

A Moraic Account of Compensatory Lengthening in Tehrani Farsi*

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1. Introduction

The purpose of this paper is to reconsider compensatory lengthening (henceforth, CL) in modern colloquial Tehrani Farsi in a moraic theory framework.

To begin with, the consonantal system of Farsi is given in (1) (Darzi 1991:23-24).

(1) Consonants

	labial	labio-dental	dental	alveolar	alveo-palatal	palatal	uvular	glottal
stop	p, b		t, d			k, g	q	ʔ
fricative		f, v		s, z		ʃ, ʒ	x	h
affricate					tʃ, dʒ			
trill				r				
nasal	m			n				
lateral				l				
glide					y			

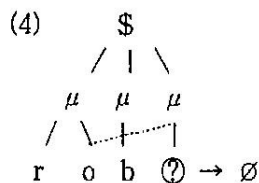
In modern colloquial Tehrani Farsi, the loss of the glottal consonants /ʔ/ and /h/ in

* This paper has benefited greatly from discussions with Chin W. Kim. Any faults are, of course, mine.

coda position induces CL as shown in (2)¹, whereas that of other consonants fails to trigger CL as shown in (3).²

(2)	Formal/Conservative	Colloquial	Gloss
	ro:b ?	ro:b	quarter
	so:bh	so:b	morning
	tæ?mir	tæ:mir	repair
	pæ:hna	pæ:na	width
	su?	su:	bad
	kuh	ku:	mountain
	bo?d	bo:d	dimension
	bæ:hs	bæ:s	discussion
(3)	dæst	dæs	hand
	mo:zd	moz	wage
	ʃokr	ʃok	thanks
	æz	æ	sugar
	fekr	fek	thought

Darzi (1991) has recently proposed that in order to account for CL in Farsi, it is necessary to replace Hayes's (1989) original account in the "exclusively" moraic framework with a two-tier analysis combining both a skeletal (CV) and a moraic tier, along the lines suggested by Hock (1986). He was motivated to adopt a two-tier analysis in order to avoid a line crossing such as (4) in a strictly moraic account.



Darzi's analysis, however, is undesirable in some respects to be discussed in what

¹ Glottal consonants /ʔ/ and /h/ are sometimes deleted in syllable-initial position, which, however, does not induce CL (e.g., /mæʃhæd/ → [mæʃæd], /sæʔid/ → [sæid]). This is precisely what moraic theory predicts: i.e., since onset consonants are nonmoraic, deletion of them strands no mora, and hence no CL occurs.

² The data in (2) and (3) are all taken from Darzi (1991).

follows. In this paper, I will argue that in accounting for CL in Farsi, the two-tier analysis proposed by Darzi runs into serious difficulties, and that CL in this language can be given a natural account in the 'pure' moraic theory by modifying three of Hayes's principles. Before I proceed to a moraic account of CL in Farsi in section 3, I will provide a brief review of previous analyses in the following section.

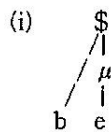
2. Previous analyses

Considering the syllable structure of Farsi³ and its relation to the moraic structure of syllables, Hayes (1989) proposes the moraic structure of Farsi as in (5).⁴

(5) light	heavy	superheavy	ultraheavy
\$	\$	\$	\$
	\	\	\
μ	μ μ	μ μ μ	μ μ μ
/	/ \ /	/	/ \ / \
b e	t a	t a b	d æ s t
"to"	"till"	"bad"	"swing"
			"hand"

³ In Farsi, no syllable can begin with a vowel (Darzi 1991:24). Thus, the types of the permissible syllable structure in this language are CV, CVC and CVCC. In addition, there are no syllabic consonants.

⁴ In Hayes (1989), onset consonants are directly linked to the syllable node. /be/ 'to', for instance, is syllabified as follows:



As discussed in Zec (1989) and Kang (1992), however, this representation violates the Strict Layer Hypothesis given in (ii).

(ii) Strict Layer Hypothesis

A category of level *i* in the hierarchy immediately dominates (a sequence of) categories at level *i*-1. (Selkirk 1984)

In this paper, I will assume after Zec (1989) and Kang (1992) that onset consonants are associated with the following mora.

(6) a.

\$		\$		\$
^		^		^
μ μ → μ μ (/ ? / → ∅)		→ μ μ (CL)		
/		/		/ .
s u ?		s u		s u [su:] "bad"

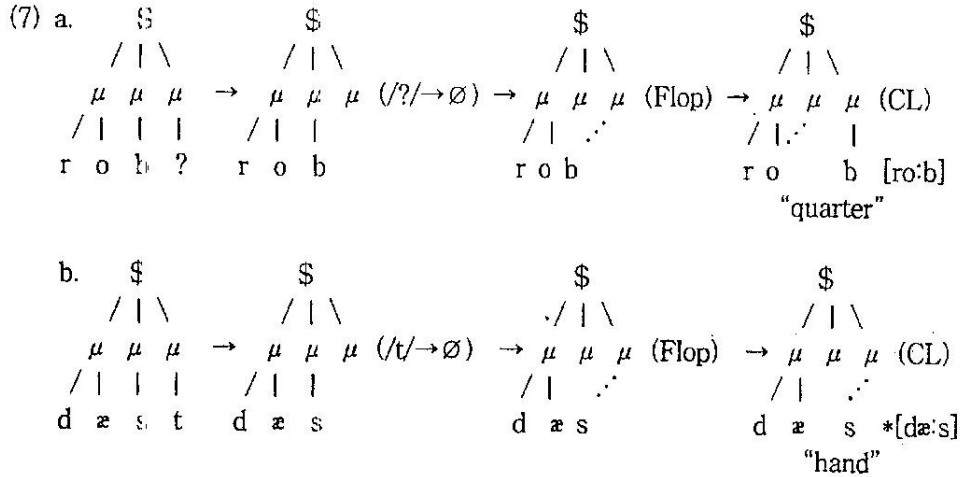
b.

\$		\$		\$
^		^		^
μ μ → μ μ (/ z / → ∅)		→ μ μ (CL)		
/		/		/ .
? æ z		? æ		? æ *[?æ:] "sugar"

c.

\$		\$		*\$
/ \		/ \		/ \
μ μ μ → μ μ μ (/ ? / → ∅)		→ μ μ μ (CL)		
/		/		/ .
r o b ?		r o b		r o b *[rob]
				"quarter"

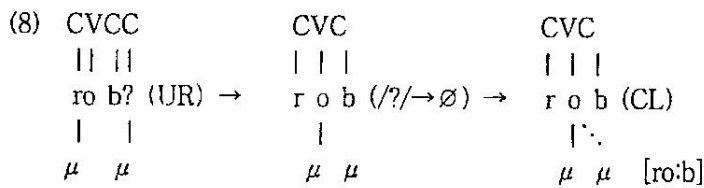
In (6a), Hayes's analysis produces the correct output [su:]. Note, however, that in (6b), it makes a wrong prediction that the loss of the coda consonant /z/ causes the preceding vowel /æ/ to lengthen. On the other hand, CL in (6c) is ruled out by the ban on crossing association lines, incorrectly producing *[rob]. The only way to exclude these derivations would be to employ a double flop, as shown in (7a); i.e., when /ʔ/ deletes, the preceding consonant /b/ shifts its association to fill the vacated μ slot. This process creates a new empty mora, which is filled by spreading of the preceding vowel melody, in a double flop maneuver. But his analysis with this modification still cannot account for no CL with the deletion of coda consonants in (3). In (7b), for example, /s/ would be relinked to the following mora after /t/ is deleted, and then /æ/ would be incorrectly lengthened.



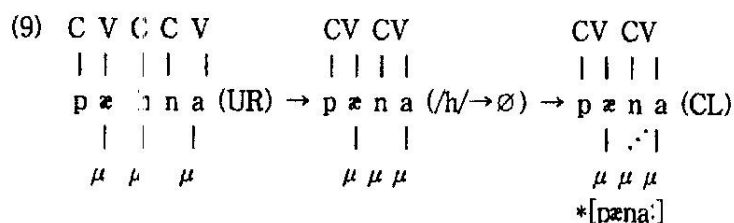
Assuming that only glottals are moraic consonants in Farsi, Darzi (1991) claims that in addition to a moraic tier, we also need to have a CV tier. He (pp. 34–35) says,

"Once we assume that moras are not constructed directly on top of segments but rather are on a tier separate but linked to the skeleton, the spreading of a segment on the moraic tier does not cross the association lines between the elements of the CV tier and the syllable node or moraic slots, because they are on two separate tiers or planes."

Under his analysis, for instance, [ro:b] 'quarter' is derived from its underlying /rob?/ as shown below.



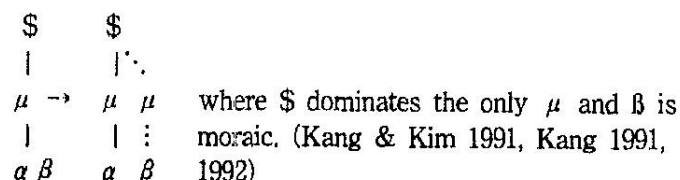
This analysis, however, is untenable for two reasons. First, Darzi's account multiplies entities unnecessarily, since a CV tier is redundant once we have a moraic tier (cf. Auer 1989, Hayes 1989). Second, in Darzi's analysis, we have to stipulate that CL in Farsi is a rightward spreading rule so as not to produce a wrong output in examples like (9).



3. Alternative analysis

Now turning to the analysis in the framework of the moraic theory I argue for here, I will show that the CV tier can be dispensed with in accounting for CL in Farsi once the moraic tier is employed. In order to show this, first, I will follow Kang and Kim (1991), and Kang (1991, 1992), assuming that unlike Hayes's (1989) assertion, only moraic coda consonants (i.e., /ʔ/ and /h/ in Farsi) are assigned a mora by 'Weight by Position' in (10), the revised version of Hayes' (1989).

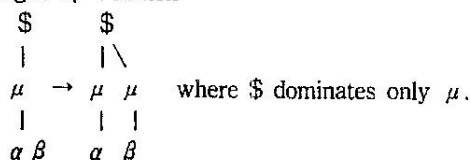
(10) Weight by Position (WP)⁵



What (10) says is that only moraic segments can license the second mora of heavy syllables. (11), for instance, shows how (10) works in the process of syllabification of /robʔ/ 'quarter'.⁶ Here, the moraic segment /ʔ/ but not the nonmoraiac segment /b/ is

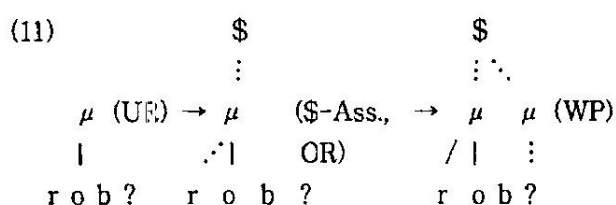
⁵ Hayes (1989) formulates this rule as follows:

(i) Weight by Position



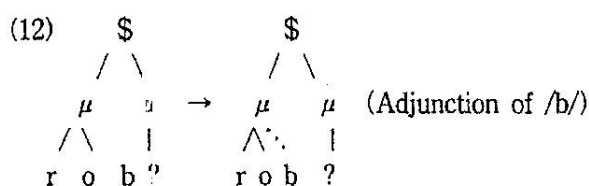
⁶ In moraic theory, a short vowel is assigned a mora underlyingly, whereas a long vowel is assigned two moras, as shown below.

assigned a mora by the WP.

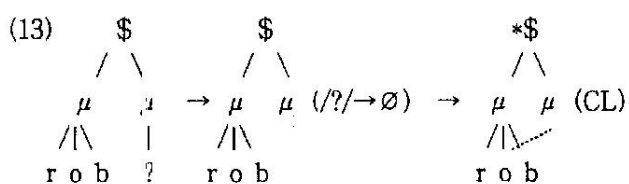


(UR=underlying representation; OR: onset rule)

Second, Hayes (1989) asserts that nonmoraic consonants in the coda are linked to the preceding mora. If we accept his proposal, the nonmoraic segment /b/ in (11) will be adjoined to the preceding mora, as shown below.



However, such an analysis would clearly be inadequate for Farsi, because it removes the possibility of CL: it cannot account for CL with the loss of the glottal consonants /ʔ/ and /h/ in the cases where they are preceded by another consonant, as in /robʔ/ and /sobh/. Observe, for example, the following derivations:



-
- (i) a. μ b. $\mu \mu$
 | √
 i = /i/ i = /i:/

(14)	a. /nozd/	b. /bəhs/	c. /rob?/	
	μ	μ	μ	(UR)
	nozd	bəhs	rob	
	\$	\$	\$	
	⋮	⋮	⋮	
	μ	μ	μ	(\$-Ass., OR)
	⋮	⋮	⋮	
	m o z d	b æ h s	r o b ?	
		\$	\$	
		⋮	⋮	
	μ μ	μ μ	
		/ :	/ :	(WP)
		b æ h s	r o b ?	
	\$	\$	\$	
		\	\	
	μ	μ μ	μ μ	(Adj. of
	/ ⋮	/ ⋮	/ ⋮	stray
	n o z d	b æ h s	r o b ?	segments)

Finally, accounting for Middle English CL, Hayes (1989) proposes the following principle:

Onset consonants are desyllabified if their syllable contains no overt moraic nucleus

The crucial consequence of PD is that when a vowel delinks from a mora, the mora becomes completely free, and may acquire an unexpected new association. For Middle English, for example, the effect of PD on the output of Schwa Drop (SD) is as follows:

$$\begin{array}{ccccc}
 (16) & \$ & & \$ & & \$ & & \$ & & \$ \\
 & | & & | & & | & & | & & | \\
 & \mu & & \mu & \rightarrow & \mu & & \mu & \text{(SD)} & \rightarrow & \mu & & \mu & \text{(PD)} \\
 & / | / | & & / | / & & / | / & & / | / & & / | / \\
 & t a l \text{ ə} & & t a l & & t a l & & t a l
 \end{array}$$

In (16), we have a stray mora, which relinks to the preceding vowel melody, producing a long vowel, as illustrated in (17). The end result derives from the resyllabification of the stranded final consonant /l/.

$$\begin{array}{ccccc}
 (17) & \$ & & \$ & & \$ \\
 & | & & | & & | \backslash \\
 & \mu & \mu & \rightarrow & \mu & \mu & \text{(CL)} & \rightarrow & \mu & \mu & \text{(Adj. of /l/)} \\
 & / | & & / | & & / | / : & & / | / : \\
 & t a l & & t a l & & t a l
 \end{array}$$

In order to account for CL in Farsi, however, we need to modify the PD as in (18).

(18) Parasitic Delinking (PD)

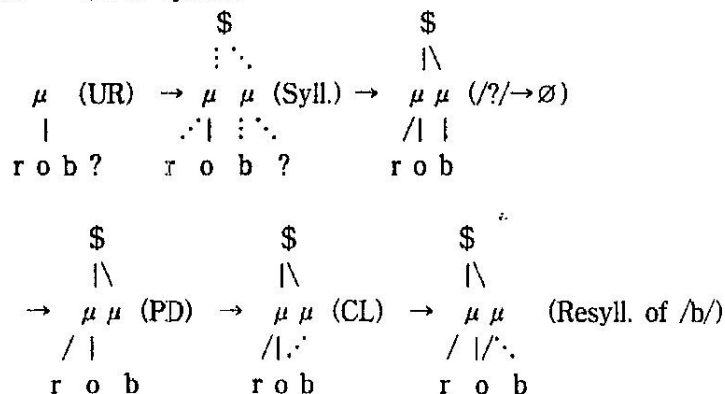
Nonmoraic segments are desyllabified if the mora to which they have been linked contains no overt moraic segment.

What (18) says is that when moraic segments are deleted, nonmoraic segments linked to the mora are delinked from it, stranding the mora.

Given the revision above in the mora-linking convention, explanation of CL in Farsi is straightforward. Observe, for example, the following derivations:

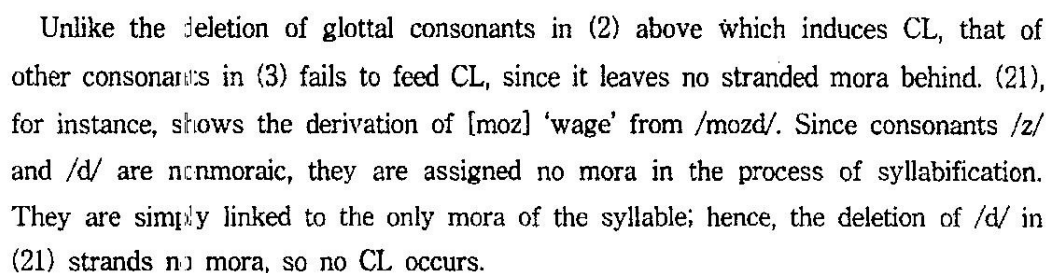
$$\begin{array}{ccccccc}
 (19) \text{ a. } & /su?/ & \rightarrow & [su:] & \text{'bad'} \\
 & & & \$ & & \$ & & \$ \\
 & & & : & & | \backslash & & | \backslash \\
 & \mu & \text{(UR)} & \rightarrow & \mu & \mu & \text{(Syll.)} & \rightarrow & \mu & \mu & \text{(/?/} \rightarrow \emptyset \text{)} & \rightarrow & \mu & \mu & \text{(CL)} \\
 & | & & : & & / | & & / | & & / | & & / | & & : \\
 & s u ? & & s u ? & & s u & & s u
 \end{array}$$

b. /rɒb?/ → [rɒ:b] 'quarter'



In (19a), the loss of the moraic segment /?/ creates a stray mora, which is reassociated with the preceding vowel melody, producing a long vowel [u:]. (19b) illustrates the derivation of [rɒ:b] from /rɒb?/. After the deletion of the moraic segment /?/, the nonmoraic segment /b/ is dissociated from the mora by PD. Then, the vowel /o/ can freely spread to the stranded mora, producing a long vowel. The spreading here does not violate the ban on crossing association lines. Finally, /b/ is reassociated with the preceding mora, i.e., the second mora of the syllable. Note that the occurrence of CL prior to the resyllabification of /b/ is a consequence of Ito's (1986) principle that syllable structure (indeed, all prosodic structure) is created maximally.

Unlike Darzi (1991), there is under the analysis adopted here no need to stipulate that CL in Farsi is a rightward spreading rule. That is, my analysis correctly predicts that spreading of the vowel /a/ to the left in (9) above is blocked, as illustrated in (20a) in comparison with (20b). (20a) clearly shows that the stranded mora after the loss of /h/ cannot be linked to the following vowel /a/; since the /n/ remains linked, it is impossible for the vowel /a/ to spread leftward, due to the ban on crossing association lines. Thus, CL in (20a) is correctly ruled out. As shown in (20b), the only possible way of conserving the stranded mora is to link it to the preceding vowel /æ/. This is exactly what is predicted in my analysis.



Considering CL in Farsi so far, I have claimed (i) that unlike Darzi's (1991) assertion, a two-tier analysis combining both a skeletal (CV) and a moraic tier is not necessary, and (ii) that CL in this language can be given a natural account in the 'purely' moraic framework by modifying three of Hayes's (1989) principles.

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