from the inherent licensing capacity of an empty vocalic position inside a real cluster, viz., that such an empty vocalic position may only grant government license to a preceding consonant to govern its complement, cf. Csides (2000). This is all well in the case of an onset cluster. However, in the case of a coda-onset cluster the first consonantal position may not receive government licence since it is itself governed. A consonantal position, however, cannot simultaneously be a governor and a governee.³⁶

(26) A consonantal position may not simultaneously be a governor and a governee.³⁶

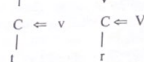
With this in mind, consider the representations of onset versus coda-onset clusters.

³³ For the exact details of the governing and licensing relations I am assuming here, cf. Csides (2000).

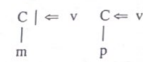
³⁴ In fact, we will assume a different position. We shall claim that (cf. Csides (2000)) in languages where the domain-final empty v-position is not a licensor there is word-final consonantal lenition. Notice that languages without word-final consonants simply do not have an empty vocalic position word-finally. In these languages all words may only end in a full vocalic position.

³⁵ This may actually depend on the licensing potential of the word-final empty vocalic position. On the licensing capacity of different types of nuclei see Cyran (2000).

³⁶ This is not true of vocalic positions, however, since metrically weak vocalic positions can only properly govern if they are metrically governed by a dominant (stressed) vocalic position. This is an extension of the idea of government licensing to vocalic positions. Furthermore, this successfully excludes word-initial lenition in languages (like English) having trochaic feet. For the details cf. Csides (2000).

(27)³⁷ (a) onset cluster

(b) coda-onset cluster

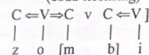


The situation is rather different in the case of onset clusters: here the empty vocalic position flanked by the two consonants lends governing licence to the first consonantal position, which is the governor (27a)³⁸. Once again, if we assume that phonological words begin with a licensed consonantal position it is not surprising why only onset clusters may occur at the beginning of words in the unmarked case in languages that can form such clusters at all.

Rebrus (2000) assumes an entirely different position with respect to 'coda licensing' by introducing the notion of left-to-right coda licensing, as in (28). According to Rebrus (2000:826), a 'real'³⁹ cluster cannot appear at the beginning of the word (28b) because the 'coda' must be supported by licence emanating from a preceding full vocalic position. If there is a vowel preceding a real cluster it can grant licence to the coda to appear. Coda licensing is thus left-to-right in his framework.

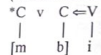
(28) Licensing of real clusters (2000:826)

a. stem-internally
(coda-licensing)



zombi

b. word-initially
(no coda licensing)



**mbi*

Notice that adopting the assumption that phonological words begin with a licensed consonantal position leads to the same result. In this case the first consonantal position in a cluster is only licensed in the case of an onset clusters, this immediately excludes all bogus and coda-onset clusters from occurring at the beginning of the word.⁴⁰ As a result, there is no need to introduce another type of licensing relationship and the structural relation of licensing may be maintained as universally right-to-left. Notice that allowing V-to-C licensing to be bi-directional considerably weakens the explanatory power of the concept of licensing. It would ultimately remain totally unclear why the first position of an onset cluster or an intervocalic consonant does not require licence to come from a preceding vocalic position. If V-to-C licensing is allowed to take effect bi-directionally it becomes too powerful a device, which can be invoked nearly any time when a consonantal position is to be licensed.

³⁷ I included in the representations the solid line ending in a pointed arrow in order to illustrate the directionality of government. Otherwise there is no difference between the two methods of indicating government, i.e., between the square brackets of Rebrus (2000) and this one.

³⁸ Törkenczy & Siptár (1999) argue that in Hungarian there is no convincing evidence as to the existence of onset clusters. But then there is no convincing evidence that this structure is really absent from the inventory of Hungarian structural relations. We leave this issue unsettled here.

³⁹ By the term 'real' cluster, Rebrus means a coda-onset cluster.

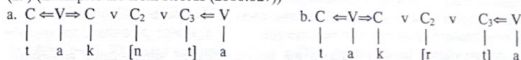
⁴⁰ There are languages in which bogus-clusters or bogus cluster like CC sequences may appear at the beginning of the word, but this is clearly a marked situation. On this see Gussmann & Cyran (1998).

Furthermore, according to Rebrus (2000:826) left-to-right coda licensing shown in (28a) explains why we don't have CCC clusters where the last two consonants would form a coda-governing domain. In his framework, the first empty vocalic position could never coda license the second consonantal position C₂. After a consonant thus all coda-onset clusters are excluded. Notice, however, that again left-to-right coda licensing is not a necessary device to exclude a CCC cluster whose final two consonants form a coda cluster. A bogus type of relationship is excluded from before a coda-onset cluster anyway since in such a CvCvCV sequence the full vocalic position could not reach across the last two consonants (forming a coda-onset governing domain) to silence the empty vocalic position between the first two consonants not forming a governing domain. This is due to a locality requirement imposed on proper government, viz., that proper government cannot reach across a governing domain. As a result the first empty vocalic position in this sequence is bound to receive phonetic interpretation.

An onset cluster preceding a coda cluster without an intervening full vowel can also be excluded without resort to left-to-right licensing in Hungarian by simply by assuming that onset clusters cannot be formed in this language. Detailed arguments for this position are to be found in Törkenczy & Siptár (1999). Moreover, we suggest that the second consonantal position in an onset cluster should be licensed since licensing guarantees that a consonantal position is able to maintain independent melody. Now, it is a cross linguistically attested fact that onset clusters are generally not homorganic. In a number of languages (including English) exhibiting onset clusters there is a strict restriction on onset clusters prescribing that the consonants entertaining such a relation may not be homorganic. Thus the middle C position in such a CCC sequence is a problematic one. On the one hand, it has to be licensed as the second member of an onset cluster, while on the other hand it may not be licensed since it also functions as the first member of a coda cluster; recall, the first member of a coda cluster rejects government licence due to being governed. It is clear then that ternary consonant clusters may well be prevented from occurring without resort to left-to-right licensing. We, therefore, question the need for this particular structural relation and adhere to a single licensing relation, viz., right-to-left V-to-C licensing.

Notice that even for Rebrus (2000) proper government also excludes this configuration, but in a different way. The representations in (29) both contain a sequence of empty vocalic positions. Since in such a sequence the second empty vocalic position could never properly govern the first one (by virtue of being itself empty), the first vocalic position would have to receive phonetic interpretation.⁴¹

(29) (Examples are from Rebrus (2000:827))



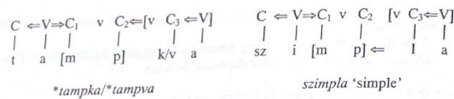
**taknta*

**takrta*

Similar restrictions apply to bogus clusters in the framework advocated by Rebrus. Let us assume that bogus clusters cannot occur at the beginning of the word. Rebrus postulates that this is because the empty vocalic position does not license the first consonant of the cluster (30b), while the cluster may appear postvocally (30a).

⁴¹ Notice that Rebrus assumes that an empty vocalic position inside an onset type configuration also has to be silenced by proper government.

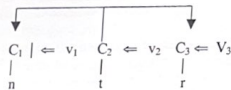
(34) CCC cluster (C₁C₂ is a real cluster): Rebrus (2000:830)
 a. C₂C₃ no onset licensing b. C₂C₃: there is onset licensing



The majority of CCC clusters are like (34b), the middle consonant is the second member of a coda-onset cluster and the first member of an onset cluster. The most frequent configuration is nasal + obstruent + liquid: e.g., *krumpli* 'potato', *improvizál* 'improvise', *kompjúter* 'computer', *konflis* 'hansom cab', *konfrontál* 'confront' (v.), *antracit* 'anthracite', *pondró* 'grub', *konkrét* 'concrete' (adj.), *ringló* 'greengage', *kongresszus* 'congress', *pingvin* 'penguin', or liquid +stop + liquid *altruizmus* 'altruism', *kurbli* 'crank', *portré* 'portrait', *gardrób* 'wardrobe', *partvis* 'broom'⁴². Onset clusters occurring in these examples are also well-formed initial clusters.

Once again, notice that the existence of coda-onset-onset type of CCC clusters is not excluded by the concatenation of the two structures we are proposing. Consider the representation of such a CCC cluster in (35) below.

(35) Coda-onset + onset cluster configuration



As can be seen in (35) the existence of these particular clusters can be predicted without resort to the concept of onset licensing. The vocalic position v_2 government licenses C_2 , which in turn can govern two complements, a coda C_1 and an onset complement C_3 . This latter consonantal position, however, must be licensed by a full vocalic position, V_3 because in Hungarian only full vocalic positions may lend a governed position enough licensing charge to hold independent place specification. Recall that an unmarked onset cluster is never homorganic. These clusters then are predicted not to occur word-finally: in fact, onset clusters do not occur at the end of the word or before a syncope site in the majority of languages.⁴³

We have seen above why consonant clusters cannot follow the unstable vowel. So, the next question is why we do not have ~VCCvC epenthetic stems? There are three possibilities: first the consonant cluster preceding the unstable vowel could be a bogus cluster; this is immediately ruled out by the fact that we would end up with two consecutive empty vocalic positions in the vowelless form of the epenthetic stem and the first of these empty vocalic positions could not be governed. Second, the unstable vowel could be preceded by a coda-onset cluster; but here again in the suffixed form the second empty vocalic position in the CvCvCV sequence would be governed by the

⁴² Examples are from Rebrus (2000:830).

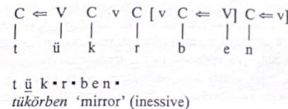
⁴³ We are well aware of the fact that there are languages (French), e.g., in which onset clusters occur word-finally. We assume that in these languages word-final empty vocalic positions have a stronger licensing potential.

full vowel and would thus lose its inherent licensing capacity. As a result there would be no government licence given to the middle consonantal position to govern its 'coda' complement, the first C-position in the above sequence. An onset cluster preceding the unstable vowel is likewise ruled out by the theory. In a CvCvCV sequence, if the first two consonants are to form an onset cluster the second consonantal position is to receive licence (although not government licence, cf. Csides (2000)) to be able to maintain independent place elements. Recall that onset cluster may only occur before a realized vowel in the majority of languages. In the suffixed vowelless form however the second vocalic position hit by proper government from emanating from the following realized vowel would lose all its licensing potential. As a result it would never be able to provide the necessary licence for the second consonantal position of a branching onset to keep its melody. Thus consonant clusters before an unstable vowel may be excluded without resort to the concepts of onset licensing and left-to-right coda licensing.

2.5. Analytic versus synthetic suffixation

The behaviour of non-conditioning suffixes beginning with a consonant can be explained away as above since these suffixes always contain a vowel in the case of nominal stems. The final consonant of the stem can be anything, which excludes coda-government between the stem final consonant and the following suffix initial one, i.e., they are bogus clusters. As a result, there will always be an empty vocalic position between these two consonants.

(36) A form suffixed with a non-conditioning, consonant-initial suffix.⁴⁴

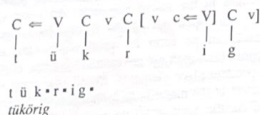


The interpretation of the empty vocalic positions in (36) will be regulated by the phonological ECP and proper government.

This kind of analysis may also be applied to vowel-initial, non-conditioning suffixes but the representation of the suffixed form must be different from those suffixed with vowel-initial suffixes that trigger alternation. Examples involving non-conditioning vowel-initial suffixes are, e.g., *tükörig* 'mirror' (terminative), *tükörért* 'mirror' (causal/final). If we suppose that both consonant-initial and vowel-initial non-conditioning suffixes attach to the stem quite similarly then the result has to be quite similar.

⁴⁴ Cf., Rebrus (2000:831), who analyses analytic suffixes along the same lines.

(37) A form suffixed with a non-conditioning, vowel-initial suffix



These representations show the difference between the two types of affixation, traditionally called analytic and synthetic. In the case of synthetic suffixation the vowel appearing after the stem occupies the first vocalic position after the stem, while in the case of non-conditioning suffixes this is never so. In the suffixed forms of epenthetic stems there is always a vowel after the stem while in the suffixed forms of non-epenthetic stems there may be a vowel after the stem as well as a consonant.

In the case of analytic suffixation the suffix is attached to the entire representation of the stem including the stem final empty vocalic position, while in the case of synthetic suffixation the suffix forms one unit together with the stem. As Rebrus (2000) also notes analytic affixation is thus concatenation of the representation of the stem and the suffix. However, in suffixed forms showing alternation the slot of the stem final empty vocalic position and that of the appearing vowel is the same; there is overlap and in such a way the stem and the suffix form one lexical unit.

Since the phonotactic properties of epenthetic forms show that tendencies observed amongst monomorphemic forms may also be detected amongst suffixed epenthetic forms, it is natural to assume (following Kaye (1995)) that these tendencies take effect in the lexicon in the case of monomorphemic forms. Similarly, it is natural to assume that suffixation resulting in alternation takes place in the lexicon regardless of whether it is inflection or derivation – as opposed to the traditional assumptions advocated by lexical phonologists, who claim that derivation takes place in the lexicon while inflection is post-lexical. Furthermore, it follows from the discussion above that morpho-phonological processes assigned to different levels in classical lexical phonology may fall out naturally from two distinct types of lexical representation assigned to different suffixes in CV phonology.

Notice that the interpretation of empty positions will also fall naturally out of the function of government and licensing as proposed by Dienes & Szigetvári (1999). The empty *vc* sequence is not interpreted in (37), precisely because of these functions. The empty consonantal position is though licensed, it is by definition empty since it has no melody associated to it. The empty vocalic position of the *vc* sequence is properly governed by the full vowel of the suffix. This latter entity, being properly governed, remains silent and is not able to govern the stem internal empty vocalic position, which thus receives phonetic interpretation.

3. Conclusion

In this paper we reviewed stem-internal vowel-zero alternation in nominal stems in Hungarian. Drawing on some of the data provided by Rebrus (2000), Polgárdi (2000) we reviewed their analysis and proposed that the structural relations of onset licensing and coda licensing are not necessary devices in the analysis of these processes. As a result we have proposed to adhere to a single licensing relation, namely, right-to-left V-to-C licensing. We also proposed that structural relations showing phonotactic

effects are best analysed in terms of government. Therefore, onset clusters are viewed as C-to-C governing domains. We have also found that analytic and synthetic suffixation is best analysed in terms of CV slots and that they involve two entirely distinct phonological operations. One of these operations may be referred to as overlap while the other one is simple concatenation or adjunction.

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