On non-moraic geminates*

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Kim, Young-Seok 2002. On Non-moraic Geminates. *Studies in Phonetics, Phonology and Morphology* 8.2. 187-200. In Moraic Theory, it is generally assumed that geminates are lexically specified for a mora, so that a CVC syllable should always count as heavy if the coda consonant is part of an underlying geminate, even in languages like Korean where a CVC syllable invariably counts as light otherwise. Based on *l*-gemination and other geminates derived by total assimilation, we show that this assumption is simply not tenable. The mora is a unit of phonological weight, not of segment length. In this paper we explore ways to represent non-moraic geminates, and propose a return to the skeletal theory minimally supplemented with the Moraic Projection. **(Sogang University)**

Keywords: (non-moraic) geminate, mora, length, phonological weight, compensatory lengthening, total assimilation, Moraic Projection

1. Introduction

In CV Theory, long segments, geminates and long vowels alike, were represented as single melody units linked to the two (C/V or X) skeletal slots (Clements and Keyser 1983; Levin 1985).

(1) a. Long vowel

b. Geminate consonant

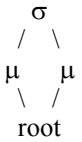
This basic assumption about phonological length[1] has been carried over in most recent work on feature geometry, where a root node is assumed to take the place of a single melody unit.

In Moraic Theory, on the other hand, a long segment is represented as a single root node linked to two different positions in a syllable/mora structure, as in (2):

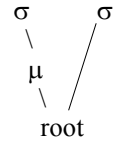
*This work was supported by the Brain Korea 21 Project in 2002.

[1] Crystal (1980) defines *length* as "a term used in phonetics to refer to the physical duration of a sound of utterance, and in phonology to refer to the relative duration of sounds and syllables when these are linguistically contrastive" (see also Bright 1992).

(2) a. Long vowel



b. Geminate consonant



As we can see in (2), the representation of length in terms of a moraic model[2] is less straightforward. However, this is what McCarthy and Prince (1986, 1988) and Hayes (1989) conceive of as a universal theory of length. They further assume that length is reflected directly in underlying forms.[3] Accordingly, vowels, long or short, are inherently moraic. And an underlying geminate consonant differs from a simple consonant in terms of a mora. Under this assumption, it is predicted that a CVC syllable should always be heavy if the coda consonant is part of an underlying geminate, even in languages where CVC syllables count as light otherwise.

As I showed elsewhere (Kim 2001), however, compensatory lengthening (henceforth CL) does not occur precisely when there is no onset. The following examples may illustrate the point.

(3) a. o-a 'to come' → wa, *o.a, *wa:
b. po-a 'to see' → *pwa, po.a, pwa:

When the verb stem *o-* is followed by the infinitive ending *-a*, we get [wa] instead of *[wa:]. Moreover, glide formation here is obligatory since *[oa] never surfaces. This is unusual when we compare it with *po-a* which is realized as either [poa] or [pwa:].

While the skeletal theory or Hyman's (1984) WU theory makes this prediction straightforward, one would have to add an *ad hoc* mora deletion rule for such cases within the moraic framework (cf. Bickmore 1995: 148n).

Needless to say, CL is understood by a "stability" effect similar to that found in many tone languages. Within OT, this effect may be achieved by the constraint MAX-μ. Given the constraint ranking ONSET >> *COMPLEX >>MAX-μ, however, we get the partly wrong results, as the tableaux in (4) show:

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[2] In Hyman's (1984) model, all segments are linked to moras (or weight units (WU's) in his terminology), in accord with the Strict Layer Hypothesis (Selkirk 1984). In Hayes (1989), on the other hand, onset consonants are linked directly to the syllable, while all other segments are dominated by moras, apparently in an attempt to recapture the onset/rime division of the syllable. McCarthy and Prince (1986, 1988) differ from Hayes in the point that all non-moraic segments are linked to the syllable.

[3] Hayes (1989) and McCarthy and Prince (1986, 1988) differ in their representation of underlying long vowels although they have a similar idea of underlying geminate consonants.

(4)

/o$^{\mu}$.a$^{\mu}$/ 'come (Inf.)'	ONSET	*COMPLEX	MAX-$^{\mu}$
o$^{\mu}$.a$^{\mu}$	*!*		
☞ wa$^{\mu}$			*!
☜ wa$^{\mu\mu}$			

/po$^{\mu}$ .a$^{\mu}$ / 'see (Inf.)'	ONSET	*COMPLEX	MAX-$^{\mu}$
po$^{\mu}$ .a$^{\mu}$	*!		
pwa$^{\mu}$		*	*!
☞ pwa$^{\mu\mu}$		*	

This situation appears to call for a phonological theory capable of encoding length directly without recourse to weight. We will return to this point in section 3.

2. Geminates in Korean

Korean exhibits a contrast between short and long vowels, but there is arguably no such contrast between simple and geminate consonants (cf. Perlmutter 1995). In what follows we will show that geminates in Korean do not bear moras, unlike vowels.

2.1 *l*-gemination

Save for a handful of native words such as /pəl.le/ 'worm', /kən.nə/ 'across', /nolla-/ 'be surprised', and /manna-/ 'meet', Korean has no tauto-morphemic geminate consonants. However, we see several notable cases of derived geminates. Let us consider the following examples:

(5)

Stem	Infinitive
puli-/pulli- 'call, sing'	[pullə], *[purə]
hili-/hilli- 'flow'	[hillə], *[hirə]
nuli-/nulli- 'press (down)'	[nullə], *[nurə]
kili-/killi- 'grow'	[killə], *[kirə]
keili-/keilli- 'be lazy'	[keillə], *[keirə]
mali-/malli- 'become dry'	[malla], *[mara]
tali-/talli- 'be different'	[talla], *[tara]
oli-/olli- 'climb'	[olla], *[ora]
moli-/molli- 'do not know'	[molla], *[mora]
koli-/kolli- 'pick out'	[kolla], *[kora]

These are examples of the so-called *li*-irregular predicates. They are different from other stems, such as *c^{h}ili-* 'pay (one's bill)' and *t'ali-* 'follow, pour', which require only *i*-deletion. To be precise, instead of simply

dropping *i,* the examples in (5) double the remaining *l*.

As indicated in (5), many Korean speakers tend to level the paradigm by doubling the *l* almost everywhere. So one might be tempted to take *pulli-, illi-, malli-,* etc. as basic (see e.g., Kim-Renaud 1982). But if we posit an underlying geminate *l*, one would expect that every derived form with that geminate *l* would be equally acceptable as one with a single *l*, which seems not to be the case.

(6)			
	puli̱m	*pulli̱m	'a summons'
	oli̱lak nɛlilak	*olli̱lak nɛlilak	'rising or falling'
	ili̱l-t^{h}emyən	*illi̱l-t^{h}emyən	'so to speak'
	cili̱m kil	?cilli̱m kil	'a short cut'
	kei̱li̱m-pɛŋi	?kei̱lli̱m-pɛŋi	'a lazynones'
	pali̱n mal	*palli̱n mal	'a candid remark'

As indicated in (6), one thing is fairly clear— many of the second type are far less acceptable than the first. This means that the geminate *l* of the *li*-irregular predicates is restricted to certain morphological contexts. With basic forms such as /pulli̱-/, /illi̱-/, /malli̱-/, etc., one may seek to remedy the ill-formed outputs of morphology by means of degemination. However there is reason to believe that what is really needed in cases like (6) is in fact *l*-gemination rather than degemination. Compare the following forms:

(7)		Causative/Passive	Infinitive
	a. mali̱ - 'become dry'	malli-, *mari-	*mara, malla
	mal- 'roll up'	malli-, *mari-	mara, *malla
	ma:l- 'stop, give up'	malli-, *mari-	mara, *malla
	b. puli̱- 'call, sing'	pulli-, *puri-	*purə, pullə
	pu:l- 'blow'	pulli-, *puri-	purə, *pullə
	c. kolh- 'underfeed'	kolli-, *kori-	kora, *kolla
	d. kə:t- 'walk'	kəlli-, *kəri-	kərə, *kəllə
	kə:l- 'hang'	kəlli-, *kəri-	kərə , *kəllə
	kəli̱- 'filter, skip'	kəlli-, *kəri-	*kərə , kəllə

When the causative/passive suffix -*i*[4] is attached to a verb root, the final *l* is geminated with concomitant shortening of any preceding long vowel. Again this fact should not be mistaken for evidence that geminates in Korean may bear weight; in Korean, long vowels are allowed only in the initial syllable of a (prosodic) word. Thus, underlying long vowels placed in noninitial syllables are shortened, presumably due to the accent-related constraint ALIGN-μμ. Even in word-initial position, underlying long vowels of verb stems are shortened before a vowel-initial suffix. This may be attributed to the constraint SHORT (Kim 2001).

[4] K.-M. Lee (1972: 94) suggests the possibility of restructuring the proto-form **ɤi* for the causative/passive suffixes, which later changed to *hi* between *l* or *z* and a vowel.

In the case of *mali-* (and for that matter *puli* - and *kəli-*) at least, it may be possible to set up /malli-/ and to obtain the correct surface output via *i*-deletion which is independently motivated in the phonology of Korean. Unfortunately the same strategy cannot apply to other forms for two reasons. First, this should mean that the underlying forms of *mal-* and *pu:l-* are /mall-/ and /pu:ll-/ with double *l*'s. We cannot rule out this interesting possibility *a priori*. But we would still need obligatory application of degemination or some extra device to keep *-ə* from attaching to them. In any event, postulation of /pu:ll-/ and /pulli-/ does not help explain the clear disparity they show with respect to the infinitives, [purə-] and [pullə-]. Second, how can we handle *kolh-* in (7c) and *kə:t-* in (7d)? It is unlikely that /kollh-/ underlies *kolh-*; such a consonant cluster is not found elsewhere. More importantly, there is no way of postulating the geminate *l* for what is called a *t*-irregular predicate, such as *kə:t-* 'walk', where a stem-final *t* alternates with /l/— that is, [r] intervocalically.[5]

It is striking to note here that, consonant gemination notwithstanding, CVC syllables in Korean invariably count as light rather than heavy,[6] and geminate CVC syllables cannot be heavy. In coda positions, as Tranel (1991) argues, geminate consonants behave exactly like other coda consonants with regard to syllable weight. Tranel calls this the Principle of Equal Weight for Codas.

2.2 Excursus on Korean tense consonants

It has been claimed by some researchers that tense obstruents in Korean are geminate[7] although not all of them make an issue of the moraic status of these "geminates" (cf. Martin 1954; Jun 1994; Ahn and Iverson 2001). After arguing against this view, Tak and Davis (1994) tried to show that, unlike underlying tense obstruents, derived tense obstruents in Korean

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[5] Recently Y. Lee (2001) claims that the distribution of Korean liquids is governed by their morahood: [l] is licensed in moraic positions and [r] in non-moraic (i.e., onset) positions. But in Korean, it is generally the case that [r] occurs only intervocalically. If the /l/ of *pul* 'fire', for example, is truly moraic, deletion of that coda consonant is expected to cause CL, as is generally assumed within the moraic framework. But we can detect no such trace: cf. /pul-napi/ 'a tiger moth'→[punapi], [pullabi], *[pu:napi].

[6] It is interesting to note in this connection that C.-K. Kim (1987) argued for the "body" (rather than "rhyme") analysis of Korean syllable structure. I would like to reinterpret his idea as another way of saying that in Korean no coda consonant receives a mora.

[7] A fundamental claim of syllable theory is that moras are excluded from the onset (Davis 1999). Hume et al.'s (1999) proposal is remarkable in this respect. They argue that in the Austronesian language Leti, spoken on the island of Leti off the northeastern coast of East Timor, geminate consonants are not moraic, and hence they are best represented with a single segment linked to two X-slots.

In Korean, a tense obstruent (*p', t', s', c', k'*) must be analyzed as the onset of a syllable. This phonological patterning clearly argues against the geminate analysis of tense obstruents (*pp, tt, ss, cc, kk*). I doubt if there exist such languages in the world as permit geminates as the only initial consonant clusters.

should be analyzed as moraic geminates. But there is no independent evidence in Korean supporting their claim. Even the V.C'V and VCi.CiV words are not always pronounced differently in Korean, as shown in (8).

(8)		slow speech	fast speech		
a.	a.p'a	[a.p'a]	[a.p'a]	[ap.p'a]	'daddy'[8]
	ap.pa	[ap.p'a]	[ap.p'a]	[ap'a]	'father'(<abba)
b.	pɛ.k'op	[pɛ.k'op]	[pɛ.k'op]	[pɛk.k'op]	'navel'
	pɛk.kop	[pɛk.k'op]	[pɛk.k'op]	[pɛ.k'op]	'100 times'
c.	c^hət-tal	[c^hət.t'al]	[c^hət-t'al]	[c^hət'al]	'first month'
	c^hət-t'al	[c^hət.t'al]	[c^h ət-t'al]	[c^hət'al]	'first daughter'

In short, it is only vowel length that counts in Korean; coda consonants never add to syllable weight. For all that, Tak and Davis went so far as to claim that all coda consonants in Korean receive a mora. Their argument was based primarily on the "stress facts" they reported: The first syllable is stressed if heavy ((C)VC, (C)V:), e.g., [ó:hu] 'afternoon', [núnmul] 'tear', [ákki] 'musical instrument'. Otherwise, the second syllable is stressed, e.g., [pagúni] 'basket', [urí] 'we'. Never have I seen this kind of distortion of Korean data, however.

3. The formal representation of (non-moraic) geminates

In this section, we will first clarify the notion of mora and then examine two proposals put forward by Tranel (1991) and Selkirk (1990) to deal with non-moraic geminates.

3.1 What is the mora?

Bright (1992) defines the mora as "a unit of phonological length," and many researchers mistakenly think of the mora as a unit of length constituting a kind of timing slot. Zec (1995: 150-151) writes:

> Under the present approach, neither the CV nor the X tier is assumed. Rather, the subsyllabic *timing tier* corresponds to the moraic level (emphasis added).

But it must be kept in mind that each segment has its own inherent length or physical duration (Crystal 1980; Bright 1992). So the four words in (9) may not be pronounced in the same length of time despite the fact that they have the same weight.

[8] Similarly, *$ap^h a$* [a.p^ha] 'to be sick' can be pronounced as either [a.p^ha] or [ap.p^ha]. Again this has nothing to do with the moraic status of aspirated consonants (cf. Jun 1994).

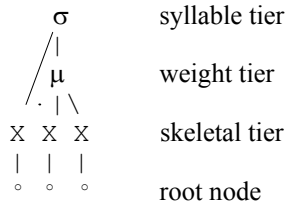
(9) a. it
b. sit
c. spit
d. split

In phonology, however, length is often referred to as quantity since the term is used when the relative duration of sounds and syllables is linguistically contrastive (see note 1). The mora is thus a unit of phonological weight; therefore it is not surprising that only quantity-sensitive languages make use of the mora in a non-redundant way (Brentari and Bosch 1990).

3.2 An unwanted problem with the moraic tier

Combining the skeletal tier, the syllable tier, the weight tier, and the root node, we end up with a multi-tiered representation such as that shown in (10):

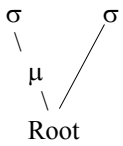
(10)

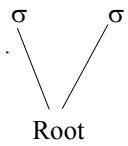


This is in fact akin to what Tranel (1991) had in mind although he avoided the explicit use of the root notes. Recognizing the existence of non-moraic geminates, he argues against the view that geminate consonants are underlyingly specified for a mora. To Tranel the elimination of skeletal positions in favor of moras appears to be "premature" (p. 291), as the skeleton is where length can be encoded directly without resorting to weight.

But as we see in (10), length appears to be redundantly encoded at two places— the weight tier and the skeletal tier, or, as some may think, the skeletal tier and the root node. In order to eliminate redundancy from (10), we can think of at least two possibilities. One is to dispense with the skeletal tier, as in Moraic Theory, for the root node is the integral part of the feature tree. Another possibility is to remove the mora as a constituent below the level of the syllable. Let us first consider the possibility of eliminating the skeleton.

Without the skeletal tier, geminates will be represented as (11a), whereas non-moraic geminates, deprived of moras, will have to be represented as (11b).

(11) a. 

b. 

This seems to be an unexpected but revealing result: non-moraic geminates turn out to be indistinguishable from ambisyllabic consonants. (cf. Borowsky et al. 1984).

So we seem to stand in need of a novel approach wherein segment length is not equated with syllable quantity. A theory which accords with this spirit, to my knowledge, is the one proposed by Selkirk (1990), to which we turn immediately below.

3.3 Selkirk's (1990) proposal

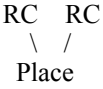
In her two-root theory of length, Selkirk (1990) assumes, following McCarthy (1988),[9] that the root node is made up of [cons][10] and [son]. Four major category (vocalic, consonantal, obstruent, sonorant) roots are distinguished, as in (12):

(12)

RV: [-cons] [+son]		RO: [+cons] [-son]
RC: [+cons] [uson]		RS: [ucons] [+son]

Selkirk claims that moras are not present in underlying representation. Instead, length is represented on the root tier. She then argues for a representation of geminates as a single set of place features linked to two root nodes, as shown in (13):

(13) Geminate Consonant



In her theory the root node takes over the function of (C/V or X) "timing" slots, so that no segment is lexically moraic, at least in the normal

[9] As Broselow (1995) points out, McCarthy's (1988) proposal brings the root tier closer to the C/V skeletal tier of McCarthy's (1979) earlier proposal. I would rather interpret this as further decomposition of C/V into the root node and the empty X slot though McCarthy himself disfavors the use of X's.

[10] But Kaisse (1992) disputes this empirical observation concerning [cons], arguing that it should be placed as a daughter of the root node.

case. Thus, the non-moraic status of initial vowels of *o-a* 'to come' or whatever is no longer a point at issue.

In the next section we will review Selkirk's proposal, noting in particular how (non-moraic) geminates derived by total assimilation shed light on the formal representation of geminates.

4. Geminates derived by assimilation

In section 2, we examined *l*-gemination observed in the verbal paradigms of Korean. Geminates can also be derived by total (or complete) assimilation, as the representative examples in (14) illustrate:

(14) a. /t+n/→[nn]	mot-nan-i	'a dull-witted man'
	pat^{h}-noŋsa	'dry-field farming'
	mas-nan	'tasty'
	nac-n-il	'day work'
	myəc^{h}-nal	'several days'
b. /p+m/→[mm]	cip-man	'only a house'
	pap-mul	'rice-water'
	ip^{h}-mata	'every leaf'
	nɨp^{h}-man	'only a swamp'
c. /n+l/→[ll]	sin-la	'Silla kingdom'
	c^{h}ən-1i	'one thousand ri'
	in-lyək-kə	'a rickshaw'
d. /l+n/→[ll]	c^{h}al-na	'a moment'
	t^{h}ɨl-ni	'a denture'
	p^{h}ul-nɛ	'smell of grass'

As we saw above, both Selkirk (1990) and Tranel (1991) agree that geminates are not inherently moraic. We also concur in Tranel's generalization that CVC syllables, be they simple or geminate, always bear the same weight. But we could hardly subscribe to his position to keep both the skeletal timing tier and the moraic tier. In this respect, Selkirk's theory appears to be superior because it is redundancy-free. What is better, the afore-mentioned Tranel's generalization would follow from the two-root analysis of geminates.

Unfortunately, however, this type of approach to phonological length is not without problems. For example, in Selkirk's account, contour segments (e.g., affricates, prenasalized stops) should be analyzed as one root node dominating two (unordered) relevant features (e.g., [-cont][+cont], ...). But Steriade (1991) proposes a two-root analysis of contour segments, using what she terms "aperture nodes"— A_0 (oral and nasal stops), A_f (fricatives and the second phase of affricates), and A_{max} (oral sonorants and the release phase of stops). Clearly this analysis is unthinkable in a two- root theory of length.

Most serious, perhaps, is the description of total (or complete) assimilation, which has so far been described as spread of the root node. How can we deal with the process with equal simplicity? As shown in (13), Selkirk (1990) represents geminates as a single class node, Place, mapped to two root nodes. In her theory, no clear distinction can be made between total assimilation and place assimilation (see also Hume et al. 1997).

Before attempting an answer to this question, let us think about the examples often cited as typical cases of total assimilation. In the phrase *ten bikes*, for example, the normal form in colloquial speech would be /tɛm bayks/. In this case, we say the assimilation is "partial," whereas the assimilation is "total" in *ten mice* /tɛm mays/ (Crystal 1980). What is the sense of distinguishing between the two? Both are simple place assimilations, only that sometimes the /n/ happens to become identical with the /m/ which influenced it. Similarly with *this year* /ðɪs˘yir] and *horseshoe* /hɔrš ˘šu/.

Jeffers and Lehiste (1979:4) note that "many, perhaps most, complete assimilations are the result of a series of separate processes that have operated in the course of the progressive development of a language." Indeed, real cases of spread of the root node, or rather the simultaneous spread of a place node, laryngeal node, etc. are extremely rare.

With this in mind let us consider the following geminate variants we often find in fast speech:

(15) a.	/t+p/→[pp]	kot-palo	'straight'
		kas-pang	'a hat-maker's'
		suc^{h}-pul	'charcoal fire'
b.	/n+m/→[mm]	han-mokɨm	'a draught'
		sun-mu	'a turnip'
		son-mati	'a knuckle'
c.	/t+k/→[kk]	sut-kalak	'spoon'
		kas-k'ɨ n	'a hat string'
		sas-kas	'a reed hat'
		pis-kɨm	'a deviant line'
d.	/p+k/→[kk]	kop-ke	'prettily'
		pap-kɨlɨs	'a rice bowl'

For ease of comparison, look at the following examples, all of which begin with /son/ 'a hand'. (Assimilated features are indicated in paren- theses.)

(16) a. *son-mati* 'a knuckle'
/n+m/→[mm] (Place: [labial]).....total assimilation(?)
b. *son-patak* 'the palm of a hand'
/n+p/→[mp] (Place: [labial]).....partial assimilation
son-kalak 'a finger'
/n+k/→[ŋk] (Place: [dorsal]).....partial assimilation

As is evident from (15) and (16), what they call total assimilation is mostly nothing but partial (or, sometimes, single-feature) assimilation. See also (14).

The question is, can we really dispense with total assimilation? According to Lin (1997), the loss of an onset or unsyllabified consonant in Piro can lead to CL. This fact contradicts the basic claim of Moraic Theory that the relevant unit of CL, as Hayes (1989) argues, is the mora, rather than the skeletal slot. In this respect, CL in Greek is noteworthy (Steriade 1982: 347; Wetzels 1986: 314).

(17)	Lesb/Thes	Elsewhere	
*ekrinsa	> ekrinna	ekrīna	'I judged'
*āngelsa	> āngell	āngēl	'I announced'
*gwolsā	> bollā	bōlā	'council'
*esmi	> emmi	ēmi	'I am'
*naswos	> nawwos	Att. nāwos	'temple'

Notice that in the Lesbian and Thessalian variants, we see a clear case of gemination (or total assimilation), elsewhere vowel lengthening triggered by the loss of *s*. Wetzels (1986) analyzes both cases as CL. However, on closer scrutiny we can surmise that Greek underwent a historical change initiated by total assimilation: *ns>nn, ls>ll, sm>mm, sw>ww*. Vowel lengthening elsewhere was due to degemination; (only) deletion of moraic coda consonants can cause CL.

In any case, there seems to be no accounting for this type of total assimilation in a two-root theory of length.

5. Concluding remarks

With the reintroduction of the traditional notion of mora, the syllable receives a new interpretation. One of the basic claims made by Moraic Theory is that geminates are underlyingly associated with a mora regardless of whether CVC and CVV are equivalent in the language in question.

But there is no mora assigned to a coda consonant in Korean. Thus, all geminate consonants, underlying or derived, are weightless (or non-moraic). Furthermore, representing vowels as moraic underlyingly is unnecessary because their morahood is largely predictable during syllabification. While vowel length is distinctive in Korean, even the moraic status of underlying vowels is a moot point (see Kim 2001).

The mora is a unit of phonological weight, and not of length. This appears to support in part Selkirk's (1990) two-root theory of length, because it is redundancy-free. However, we find it impossible to adopt this theory because of its insurmountable problem(s) pointed out in the previous section.

Another way of eliminating redundancy from the phonological representation (10) is to remove the moraic tier which is not sufficient to encode length. This is by no means a denial of the mora as a unit of phonological weight. But we can at least ask here if the mora is really a subsyllabic "constituent," as has frequently been assumed in the current literature (cf. Sommerstein 1977: 203). Indeed it often proves convenient for the statement of phonological processes, but it is next to useless in a quantity-insensitive language. Moreover, as Hyman (1984) argues, a mora (or WU) is not necessarily dominated by a syllable. Or to put it differently, the mora need not be a syllable-internal constituent. This in turn seems to signal a return to either the skeletal theory, or the familiar onset/rime division.[11] The latter may perhaps be modified by the addition of Appendix (Halle and Vergnaud 1980: 95).

In any case, we choose to retain the X-slots because these are places to encode length. The mora is a useful unit especially for rules governing prosodic features and there is no gainsaying it. Where is the mora then? One thing that immediately comes to mind is something like the "nucleus display" proposed earlier by Clements and Keyser (1983). Interestingly enough, this long-forgotten idea is akin to what I term the Moraic Projection (cf. Sommerstein 1977; 203).

(18) Moraic Projection (informal)
Project the mora on a new plane such that a light syllable consists of one mora and a heavy syllable of two (and a super-heavy syllable normally of three).

That is, the weight of a segment is not intrinsically determined but derived by (18) if need be. It will readily be seen that this is strikingly similar in its use to the rime projection employed in Metrical Phonology. Given the Moraic Projection, length can now be represented uniformly as in the skeletal theory.

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[11] I dispute Zec's (1995: 149) claim that the relevant unit for capturing the patterns of sounds in a language is the mora rather than the syllable.

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Received: October 15, 2002
Accepted: November 25, 2002