On Nonlocal Compensatory Lengthening*

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Various types of compensatory lengthening have been analyzed extensively both linearly (de Chene and Anderson 1979) and nonlinearly, the latter in metrical framework (Ingria 1980). de Chene and Anderson claim that for a consonant to be involved in compensatory lengthening it has to be always *immediately adjacent* to the vowel to be lengthened and that while compensated loss occurs in syllable final position, uncompensated loss occurs intervocalically or adjacent to word boundary (de Chene 1987:14). Therefore, they decline to comment on the cases of nonlocal (i.e. nonadjacent) comopensatory lengthening in Slavic (1a), in which the lengthening of the preceding (stressed) vowel is caused by the deletion of a nonadjacent vowel (1979 fn. 1).[1)]

(1) a. (Slavic)

mostu 'bridge' → mo:st (Serbo-Croatian)

bogu 'god', bobu 'bean' (OCS) → bo:g, bo:b (pre-Serbo Croatian)

eRə (PIE) → e:R (Balto-Slavic)

b. (Middle English) (Minkova 1982)

namə 'name' → na:m

talə 'tale' → ta:l

On the other hand, Ingria (1980) claims that a consonant involved in compensated loss has to be in the *coda* position by the Empty Node Convention (2) —via metathesis, following Kiparsky (1967), in the case of nonlocal compensatory lengthening of the type (3) from Greek, where compensatory lengthening of the preceding stressed vowel is caused

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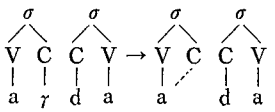
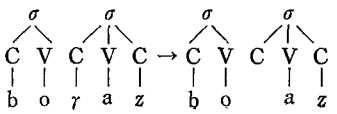
1) On the other hand, Sezer (1982) analyzes uncompensated loss in (b) below as segmental, not skeletal (p. 247), since no reassociation/lengthening occurs in as much as only rhyme elements (a) serve as the hosts of compensatory lengthening, not onset elements (b), in which the unassociated empty C in onset position is shown floating.

a. 

b. 

by the loss of the following nonadjacent *consonant*, as shown analyzed in (3b).

(2) Empty Node Convention (ENC)

Empty *w* nodes which are part of a syllabic coda are to be associated with the terminal element dominated by the immediately preceding syllable nucleus. All other empty nodes are pruned.

(3) a. wiswos 'equal' → wi:sos
kalwos 'beautiful' → ka:los
bolsa 'council' → bo:la
(cf. esmi 'I am' → e:mi)
ekrinsa 'judge' → ekri:na
ksenwos 'stranger' →kse:nos

b. [ekrin][sa] → [ekris][na] (metathesis) → [ekri:][na]

A metrical analysis of local (4)∼(5) and nonlocal (6) compensatory lengthening in Old English in the similar vein is given in Kim (1983).

(4) a. sēon 'to see' (<seo͡han; cf. OHG sehan), slēan 'to slay' (<sle͡ahan; cf. Go. slahan)

b. [se] [han]→[seo͡] [han] (breaking)→[seo͡h] [an] (resyllabification)→[seo] [an] (compensatory lengthening)→[seon] (hiatal vowel deletion).[2)]

(5) a. þweales (gen. sg. of þwe͡ahl 'washing'; Go. þwahl)
[þwe͡ah][les]→[þwea][les] (compensatory lengthening)

b. (in compound words) ēored 'troop' (<e͡oh 'horse'+rād 'ride')
[e͡oh][ra:d]→[eo][ra:d] (compensatory lengthening)—[eored] (unstressed vocalic quantity reduction)

(6) a. i. furhum (dat. pl. of furh 'furrow')→fu:rum
ii. holhes (gen. sg. of holh 'hole')→ho:les

b. i. [fur][hum]→[fuh][rum] (metathesis)→[fu:][rum]
ii. [hol][hes]→[hoh][les] (metathesis)→[ho:][les]

Now the *h*-pruning rule (7) is lexical, not postlexical since it applies only within a word ((4) and (5a)) or compound (5b).

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2) a. Breaking: $\emptyset \rightarrow \begin{bmatrix} V \\ +back \end{bmatrix} / \begin{bmatrix} V \\ -back \end{bmatrix} \_\_\_ \begin{Bmatrix} +cons \\ +cont \\ +back \end{Bmatrix}$

b. loss of hiatal inflectional vowel: $\begin{bmatrix} V \\ -stress \end{bmatrix} \rightarrow \emptyset / V + \_\_\_ (C) \#$

(7) *h*-pruning:

$$h \rightarrow \phi / [+son] \underset{\substack{| \\ C}}{\text{—}} [+son]$$

However, it is to be noted that resyllabification of the onset *h* of the second syllable of ***seo-han*** (4b) into the coda position as in ***seoh-han*** for the preceding short vowel (see fn. 3) to be compensatorily lengthened violates the universal CV onset rule.

The purpose of this paper then is first reexamine the claim (2) in Part I as it will lead to positing an unwarranted intermediate stage with metathesis in derivation in the cases of (3) and (6) and also unwarranted resyllabification in the case of (4) in violation of the universal CV onset rule, and then reanalyze within a CV-framework the local compensatory lengthening of type (4) without unwarranted resyllabification and also the nonlocal compensatory lengthening of type (3) and (6), involving the loss of a nonadjacent consonant, without unwarranted metathesis, and finally present in Part II a new analysis of the type (1), involving the loss of a nonadjacent vowel, within the moraic framework.

Part 1

The claim that compensated loss, both local and nonlocal, has to occur in the coda position adjacent to the vowel to be lengthened has to be re-examined since it would necessitate both unwarranted resyllabification in violation of the principle of structure preservation in the case of local compensated loss of the type (4a) and an unwarranted intermediate stage with metathesis in the case of nonlocal compensated loss of the type (3) and (6). For example, positing a hypothetically reconstructed instermediate stage of [ksew][nos] from [ksen][wos] (3b) with *w* brought into the coda position is said to be untenable since such a hypothetical metathesized stage of the word is not only unattested in the written record but also the *w* that originally occupied in the coda position as in [aw][laks] ***awlaks*** 'furrow' did not delete as it would if the intermediate stage [ksew][nos] (→[kse:][nos]) really occured (Wetzels 1986).

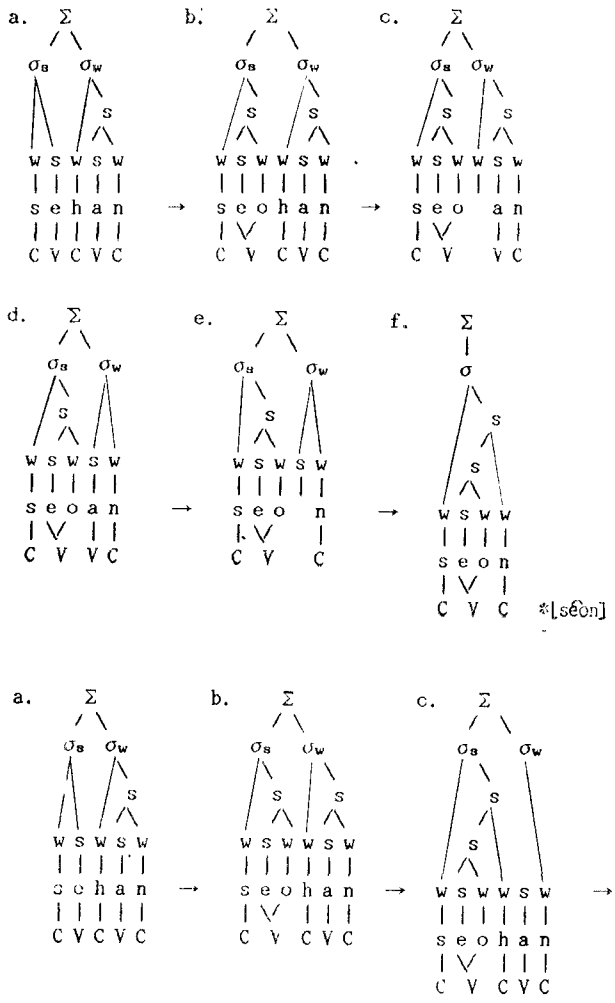
To account for both local and nonlocal compensatory lengthening, Ingria (1980) proposed the Empty Node Convention (2), which involves essential reference to syllable structure, which states that only a *w*-segment in the coda can be deleted—hence 'the empty node'—for compensatory lengthening of the preceding vowel (see (5)), and all other empty nodes, for example, (an *s*-segment in the coda as well as) a *w*-segment in the onset (see (8c),

are to be simply pruned without compensatory lengthening since what is relevant to quantitative change in a syllable is the rhyme, not the onset.

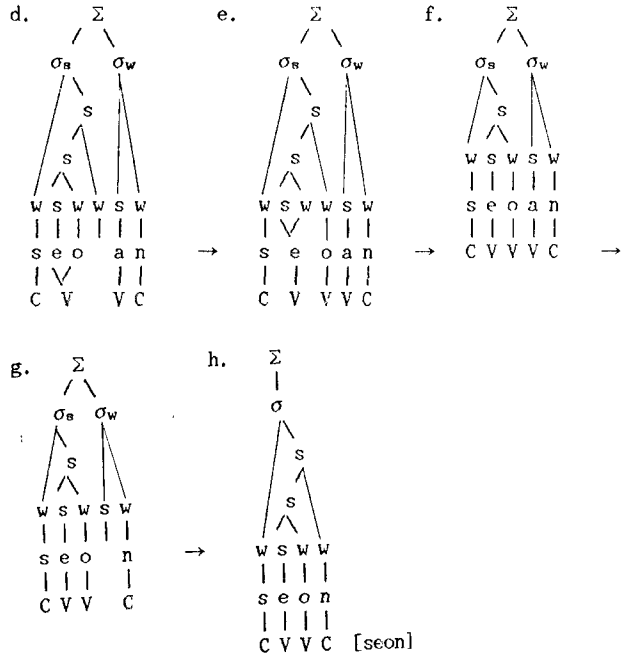
Now the trouble with the ENC(2), which is said to be 'universal', is that it alone can not account for the Old English data (4) (see the analysis (8) below) without further ado (see (9))—in this case, resyllabification in violation of the the universal CV rule (see fn. 4).

(8) sehan (underlying)→seohan (Breaking) (fn. 2a)[3]→seo-an
(*h*-pruning) (7)→seon (hiatal vowel deletion) (fn. 2b)→*seon

(9)



3) In Old English, a simple vowel is "dippthongized" before certain consonants such as *h*. The resulting short "diphthong" or long "diphthong" is moraically equivalent to a single short



Note that while (9b) is well-formed since it has observed the CV rule, (9c) is not since it has violated the CV rule. If we assume with Levin (1985 and also see Rubach 1990:91) that the CV rule automatically resyllabifies the coda into the onset of the newly created syllable, as in $(VC)_\sigma(V)_\sigma \rightarrow (V)_\sigma(CV)_\sigma$, then the question arises as to the legitimacy of resyllabification of $(wa)_\sigma(ter)_\sigma \rightarrow (wat)_\sigma(er)_\sigma$ to account for flapping in English: wə-tər (underlying)→wət-ər (resyllabification)→wəɾ-ər (laxing and flapping) (Selkirk 1982:366; Borowsky 1988:269). This analysis implies that the optimal syllable structure, CV, is to hold throughout the derivation only during the lexical phonology by the principle of structure preservation in both initial syllabificastion and resyllabification, to be dropped only

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vowel (V) or a long vowel (see (9)) respectively, as evidenced metrically in Old English verse and from the High Vowel Deletion rule.

The reader will quickly note why the present writer resorts to the simple autosegmental CV-framework, instead of the cumbersome metrical framework (see the metrical-cum CV representations in (9e)), since the latter cannot capture the quantitative and qualitative nature of a segment. Within the CV-framework, a complex segment such as [ts] can be linked to a single C (a), just like an Old English short "diphthong" (b): a. t s b. e o
C V

during the post-lexical phonology, since flapping is postlexical.

It is true that while lexical rules always preserve the canonical morpheme structure of a language, postlexical rules may not, as in [ftógrəfi] (<[fətógr əfi] 'photography'), giving rise to a prohibited consonantal sequence disallowed at the underlying level in English, or as in [mafta] (<[mafuta] 'oil'), violating canonical syllable structure in fast speech in Luganda with the first syllabale closed, a language which requires all canonical syllables to be open. Nevertheless, these postlexical outputs all obey the CV rule in syllabification, as in French liaison (*les amis*→[lə zami]), which shows that, unlike other rules, the CV rule should be maintained always in (re)syllabification, even in the postlexical component. Hence, the resyllabified syllable structure(wəř-ər) is phonetically impossible since it violates the CV rule.

Therefore, resyllabification, I believe, is to be carried out only to the extent that it is covered by the CV rule in both the lexical[4] and postlexical components, since the CV rule is universal and obligatory even though the onset and coda rules are language specific. For example, *frāg+lich* /fra:klix/ in German is to be syllabified as [fra:g]$_\sigma$ [lix]$_\sigma$ with final devoicing of *g* syllable finally, not *[fra:]$_\sigma$ [glix]$_\sigma$ even though *gl-* is a possible onset in German (see Rubach 1990:89). Likewise for the English word *metro*, no single syllabification is said to be preferred for medial cluster by the sonority principle since languages differ in their syllabification of such clusters; therefore, the word can be syllabified either as (10a) and (10b) but never as (10c):

(10) a. me-tro
b. met-ro
*c. metr-o

English and classical Greek and Latin have(10a), while Finnish and Sanskrit have (10b) (Kiparsky 1979:436). The correctness of the structure (10a) is attested by the optional pronunciation of the word with [č] as in [mečro] since /t/ becomes [č] only in the onset

4) even at the levels where the principle of structure preservation is not said to hold—viz. at the word boundary (#) level II and in the postlexical component—except as in *siŋ#ing* 'singing'→*si-ŋing* (CV-CVC) by universal syllabification→*siŋ-ing* (CVC-VC) by language-specific resyllabification, since velar nansal (ŋ) is not allowed in the syllable onset, due to the English onset constraint. However, Kaminashi (personal communication 1990) says that the CV rule is not constrained by resyllabification even in the cyclic(viz. lexical) component at the word level (viz. level II) since the word level II is immune to the principle of structure prescrvation and furthermore that the Middle English Open Syllable Lengthening rule (see Part II of the present paper) is a word-level rule.

For a different analysis without introducing the concept of ambisyllabicity and resyllabification, see Kiparsky 1979.

position before tautosyllabic /r/ by the rule (11).

(11) t→č/—r
X X
Onset

In the case of (10a), both the CV rule which produces open syllables and the principle of maximal onset cluster (i.e. the onset rule) have been applied, while in the case of (10b) the maximal onset cluster rule has not applied.

In this connection, let us examine the following data (12) from Middle Korean derived from the adjective stem *talᴥ-* 'different'.

(12) a. talᴥ+a→tal+a '달아'
b. talᴥ+ko→talᴥ+ko '다 ᄅᆞ 고'

Note that, even though the two words in (12) are derived from the same stem, yet in the Korean orthography the *l*, written 'ㄹ', appears as the last segment (i.e. in the coda) of the first syllabic characater '달' in the derived word in (12a) but as the first segment (i.e. in the onset) of the second syllabic character 'ᄅᆞ' in(12b). Consequently, Lee(1981) syllabifies (12a) as (13c), not as (13d), and (12b) as (14) respectively, where the subscript dot (.) represents syllable boundary.

(13) a. ta.lᴥ+a (underlying)→
b. tal.+a (hiatal vowel deletion)→
c. t a lø.a (surface form), where ø symbolizes "trace"
σ σ

*d. ta. la
σ σ

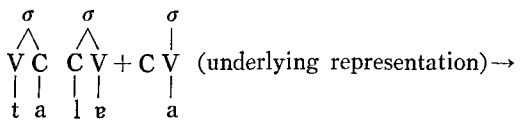
(14) ta.la.+ko
σ σ

The syllabification (13c) is said to be justified, i.e. does not violate the maximal onset principle, because of the syllabification constraint (15), which prohibits *l* and *s* (or *z*) from syllabifying with the following vowel across the vowel trace (ø) (Lee 1981:3):

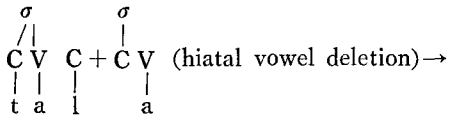
(15) $*\ (\begin{bmatrix} +\text{cons} \\ +\text{cont} \\ +\text{voice} \end{bmatrix} ø\ldots)_{\sigma}$
σ

Granted that the Korean orthographical representations in (12a) faithfully reflect their syllabic counterparts in the Middle Korean spelling system, Lee's account then can be

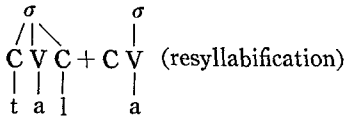
restated as in (16), with an unassociated empty C slot serving as a place holder in its CV-tier.[5]

(16) a. 

(underlying representation)→

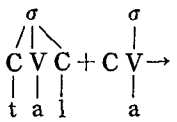
b. 

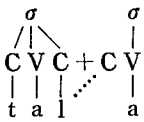
(hiatal vowel deletion)→

c. 

(resyllabification)

In Modern Korean, the place holder is filled by the *l*-spreading (17): tal.a (달아) ((17a)=(16c))→tal.la (달라) (17b).

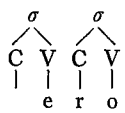
(17) a. 

b. 

The next problem has to do with metathesis. In Old English, the metathesis of the liquid—h sequence postulated for (6b) is simply not attested since in Old English only *r*, not *l*, is involved in metathesis in the written record for liquids, as shown in (18), where original forms coexist with their *r*- metathesized alternants. Moreover, *r* changes places with its adjacent vowel, not consonant, as shown in (18), where V stands for vowel and C for consonant, of which the most frequent type is(18Aa), and the type (18Ab) is much

5) The Korean spelling '가' for /ka/, for example, consists of two letters, 'ㄱ' for /k/ and 'ㅏ' for /a/. On the other hand, when a syllable consists of a vowel alone, /a/ for example is represented by two letters 'ㅇ'+'ㅏ' (16), of which the former 'ㅇ' is phonetically nil, serving in my opinion only as a place holder (16)~(17).

French *h*-aspiré words (exp. *heros* 'hero') have similarly been analyzed as shown below, since the C position blocks liaison as well as well as vowel elision:



less frequent, and the type (18Ac) is much rarer, being practically limited before *-ht* (see Campbell §459), and furthermore, metathesis operates only intrasyllabically (18Ba) not intersyllabically (18Bb).

(18) A. a. (C)rV→(C)Vr: rænan 'to run', brænan 'to burn'→ærnan, bærnan
græs 'grass', brestan 'to burst', frost 'frost',
hros 'horse'→gærs, berstan, forst, hors
b. CrV→CVr: brid 'bird', ðrida 'third'→bird, ðirda
c. CVr→CrV: worhte 'he worked', forht 'afraid'→wrohte, froht
B. bræ-nan→ a. bær-nan
*b. bæn-ran

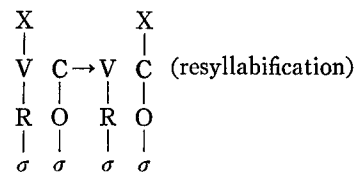
Therefore, (6aii), for example, cannot be analyzed along the lines proposed by Ingria for three reasons: (a) the consonant involved in metathesis is *l*, not *r*, (b) the consonant metathesized with its adjacent consonant, not vowel, and (c) metathesis occurs between syllables across syllable boundary (hol-hes→hoh-les) (see 18Bb), not within a syllable.

For these reasons, an analysis involving an intermediate stage with metathesis is also rejected for the Old English data in the present paper (cf. Kim 1983).

An alternative nonlocal analysis of compensatory lengthening in a straightforward fashion without metathesis by what Hayes calls a "double flop mechanism" (i.e. delinking and reassociation) has been proposed for Greek by Steriade (1982: 126ff.) (19)~(22) and Wetzels (23), which is explained as arising from an empty C slot in the rime being associated with the segment in the nucleus position (21) via onset deletion (19), resyllabification (20) and association (21), as shown analyzed in (22).

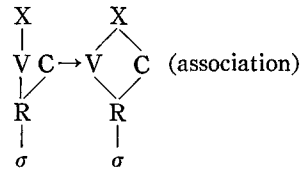
(19) onset *w*-deletion

(20)



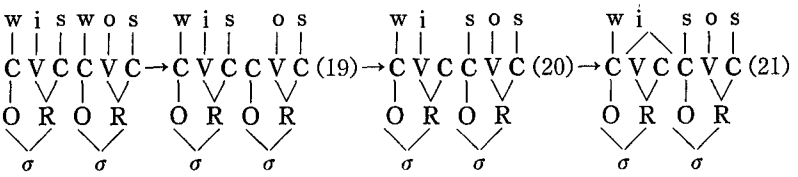
(resyllabification)

(21)

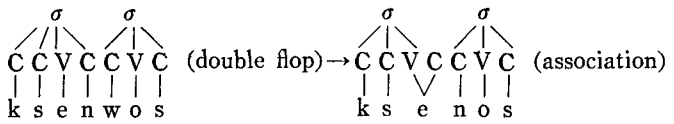


(association)

(22) [wiswos]→[wi:sos]

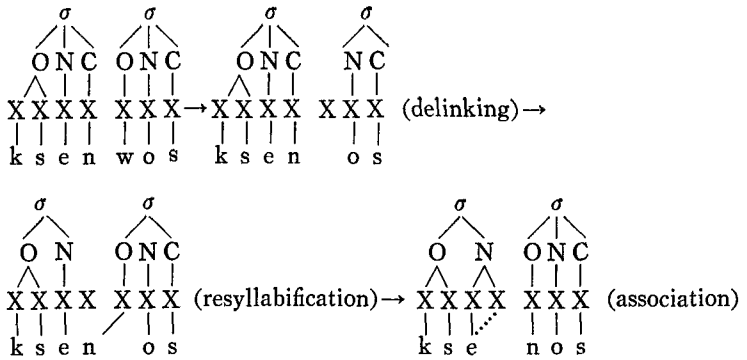


(23) [ksenwos]—[kse:nos]

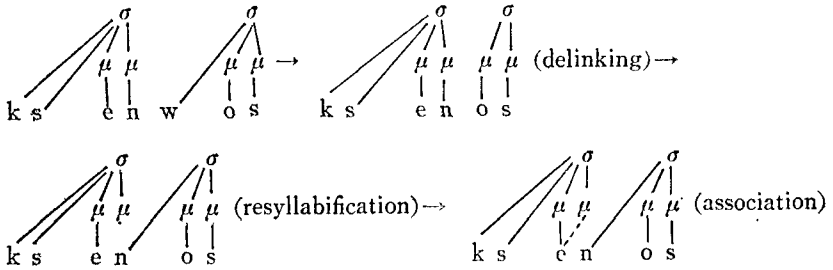


It is to be noted that in both analyses the whole processes of nonlocal compensatory lengthening, viz. delinking, segmental resyllabification, and reassociation, have been triggered by onset deletion (of *w*). The 'double-flop analysis' can be restated in X-theory (24) and also in moraic theory (25) (see Hayes 1989 for the latter).

(24) (X-theory)

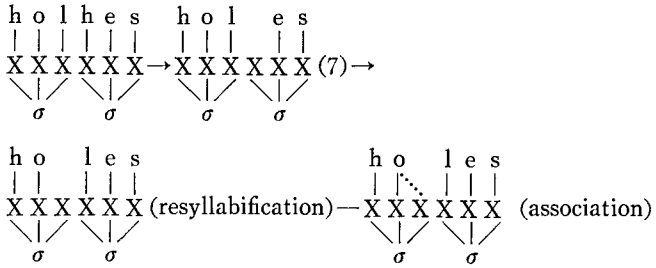


(25) (moraic theory)



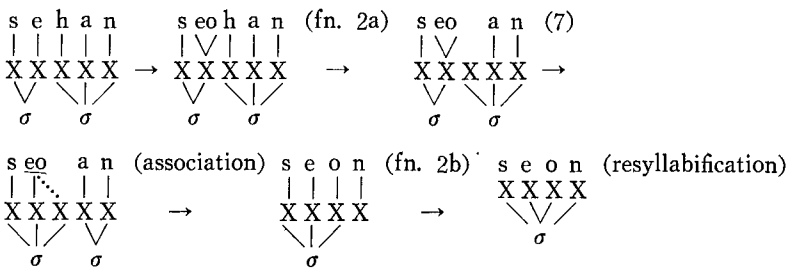
The Old English data (4a) can be reanalyzed—without recourse to metathesis—, triggered by the intersonorant *h*-pruning (7), followed by segmental (not skeletal) resyllabification for optimal syllable structure, and association, as shown in (26).

(26) [holhes]→[ho:les]



The merit of the analysis by the double-flop mechanism is that non-optimal resyllabification is to be no longer called for within the present framework, even for local compensatory lengthening (4a), as shown reanalyed in (27) for (4) (cf. (9): *se-han→seo-han* (27) (see (9))*→seo-an→seon.*

(27)



All of these analyses of nonlocal compensatory lengthening are characterized by the deletion of a segment, accompanied by the lengthening of another segment, without change in the quantitative integrity of the syllabale, i.e. in the CV (or X or moraic) tier.

Part II

The nonlocal compensatory lengthening by vowel loss of the pattern VCV→VCØ is attested in many languages (Hock 1986), including Middle English(Minkova 1982, Hayes 1989), Italian(Repetti 1989), and Korean.[6]

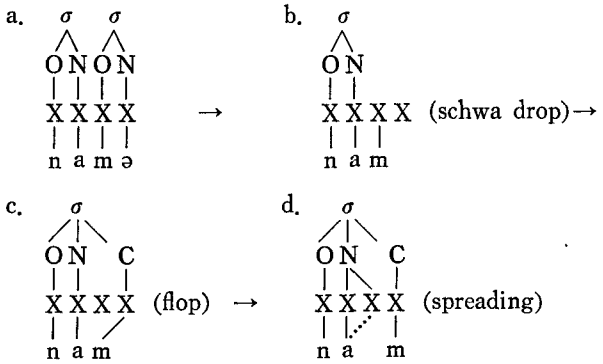
According to Minkova, the so-called Open Syllable Lengthening (OSL) in Middle English, which lengthened a stressed vowel in an open syllable in disyllabic words, occurs only sporadically, and 97% of the relevant cases have their stressed penult vowels lengthened in open syllables where a word-final schwa was dropped, as in *namə→na:m* 'name'.

Just as for Greek, an intermediate stage by metathesis cannot likewise be posited for

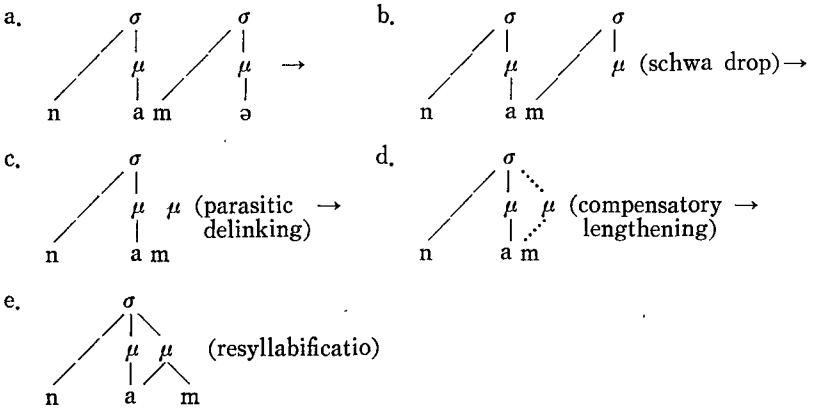
6) Korean *ko:m* (cf. Japanese *kuma*), *sə:m* (cf. Japanese *sima*).

Middle English since it is similarly not attested in the written record because if it did, the resulting derivation via metathesis would be ill-formed: *namə→*naem*. Therefore, the proper and uniform way of accounting for all cases of nonlocal compensatory lengthening including the so-called OSL in Middle English is by a mechanism of double flop for the resulting empty position to spread unto the stressed penultimate vowel, as shown analyzed below on an X-theory in (28) and also on a moriac theory in (29) (see Hayes 1989).

(28) (X-theory)



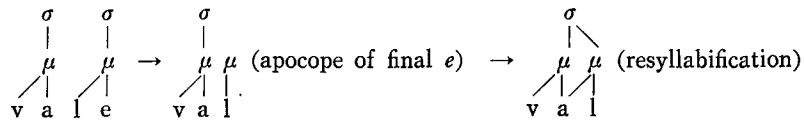
(29) (moraic theory)



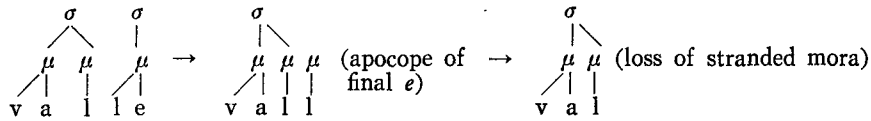
Since, by convention, any stray segments, positions (28b, c) or moras (29c) are to be eliminated unless they get reassociated to syllables, stray elements then have to be properly linked.

Similarly in Friulian, an Italian dialect, a stranded mora is rescued by reassociation with compensatory lengthening (30) but eliminated since compensatory lengthening is not feasible (31) (see Repetti 1989).

(30) vale→va:l 'it is worth'



(31) valle→val 'valley'



The moraic model is able to show that in Friulian long vowels do not occur in originally heavy syllables (see (30)).

An alternative analysis that I would like to propose below for nonlocal compnesatory lengthening in Middle English is a biplanar analysis with skeletal (33), not segmental (34) segregation,[7] since the nonlocal compensatory lengthening of *namə→na:m*, for example, cannot be accounted for by a uniplanary analysis (32) on account of line crossing.

(32) * C V C V
n a m ə

(33) V V
n a m ə = [na:m]
C C

(34) a e a e
C V C V → C V C = * [naem][8]
m n m n

(33) can also be reinterpreted moraically as (35).

(35) namə → namə → nam = [na:m]

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7) According to McCarthy (1987), only the language in which the linear segmental ordering is redundant requires the biplanar analysis with 'segmental" representation. However, since the linear segmental ordering in English is inherent (i.e. contrastive), not redundant (i.e. nondistinctive semantically), a nonderived monomorphemic lexical item such as *namə* should not be represented in the biplanar analysis according to his claim, but it does. Hence, the above Middle English example is a counterexample to his claim on two accoupts: one, since it requires a biplanar analysis; two, what is segregatead is not segments but skeletal.

8) However, instances of (34) occur in Rotuman, as in *pure→puer* 'to decide'(McCarthy 1986: 215;1987):

u e u e
C V C V → C V C
p r p r

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비인접 대상연장에 관하여

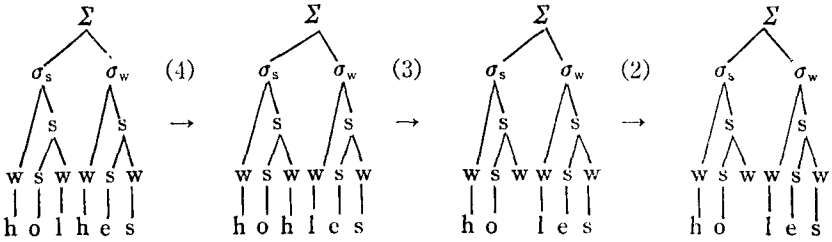
김 석 산

대상연장(=CL)에는 인접(local) CL과 비인접(nonlocal) CL이 있으며, 인접 CL에 대한 첫 복선적(nonlinear) 분석은 운율(metrical)음운론에 입각하여 분석한 것으로(Ingria 1980), 이 운율음운론을 고대영어에 적용하여 Ingria의 coda에 대한 제약인 Empty Node Covention (ENC)을 다소 수정한 것(2)이 Kim(1983)이다.

Kim(1983)에서는 고대영어의 비인접 CL 현상을 히랍어에 입각하여 Kiparsky(1967)와 Ingria(1980)에 제시된 음전이 (metathesis)규칙을 받아들여 (1)을 (2)와 같이 도출하였다.

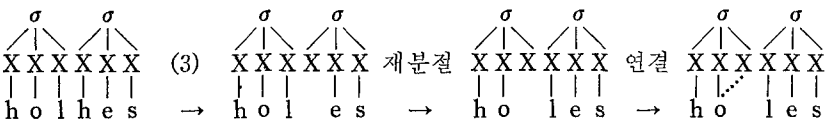
(1) holh+es(holh 'hole'의 단수속격)→hōles

(2) a. 기저형 b. 음전이 c. h-날락 d. 대상연장



이 논문은 2부로 구성되었으며, 제 1 부에서는 운율음운론에 입각한 고대영어의 비인접 CL 분석 (2)를 수정하여, 이를 CV-또는 X-층(tier) 음운론에 입각하여 음전이 규칙 (1b)의 개입 없이 단순히 onset위치의 h-탈락규칙 (3b)와 분절음의 재분절(resyllabification) 규칙 (3c)와 연결(association) 규칙 (3d)로 표면형을 도출하는 것이다.

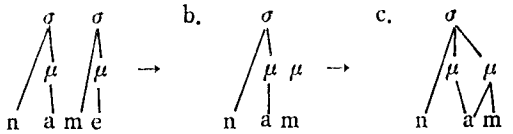
(3) a. 기저형 b. h-탈락 c. 재분절 d. 연결



(3)과 같은 비인접 CL 분석은 히랍어에서 엿볼 수 있으나(Wetzels 1986, Hayes 1989) 단 고대영어와 히랍어간의 차이는 대상연장을 야기시키기 위해 탈락되는 자음의 종류와 위치가 다르다는 점이다.

제 2 부에서 다루게 되는 중세영어의 비인접 CL 현상은 2음절 장모음화 규칙(Open Syllable Lengthening=OSL)으로, 이것 역시 음전이(metathesis) 규칙의 도입없이 CV-내지 X-층 음운론 또는 모라(mora=μ) 음운론(4)으로 분석 할 수 있다. 즉, (4)에 표시된 바와 같이

OSL은 2음절어의 어말 모음 e(=ə)의 탈락으로 선행 강제모음이 길어지는 것으로 풀이 할 수 있다(예 name→nām 'name').

(4) a. 

(4b)에서는 둘째 음절의 비강세 어말 모음 e의 탈락 (apocope) (4b)으로 둘째 음절은 음절(σ)을 형성 못 하게되어 이 좌초된 (stranded, stray) 모라 (μ)는 (4c)에서와 같이 선행 음절에 연결(association by spreading)되어 모음이 장모음화 한다. 이와 같은 현상은 이태리어(Repetti 1989) 내지 기타 언어 (Hayes 1989)에서도 엿 볼 수 있다.