SOAS Working Papers in Linguistics Vol. 14 (2006): 23-40

The end of the (Turkish) word*

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0. Introduction

It has long been observed that some languages impose a constraint on the structure of a minimal word (e.g. English, Vietnamese, Chinese, Yucatecan Mayan, Mongolian, Turkish to name but a few of those languages). The structure of a minimal word is (C)V: or (C)VC. It has also been convincingly argued (Kaye 1990, Harris & Gussmann 1998, 2002, among others) that a word-final consonant is not syllabified in a coda but in an onset, and that this onset is followed by a nucleus with no phonetic interpretation whose role is to license the onset.[1] This means that a word like *cat* is bi-syllabic and has the structure CVCØ. Finally, Lowenstamm (1996) has proposed that syllabic constituents are universally non-branching and that the only 'syllable' type is a CV 'syllable'. Since constituents do not branch, a CV: word is also bi-syllabic and has the structure $CVC_{Ø}V_{Ø}$ with the final CV pair having no lexical content resulting in V_1 spreading to V_2.

One crucial property of those languages which impose a constraint on the structure of a minimal word is that CVCV morphologically simplex words of the type *papa* are not attested.[2] We can conclude that the requirement is that the final nucleus be lexically empty. I will argue that the fact that the final empty nucleus is un-interpreted is not due to the licensing parameter of domain-final empty nuclei (Kaye 1990). Indeed, languages where word-final empty nuclei are parametrically licensed, have words ending in an empty or in a lexically filled nucleus. Those languages do not impose the condition that a final nucleus be empty. It is simply that if it is, it occurs in a licensed position and can be un-interpreted. My proposal is that languages which require a word-final nucleus to be lexically empty require words to have a final left-headed foot with the dependent position restricted to nuclei with no lexical content. This proposal is in the spirit of Lowenstamm (1999) who proposed that major categories have an initial CV site on their left and that in languages of the type of French, words are well-formed if the initial site is licensed. I see the requirement for the initial CV site to be licensed as an indication of the requirement for words to have an initial right-headed foot with an empty dependent. In the same spirit, I claim that in languages of the type of Chinese, words are well formed if they end in a left-headed foot which has as complement an empty nucleus.[3]

Looking at Turkish, I show that the final foot not only captures the structure of a minimal word, but also accounts for regular final stress, for the occurrence of CVCV words and for the laxing of word-final high vowels.[4]

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* I wish to thank Alex Bellem and Shanti Light for their useful comments. All errors are mine.

[1] For a different proposal, see Szigetvári (1999) who claims that a 'syllable' is of the type VC.

[2] See for example Goh's (1996) analysis of the structure of Mandarin Chinese words. The fact that Turkish is different from languages of the type of Chinese in that it has CVCV words (e.g. *oda* 'room', *kuzu* 'lamb') will be dealt with shortly.

[3] This does not mean that I claim that there is no initial CV site in Turkish. It is simply that this article concentrates on the end of words.

[4] Following Goh (1996), Denwood (1998, 2002, 2005) and Charette (2004, in press) have proposed that Turkish words fit a Chinese template i.e. they are made up of one or more (ONON) sequences. This proposal goes a long way to account for many different aspects of Turkish phonology (minimal word

The paper is organised as follows: I briefly re-examine the regular stress rule of Turkish in the light of the claim that final consonants are not syllabified in a coda. I propose that regular stress, while phonetically final, is phonologically penultimate. I further argue that regular stress is a consequence of the requirement for words to have a final foot. I then present the main lines of Lowenstamm's (1999) proposal of an initial CV site on the left of all major categories and show how Turkish can be analysed in the same spirit. The structure of words, regular stress and word-final high-vowel laxing, I claim, follow from the requirement of a final foot.

1. Capturing the regular stress rule

Stress assignment in Turkish has captured the attention of a large number of phonologists from different frameworks (Sezer 1983, Kaisse 1985, 1986, Barker 1989, van der Hulst & van de Weijer 1991, Inkelas & Orgun 1995, 1998, Çakır 2000, Charette 2000, Vogel & Kabak 2001, to name but a few). Based on the fact that the vast majority of words bear main stress on the final vowel and that when suffixes are attached to those nouns stress moves rightwards, the common assumption is that regular stress is final. Indeed, leaving aside verbal forms, all nouns claimed to have regular final stress, pattern similarly when suffixes are attached.[5]

(1) a) Consonant final:

bulút	'cloud'
bulut-lár	'clouds'
bulut-lar-ím	'my clouds'
bulut-lar-ım-dá	'in my clouds'
bulut-lar-ım-da-kí	'the one in my clouds'
bulut-lar-ım-da-ki-lér	'the ones in my clouds'

b) Vowel final:

odá	'room'
oda-lár	'rooms'
oda-lar-ím	'my rooms'
oda-lar-ım-dá	'in my rooms'
oda-lar-ım-da-kí	'the one in my rooms'
oda-lar-ım-da-ki-lér	'the ones in my rooms'

constraint, vowel-zero alternation, suffixes triggering vowel deletion, consonant epenthesis, reduplication, final high vowels), but suffers from the presence of too many positions when words contain more than one (ONON) domain. Denwood is forced to claim that the licensing of empty nuclei operates in a bi-directional way and Charette treats the (ONON) sequences as independent domains which, as I will show, may not be the best way to account for the stress pattern of nominal and verbal forms.

[5] For an analysis of stress including verbal forms the reader is referred to the work of Kaisse, Barker, van der Hulst & van de Weijer, Inkelas & Orgun and Kabak & Vogel as in the references mentioned above.

c)	kuzú	‘lamb’
	kuzu-lár	‘lambs’
	kuzu-lar-ím	‘my lambs’
	kuzu-lar-ım-dá	‘in my lambs’
	kuzu-lar-ım-da-kí	‘the one in my lambs’
	kuzu-lar-ım-da-ki-lér	‘the ones in my lambs’

Words which do not have final stress are referred to as Sezer roots and their stress is claimed to either i) be subject to a quantity sensitive rule (Sezer 1983, Barker 1989, van der Hulst & van de Weijer 1991), ii) belong to different cophonologies (Inkelas & Orgun 1995, 1998) or iii) be lexically marked for stress (Charette 2000, Kabak & Vogel 2001). Unlike regular roots, irregular or Sezer roots keep their stress when suffixes are attached.

(2) Irregular root:

dépo	‘store’
dépo-lar	‘stores’
dépo-lar-ım	‘my stores’
dépo-lar-ım-da	‘in my stores’
dépo-lar-ım-da-ki	‘the one in my stores’
dépo-lar-ım-da-ki-ler	‘the ones in my stores’

In sum, regular nominal roots are stressed on the final vowel and stress migrates to the rightmost vowel of the rightmost suffix which follows them. Irregular roots on the other hand, have non-final stress and they keep their main stress in inflected forms.

That the group of words which bear regular final stress can end in a vowel or in a consonant is exactly what is expected by those who assume that consonant-final words end in a coda and that all recessive vowels are lexically present in the structure. The rule is simple: stress falls on the final nucleus. But for those who believe that words universally end in a nucleus, that Turkish does not have branching constituents and that the recessive high vowels are not lexical but the manifestation of an empty nucleus failing to be licensed, this natural class is a little more problematic. It is this problem that I consider next.

1.1 Word-final codas

Anyone who assumes that a word-final consonant is syllabified in a coda, is forced to have different conditions for word-internal and word-final codas. To take an example, the French words *parti* [parti] ‘party’ and *patrie* [patri] ‘homeland’ would be syllabified as par.ti and pa.tri and never as *pa.rti, *part.i, *pat.ri and *part.i. The explanation being that when sonority increases the consonants belong to a branching onset and when sonority decreases the first consonant occurs in a coda and the second consonant in an onset. Word-internal sequences of three consonants like in *bistrot* [bistro] would be syllabified in a coda-branching onset structure (i.e. bis.tro) given their sonority and given that codas do not branch. Lastly, that a long vowel shortens in forms like *sert* [sɛ:r] ‘s/he serves’ vs *servir* [sɛrvir] ‘to serve’, would be explained in terms of vowel shortening in closed syllables. All those conditions and restrictions would have, however, to be relaxed

when the clusters are word-final. French has also words like *carte* [kart] 'card', *quatre* [katr] 'four', *castre* [kastr] 'castrate', *pâte* [pa:t] 'pasta', showing that word-finally, unlike word-internally, codas can branch, they can contain consonant sequences of increasing or of decreasing sonority and they do not trigger vowel shortening.[6]

Those problems lead Kaye (1990) to propose the principle of 'Coda' Licensing, according to which a consonant is syllabified in a coda if it is followed by a consonant in an onset which governs it. This implies that a word-final consonant is always syllabified in an onset (it cannot be in a coda since there is no consonant in a following onset to govern it), and that since an onset must be licensed by a nucleus, words universally end in a nucleus. Furthermore, there are two types of languages: those which do not allow words to phonetically end in a consonant (e.g. Italian, Dida) and those which do (e.g. French, English). In the first group of languages it is claimed that final empty nuclei are not licensed to be un-interpreted. In the second group, it is claimed that final nuclei, if lexically empty, are parametrically licensed to be un-interpreted. [7]

Returning to Turkish, one of its properties is that words can on the surface end in a vowel or in a consonant, which means that under Kaye's proposal Turkish licenses word-final empty nuclei to be un-interpreted.[8]

(3) *kara* 'land' *kapak* 'lid'

a)
O	N	O	N
|	|	|	|
x	x	x	x
|	|	|	|
k	a	r	a

b)
O	N	O	N	O	N
|	|	|	|	|	|
x	x	x	x	x	x
|	|	|	|	|	
k	a	p	a	k	

The difference between *kara* and *kapak* is that the former word ends in a lexically filled nucleus and the latter in a final licensed empty nucleus. Both words have primary stress on the rightmost vowel and both words have regular stress. Looking at their syllabic structure however, we cannot say that both words have final stress implying that both words have stress of the rightmost nucleus. Strictly speaking, although both words have final stress phonetically, phonologically *kara* has final stress and *kapak* penultimate stress. To capture the fact that both words have regular stress, one could simply propose that the regular stress rule of Turkish is:

(4) Regular stress rule:
Stress the rightmost unlicensed nucleus.

The regular stress rule will assign stress on the final nucleus of *karáa* which is an unlicensed lexically filled nucleus and it will assign stress on the penultimate nucleus of *kapák*, because in this word the final nucleus is lexically empty and licensed and therefore cannot be the metrical head.

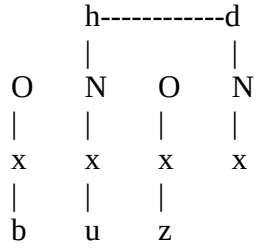
[6] I refer the reader to Kaye (1990) and Harris & Gussmann (1998, 2002) for more on this issue.
[7] Other proposals have been put forward to account for the non-interpretation of word-final empty nuclei. The reader is referred to Rowicka (1999), Szigetvári (1999) and Cyran (2003) among others.
[8] For an analysis of Turkish consonant clusters in terms of onset-to-onset government, see Charette (2004).

I assume that words with regular stress are words which have no nuclear position lexically specified for stress. I call them lexically accentless words.[9] This means that what is understood by regular stress is that since a word always has stress, when one is not lexically specified for it, the metrical head is assigned to the rightmost unlicensed nucleus. But from what does this follow? How is regular stress assigned? How can words with final stress and words with penultimate stress (from a phonological viewpoint), form a natural class? Let us go investigate.

1.2 What is regular stress?

I believe that the answers to the above questions lie in the structure of Turkish words. Starting with the structure of a minimal word, CV words in Turkish are extremely rare, they are almost without exceptions restricted to pronouns and they show the appearance of an epenthetic consonant 'n' or 'y' when suffixes are added (e.g. *bu* 'this', *bu**n**lar* 'these', *o* 'he', *o**n**lar* 'they', *su* 'water', *suyum* 'my water' vs. *oda* 'room', *odalar* 'rooms', *odam* 'my room'). Leaving aside those very few words, a typical minimal word is of the type of *buz* 'ice', *el* 'hand', that is, has a (C)VCØ structure. What I propose is that words in Turkish must contain a final binary foot whose structure is to be left-headed with the dependent position restricted to empty nuclei.

(5) a)



buz 'ice'

The requirement of a final foot composed of a head which must license an empty dependent on its right, is in the spirit of a proposal made by Lowenstamm (1999) which I consider next.

1.3 Lowenstamm's initial CV site

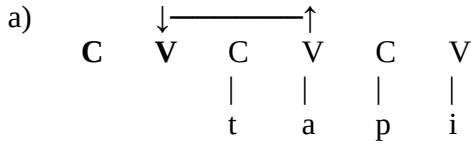
Languages which tolerate two consonants at the beginning of a word are restricted to two types. Type one: only sequences where the least sonorous consonant appears to the left of the more sonorous one are tolerated (e.g. English) and type two: sequences of increasing sonority and sequences of decreasing sonority are both tolerated (e.g. Hebrew). In no languages must a more sonorous consonant appear to the left of a least sonorous one.

Lowenstamm's proposal to account for this fact is that all major categories have a CV site on their left (an empty CV site). In languages of the type of French and English where words can begin with a single consonant and with a consonant sequence as long as the least sonorous consonant occurs to the left of the more sonorous one, the initial site must be licensed. In languages which tolerate a single consonant and consonant sequences of increasing or decreasing sonority (e.g. Arabic, Hebrew), the initial site can

[9] This is similar to what Yoshida (1999) has proposed for Japanese.

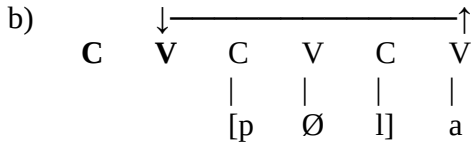
or cannot be licensed. In no languages must the initial site be left un-licensed. As illustrated below, Lowenstamm claims that the initial CV site is licensed if its V is governed by the leftmost vowel of the major category.

(6) a)



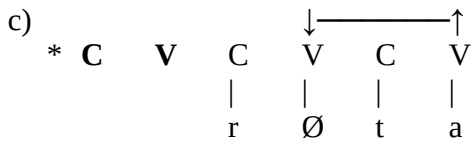
tapis [tapi] ‘carpet’

b)



plat [pla] ‘dish’

c)



*rta

In (6a) the first vowel of the noun is adjacent to the V of the site and governs it. In (6b) the two consonants ‘p’ and ‘l’ form a head-initial governing domain (i.e. the stop governs the liquid). The empty V occurring between those two consonants is governed by virtue of occurring within a governing domain, which leaves the final V of the noun (i.e. the V which dominates ‘a’) able to govern the V of the site. In (6c), since a liquid cannot govern a stop, the two consonants cannot form a governing domain and the empty V occurring between them must be governed by the V on its right. Since a governed V cannot act as governor and since a governor can only govern one position, the V of the site is left un-governed, i.e. the word is ill-formed.

Relevant to the present discussion is the fact that in languages of the type of French and English, for a word to be well-formed the empty V of the initial CV site must be governed by a following (un-licensed) V. This is similar to claiming that in French and English, all major categories must have an initial foot and that this foot is right-headed and has an empty V as dependent.

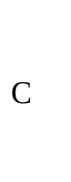
In the spirit of Lowenstamm, I propose that there is a similar requirement at the end of Turkish words. Namely, a Turkish word is well-formed if it ends in a left-headed foot which has an empty V as its dependent. This, I claim, accounts, among other properties of Turkish to be considered below, for the structure of a minimal word and for regular stress. As illustrated in (7) below, a minimal word is a word minimally composed of a foot which is left-headed and has an empty dependent.[10]

[10] From now on I will adopt the common practice in strict CV phonology to use a capital V to represent a lexically filled nucleus and a low case v to represent a nucleus with no lexical content (i.e. an empty nucleus). I further extend this difference to Cs. A capital C with no attached segment represents an empty onset in words beginning with a vowel and a low case c represents an h-aspiré type of onset.

(7) a)

gül ‘flower’

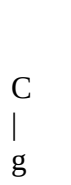
b)



el ‘hand’

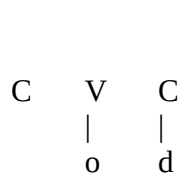
As for regular stress, we have seen that it is (phonetically) final in both words ending in a consonant and in words ending in a vowel. This, I claim, is captured by the presence and the structure of the final foot. That is, the stressed V is the head of the final foot in both words ending in a consonant and ending in a vowel.

(8) a)



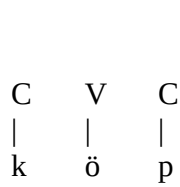
gűl ‘flower’

b)



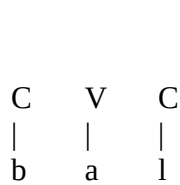
odá ‘room’

c)



köpék‘dog’

d)



balík ‘fish’

In (8a) we have a minimal word with the penultimate nucleus head of the final foot. In (8b) we see that for a word like *oda* to be well-formed, I posit a final empty CV site. As we will see below, this explains the appearance of a consonant when a suffix like the 3rd person singular is added to words ending in a vowel (e.g. *gül-ü* ‘his flower’ vs *oda–sı* ‘his room’). The form in (8c) is like the form in (8a) except that the word is not minimal. It

has three CV pairs. Finally, the form in (8d) is similar to the form in (8c) except for the penultimate nucleus which is lexically filled in (8c) and lexically empty in (8d). This penultimate nucleus is the head of the foot explaining why the V must be interpreted. It is the metrical head.

I now turn to words ending in a high vowel, which according to Charette & Göksel (1996, 1998) are not lexical, but the interpretation of un-licensed empty nuclei.

1.4 The final high vowels

According to Charette & Göksel (1996, 1998), one of the properties of Turkish is that except for the leftmost nucleus of a word, all recessive nuclei either lexically dominate the vowel /a/ or are lexically empty. This implies that non-initial high vowels are not lexical, but the result of an empty nucleus failing to be licensed to remain phonetically unexpressed.

It follows from this proposal that the well known fact that labial harmony only affects high vowels in Turkish can be explained by proposing that U can only spread into empty nuclei (e.g. [oda] *[odo] /oda/ 'room' vs [koru] *[korı] /korø/ 'forest').[11]

In addition, that non-initial high vowels are not lexical is also supported by the theory of elements. Assuming that segments are composed of elements, the eight vowels of Turkish have the following representations:[12]

(9)	i	(I)	ü	(I-U)	ı	( )	u	(U)
	e	(I-A)	ö	(I-U-A)			o	(U-A)
					a	(A)		

Relevant to the present discussion is that analysed in terms of elements, the vowel *ı* can be nothing else than an empty expression, i.e. the phonetic realisation of an unlicensed empty nucleus which does not undergo harmony. This means that even if one claimed that non-initial high vowels were lexical, not only would one miss the generalisations that they always harmonise and that unlike non-high vowels they can alternate with zero, the problem would remain that the appearance of the vowel *ı* cannot be lexical given the logic of the element theory. Therefore, a word like *karı* 'wife' must have a final empty nucleus unlicensed and phonetically realised. The question is, how can that be since *kar* 'snow', which has a final empty nucleus licensed and un-interpreted, is also a possible word? How can a word-final empty nucleus be at times licensed and at times not?

Two proposals which I consider next have been put forward to account for the occurrence of final high vowels in Turkish.

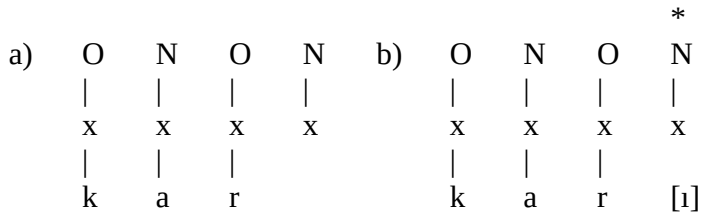
[11] The reader is referred to Charette & Göksel (1996, 1998) for full discussion of vowel harmony in a variety of Turkic languages.

[12] The role of head or operator an element occupies within an expression is not relevant here. The reader is again referred to Charette & Göksel (1996, 1998) for full discussion on the vocalic system of Turkish and the behaviour of harmony.

1.4.1 Metrical-head analysis

Charette (2000) proposed that a final high vowel occurs in a word-final empty nucleus lexically marked as metrical head, and as such fails to be licensed.

(10) Charette (2000)



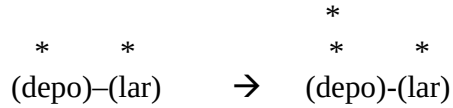
kar ‘snow’ *karı* ‘wife’

The strength of the metrical-head analysis is that if the presence of a final high vowel is because its position is lexically marked as metrical head, we explain why words ending in a high vowel, unlike words ending in a non-high vowel, have almost without exceptions final stress.[13] CVCV words ending in a lexically filled nucleus (i.e. ending in /a/) can have penultimate (i.e. lexical) or final (i.e. regular) stress (e.g. *súna* ‘male duck’, *babá* ‘father’). The same is true for CVCØ words except that when they have penultimate stress they surface as [CVC] and when they have final stress as [CVCV] (e.g. *kór* ‘charcoal’, *korú* ‘forest’).

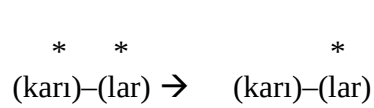
What this analysis captures less easily are the following two facts. First, even if very few, that some words end in a high vowel without having final stress (e.g. *bélki* ‘perhaps’, *şímdi* ‘now’) remains a mystery. Unless, as I explain below, we consider them compounds.

Second, if words ending in a high vowel are lexically marked for stress, one has to explain why they do not pattern like Sezer roots, i.e. like other words lexically marked for stress. Unlike Sezer roots which keep their stress in morphologically complex forms, nouns ending in a high vowel lose their stress when suffixes are attached (e.g. *dépo* ‘store’, *dépo-lar* ‘stores’ vs *karí* ‘wife’, *karı-lár* ‘wives’). One could get around this problem by proposing stress clash rules which would delete the stress on the left when two vowels bearing stress are adjacent (cf. Barker 1989, van der Hulst & van de Weijer 1991).

(11) a)



b)



In (11a) the two vowels bearing stress are not adjacent. The context for the application of the stress clash rule is not met. The fact that main stress falls on the vowel of the noun and not on the vowel of the suffix is a consequence of the application of another stress rule which is independently needed to account for stress in compounds where main stress falls on the first term (e.g. *báş* ‘head’, *bakán* ‘minister’, *báşbakan* ‘prime minister’). So, when an irregular or Sezer root is followed by a suffix, there is a sequence of stress and

[13] The reader is referred to Çakır (2000) for a statistical analysis.

the one on the left is promoted. In (11b) the two vowels bearing stress are adjacent and the stress clash rule applies. Stress on the left is lost.[14]

We can see that the apparent problems Charette's (2000) metrical-head analysis would encounter, could be explained in adopting an analysis of stress similar to the one proposed by Barker (1989) and van der Hulst & van de Weijer (1991). Major categories, suffixes and clitics are domains, they all have stress and the different stress patterns observed in morphologically complex forms are a consequence of the application of stress clash rules and of a "compound stress rule".

Treating major categories, suffixes and clitics as domains, crucially implies a single type of morphology in Turkish (i.e. analytic / level 1). I am however, more inclined to agree with Kabak & Vogel (2001) who claim that suffixes and clitics are of two types: i) lexically marked to occur within the phonological word (i.e. non-analytic) and ii) lexically marked to occur outside the phonological word (i.e. analytic). As Kabak & Vogel demonstrate, in differentiating the two morphological properties of suffixes and clitics there is no need for stress clash rules and no need to claim that certain suffixes and clitics are unstressable. Kabak & Vogel argue that regular stress is on the final syllable of a phonological word and the apparent counter-examples to final stress simply denote the end of a phonological word.

In sum, a metrical-head analysis to account for the occurrence of final high vowels is plausible, and is in fact similar to the one proposed by Barker (1989) and van der Hulst & van de Weijer (1991), but I question its implications for the morphological structure of Turkish words.

1.4.2 A template / domain analysis

A second proposal to account for the presence of final high vowels is that Turkish words are made up of one or more (ONON) sequences (Denwood 1998, 2000, 2005, Charette 2004, in press). The final nucleus of the initial (ONON) must be empty. Consequently, words ending in a vowel are made up of more than one domain. Words ending in a high vowel have two empty nuclei in the second domain and the one on the left fails to be licensed. This is illustrated below.

(12) Denwood (1998, 2000), Charette (2004, in press)

a)

(O	N	O	N)	
|	|	|	|	
x	x	x	x	
|	|	|		
k	a	r		*kar* 'snow'

[14] Note that "the compound stress rule" always overrides the stress clash rule (e.g. *bú* 'this', *gűn* 'day', *búgün*, **bugűn* 'today).

b)
```
(O  N  O  N)  (O  N  O  N)
|   |  |  |     |     |
x   x  x  x     x     x
|   |  |        |
k   a  r        a        kara ‘land’
```

c)
```
(O  N  O  N)  (O  N  O  N)
|   |  |  |     |  |     |
x   x  x  x     x  x     x
|   |  |        |
k   a  r        [ı]      karı ‘wife’
```

d)
```
(O  N  O  N)  (O  N  O  N)
|   |  |  |     |  |  |
x   x  x  x     x  x  x
|   |  |        |  |
k   ö  p        a  k     köpek ‘dog’
```

I believe that this proposal is truly pointing in the right direction. What it suffers from however, is that proposing that the domains have a fixed number of four constituents leads to a structure with perhaps too many positions. Charette treats each domain as an independent domain ending in a domain-final licensed empty nucleus. When two domains concatenate and a licensed empty nucleus finds itself followed by a pointless empty onset, as in (12b), the context for the application of the Reduction Principle (Gussmann & Kaye 1993) is met and those two constituents are deleted from the structure. Charette also claims that when two nuclear points are adjacent, as in (12b), the OCP deletes the point on the right. The problem is that in treating each domain as independent the analysis leads to stress assignment in each domain, resulting in the need for stress clash rules. As for Denwood, one may think that she does not have the same problems with the overburdened structure, except that she avoids the issue of adjacency in having onset points within brackets. Are those points absent, in which case there is a problem with the adjacency of two nuclear points, or are those points present, in which case there is a problem with having an ON pair with both constituents empty. An additional problem with Denwood’s analysis is the licensing of certain empty nuclei from the left and others from the right, which although not stated, means that licensing of empty nuclei is done in a bi-directional way.

1.4.3 The final foot

The analysis I am proposing here retains all the positive aspects of the template/domain proposal and eliminates what was undesirable. I see the structure of Turkish words closer to the structure of Semitic words than to the structure of Chinese words. That is, the

minimal number of positions is four, but words can also fit a tri- or quadri-lateral template.

Let us look at the structure of words ending in a vowel. In (13a) below, according to the well-formedness of the foot (left-headed with an empty dependent), we see that words which end in ‘a’ or ‘e’ have a final CV site on their right and the V of the site is licensed by the final vowel of the stem. As for words ending on the surface with a high vowel, they have the same structure except that the final V of the stem is lexically empty. As illustrated in (13b), the stem-final V is the head of the foot and must therefore be interpreted in order to license the V of the final site. [15]

(13) a)

```
                    h----------d
                    |          |
    C   V   C   V   c   v
        |   |   |
        o   d   a
```

oda ‘room’

b)

```
                    h----------d
                    |          |
    C   V   C   v   c   v
    |   |   |
    k   u   z   [u]
```

kuzu ‘lamb’

c) *

```
            h----------d
            |          |
        C   V   C   V
            |   |   |
            o   d   a
```

d) *

```
            h----------d
            |          |
        C   V   C   v
        |   |   |
        k   u   z   [u]
```

In the spirit of Lowenstamm’s (1999) proposal for French, I claim that a Turkish word is well formed if the final CV is licensed. [CVC] words are bi-lateral, [CVCV] tri-lateral and [CVCVC] quadri-lateral.

Words ending in a sequence of two consonants are possible in Turkish, but are restricted to words ending in a more sonorous consonant followed by a less sonorous consonant (e.g. *renk* ‘colour’, *aşk* ‘love’, *halk* ‘people’ *harp*’ war’, *alp* ‘hero’, *sert* ‘harsh’, *hapr). Following Lowenstamm (1996) I propose that two consonants of decreasing sonority form a right-headed governing domain and that the empty V occurring between them is licensed by virtue of occurring within the governing domain. As we have seen earlier, this leaves the V of the stem able to license the V of the final

[15] In Strict CV, nuclear adjacency is not an issue since the cv tier is the skeleton. Two Vs can never be adjacent.

site. In Turkish, I propose that consonants forming a governing domain are all head-final, which explains why words cannot end in a sequence of increasing sonority. As illustrated in (14b) below, words ending in a less sonorous consonant followed by a more sonorous consonant would not form a governing domain and would require the empty V occurring between the consonants to be licensed from the left leaving the final site unlicensed.

(14) a)

```
        h-------------------------d
        |                         |
  C     V     C     v     C     v
  |     |     |           |
  h     a     [l          k]          halk ‘people’
```

b) *

```
        h------------d
        |            |
  C     V     C     v     C     v
  |     |     |           |
  h     a     k           l           * hakl
```

c)

```
                    h------------d
                    |            |
  C     V     C     v     C     v
        |     |           |
        a     k     [ɪ    l           akıl ‘intelligence’
```

The reader will have noticed that what I call the final CV site is at times different from Lowenstamm’s initial site. For Lowenstamm the initial site is composed of an empty C and an empty V while for me the site has this same structure only in words ending in a vowel. When the word ends in a consonant, I posit that the final C dominates the final consonantal segment of the root. But if Lowenstamm’s CV site, at the beginning or at the end of a word, means a foot in which an empty dependent gets licensed, then it follows that the initial site can only have the structure CV and that the final site may only require an empty V. I return to this issue in a later section.

The next point I consider is cliticisation, which according to Lowenstamm:

(15) a. The initial CV site is the site of cliticisation.
b. Cliticisation can take place iff the site is licensed. (Lowenstamm 1999:161)

(16) a)

```
C V  +    C V C V C V
| |         | | | |
l ə         t a p i
l a
l e z
```

b)

```
C V  +    C V C V C V
| |           | | | |
l ə         [pø l] a
l a
l e z
```

c)
```
C V  +    C V C V C V
| |           | | |
l ə           a m i
l a
l e z
```

d)
```
C V  +    C V C V C V
          | | | | | |
          l ə t a ….
          l a
          l e z
```

e)
```
C V  +    C V C V C V
          | | | | | |
          l ə [pø l] a
          l a
          l e z
```

f)
```
C V  +    C V  C V C V
          | |  | | | |
          l ə  | a m i
          l a  |
          l e  z
```

In Turkish cliticisation (or suffixation) is final and it works as follows. Taking as an example the third person singular possessive, it takes the form of a high vowel when it attaches to a noun ending in a consonant and the form -sV when it attaches to a noun ending in a vowel. As the examples in (17) below illustrate, this follows from the structure I propose.

(17) a)
```
                                          h--------d
                                          |        |
C V C v  +   C V      →   C  V  C  V + C  V
| | |          |          |  |  |    |
b u z          s  ø       b  u  z  s  ı
```

buz – (s) ı [buzu] ‘his ice’

b)
```
                                              h-------------d
                                              |             |
CV C V c v +  C V      →   C V  C  V  C  V  +     C  V
  | | |         |           |  |  |  |  |
  o d a         s  ø        o  d  a  s  ı
```

oda – (s) ı [odası] ‘his room’

c)

```
                                                    h----------d
                                                    |          |
C V C V  c  v  +  C V        →   C  V  C  V  C  V  +     C  V
|  |  |              |           |  |  |  |  |  |
k  u  z  [u]        s  ø         k  u  z  u  s  u
```

kuzu –(s) ı [kuzusu] ‘his lamb’

1.4.4 Monosyllabic words

In proposing that the minimal word must contain a left-headed foot with an empty nucleus as dependent, it is not clear why monosyllabic words ending in a short vowel are so rare and are claimed to be exceptional. Indeed, words like *su* ‘water’ should not be exceptional since according to the analysis I propose, they could have the (well-formed) structure given below.

(18) a)

```
      h----------d
      |          |
C     V     C    v
|     |
s     u
```

su ‘water’

b)

```
      h----------d
      |          |
C     V     C    v
      |
      o
```

o ‘he’

However, I believe that the above structures are not the correct ones. For one thing, monosyllabic words ending in a short vowel do not behave like other vowel-final words when suffixes are attached to them.

(19) a)

su + (I)m	‘water + my’	=	suyum *sum	‘my water’
vs				
oda + (I)m	‘room + my’	=	odam *odayam	‘my room’

b)

o + lar	‘he + plural	=	onlar *olar	‘they’
vs				
oda + lar	‘room + plural	=	odalar *odanlar	‘my rooms

The above facts make me believe that the lexical representation of monosyllabic words ending in a short vowel have the floating consonant appearing in the inflected forms as part of their lexical representation. Although I do not at this point fully understand what prevents the floating consonant to be attached to the final C of the stem (i.e. to be licensed in the structure), it well appears that a sequence of empty C empty V is restricted to the final site. Stems cannot contain empty “syllables”.

(20) a)

```
C     V     c     v
|     |
s     u     I
```

su ‘water’

b)

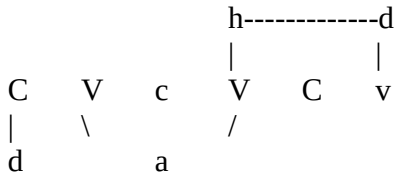
```
C     V     c     v
      |
      o     n
```

o ‘he’

The above words could be well-formed if V_1 could spread to V_2, but it appears that the presence of the floating consonant in the structure blocks the spreading of the vowel.

This leads me to consider a final type of word: those ending in a long vowel (e.g. *dağ* [daa] 'mountain'). Words ending in a soft-g have lost the consonant and could well have the structure below.[16]

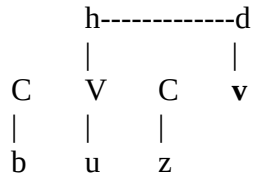
(21)



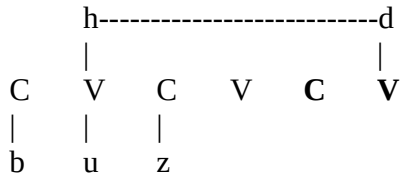
1.4.5 Why is the final CV site sometimes a V?

Earlier in the paper I mentioned that although in the spirit of Lowenstamm's (1999) proposal of an initial CV site, my analysis of a final CV site in Turkish differs from the original proposal in that although words ending in a vowel end in a CV site, words ending in a consonant simply have a final empty V in their structure. That is, the structure I assume for [CVC] words is the one given in (22a) and not the one given in (22b).

(22) a)



b)



Given the structure of a 'syllable', an initial site could never be simply composed of an empty V. Word-finally however, things are different. Although the structure in (22b) above would be in perfect harmony with Lowenstamm's proposal, it has the problem of having a sequence of two empty Vs. We would expect the empty V on the left to be phonetically interpreted, as it is the case in words ending in a high vowel. That the structure in (22a) is the correct structure, may be supported by the process of final high-vowel laxing which I consider next.

1.4.5.1 Final high-vowel laxing

It has long been observed that when a high vowel occurs in word-final position it is lax (cf. Göksel & Kerslake 2005).

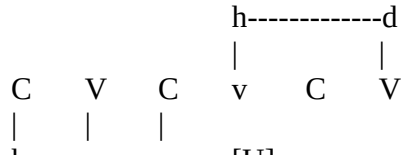
(23)	a)	kuzu	[kuzU]	'lamb'
		kedi	[kedI]	'cat'
		ütü	[ütÜ]	'iron'

[16] The only problem with this structure is that it predicts that *dağ* followed by- *(s)I* (i.e. 'mountain – his') would surface as [da:sı], which is not the case. It surfaces as [da:ı]. This is a problem I leave for further research.

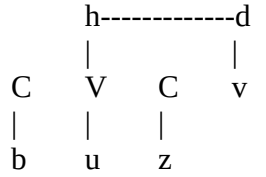
b) buz [buz] ‘ice’
fil [fil] ‘elephant’
gül [gül] ‘flower’

The context for laxing cannot be “when followed by an empty V” since in my analysis all words end in an empty V. But if the context of laxing is when the head of the foot licenses a following empty V which is preceded by an empty C, then the structures I propose are justified.

(24) a)



b)



Further research is needed to see if this last assumption is correct.

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