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64 Compensatory Lengthening

Randall Gess

Sections

1 Types of compensatory lengthening

Compensatory lengthening is the lengthening of one segment, referred to here as the "target," in compensation for the loss or reduction of another, referred to here as the "trigger" (see also CHAPTER 37: GEMINATES and CHAPTER 20: THE REPRESENTATION OF VOWEL LENGTH). The segments are usually in close proximity to one another – either adjacent or in adjacent syllables. Theoretically, a consonant can be lengthened in compensation for the loss or reduction of another consonant or vowel, and a vowel can be lengthened in compensation for the loss or reduction of another vowel or consonant. In fact, an argument can be made that all types of compensatory lengthening exist, although as Table 64.1 indicates, some types are far more common than others. There is also a problem in the classification of some types as compensatory lengthening proper rather than as instantiations of other processes, such as total assimilation (2A, B) or rhythmic lengthening (1D).

		Trigger			
		A / __ C	B / C __	C / __ (X)V	D / V(X) __
Target	1: V	numerous	limited	numerous	limited
	2: C	limited	numerous	isolated	limited

Table 64.1 Types of compensatory lengthening

In Table 64.1, Row 1 lists cases in which the target for lengthening is a vowel, and Row 2 lists cases in which the target for lengthening is a consonant. Column A lists cases in which the trigger for lengthening (the reduced or deleted segment) is a reduced consonant following the target, Column B those in which the trigger is a reduced consonant preceding the target, Column C those in which the trigger is a reduced vowel following the target, and Column D those in which the trigger is a reduced vowel preceding the target.

Examples representative of each cell in Table 64.1 are provided in the following brief sections.

1.1 Type 1A *(Target V; Trigger / ___ C)*

(1) *Old French* (Gess 1998, 1999)

a.	*blasmer*	[blazmer]	>	[bla:mer]	'to blame'
b.	*angle*	[ãnglə]	>	[ã:glə]	'angel'
c.	*large*	[laʁʤə]	>	[la:ʤə]	'wide'

The type of compensatory lengthening in (1) is common. **Kavitskaya (2002**: App. 1) lists 58 languages in which it is manifested. Other cases not mentioned by Kavitskaya can be found in **Gordon (1999)** and **Beltzung (2008)**.

More exotic types of compensatory lengthening triggered by a following consonant are ones in which the trigger is an intervocalic consonant, or in which the target and trigger are separated by an intervening consonant, i.e. in which the triggering consonant is the second of a sequence of two intervocalic consonants (e.g. Ancient Greek *odwos > East Ionic /o:dos/ (**Wetzels 1986**: 310). **Hayes (1989)** refers to this type of compensatory lengthening as a "double flop," a term which has gained currency in the literature (see **Beltzung 2008** for an extensive discussion of "exotic" types of compensatory vowel lengthening triggered by consonant loss).

1.2 Type 1B *(Target V; Trigger / C ___)*

(2) *Samothraki Greek* (Katsanis 1996, as reported in Topintzi 2006; see also CHAPTER 55: ONSETS)

a.	'rafts	>	'a:fts	'tailor (MASC)'
b.	'ruxa	>	'u:xa	'clothes'
c.	'rema	>	'e:ma	'stream'
d.	'protos	>	'po:tus	'first'
e.	'vrisi	>	'vi:s'	'tap'
f.	me'trun	>	mi'tu:n	'they count'
g.	'extra	>	'exta:	'hostility'

The type of lengthening shown in (2) is rare and somewhat controversial (see **Beltzung 2008** for an overview), as it is predicted not to occur by the framework of Moraic Phonology developed in **Hayes (1989)**. In Samothraki Greek this process is limited to rhotics in word-initial or post-consonantal position – it does not occur when the segment is in intervocalic position or in a coda position (there is no deletion of syllable-final /r/ in Samothraki Greek). According to **Beltzung (2008)**, the segments implicated in this type of compensatory lengthening are rhotics, pharyngeals, and laryngeals.

1.3 Type 1C *(Target V; Trigger / ___ CV)*

(3) *Hungarian* (Kálmán 1972, as reported in Kavitskaya 2002)

a.	*wizi	>	vi:z	'water'
b.	*tyzy	>	ty:z	'fire'
c.	*utu	>	u:t	'road'
d.	*ludu	>	lu:d	'goose'
e.	*neʒi	>	ne:ʒ	'four'
f.	*modoru	>	modo:r	'bird'
g.	*teheni	>	tehe:n	'cow'

Cases like the one illustrated here are relatively common, but appear to be more phonologically restricted and less widespread than the type shown in §1.1. **Kavitskaya (2002**: App. 2) lists 21 languages (neglecting to include Yapese (**Jensen 1977**), where it appears to be a synchronic process) in which this process occurs or has occurred, whereas she lists 58 languages (App. 1) in which the CVC type of compensatory lengthening shown in §1.1 is manifested. As indicated in **Table 64.1**, this type of compensatory lengthening does not always involve an intervening consonant (e.g. Old French [fi:] < [fiə]; **Pope 1952**: 205).

According to **Hayes (1989**: 284), this type of compensatory lengthening "appears not to exist." However, a process in Macuxi may prove problematic for this claim. In a section entitled "Compensatory length," **Carson (1981**: 50) states that "[w]hen a short vowel is suppressed, the vowel that immediately precedes a stop consonant in its vicinity is lengthened."

Representative data are shown in (4).

(4) *Macuxi* (Carson 1981)

kasa'pan	→	ksaa'pan	'sand'
kusupa'ra	→	'ksuu'pra	'machete'
'wakiri'pe	→	'wakrii'pe	'agreeable'
'miki-'ri	→	'mɨi'kri	'he'

It appears in all the examples but the last one that the lengthened vowel is the one that follows the deleted one. However, the absence of otherwise expected *['mɨ'krɨɨ] in the last example may be attributed to what **Pessoa (2006**: 78, 2009: 117), citing **Abbott (1991)**, refers to as the absence of "sílaba alongada fonológica na última posiçao," since final syllables are already rhythmically lengthened.

According to **Kavitskaya (2002**: 149), lengthening in Macuxi (as described in **Kager 1997**) is not a case of compensatory lengthening, and "should be attributed to the properties of iambic systems" since it "happens regardless of syncope" (see also **CHAPTER 44**: THE IAMBIC—TROCHAIC LAW). She cites the following examples from **Kager (1997**: 466–467).

(5) *More examples from Macuxi*

/piripi/	(ˌpri:).('pi:)	'spindle'
/waimujami/	(ˌwai).(mja:).('mi:)	'rats'

The first example is taken by **Kager (1997)** from **Hawkins (1950**: 89), and the second from **Abbott (1991**: 147). In both examples, the final syllable of the form in question is apparently lengthened, and there is no vowel syncope to point to as a trigger. However, with respect to the first form, no lengthening in any position is indicated by **Hawkins (1950)**, who says nothing more about final vowels than that "[t]he last vowel in each stress contour in the basic form of any utterance is always retained," and he transcribes the form as 'pripí', with the acute accent marking "the end point of contours" (**Hawkins 1950**: 89).

It may be that length is present and not noted by Hawkins, but if so, it is just as easily described as phrase-final lengthening that is independent of iambic (foot-level) lengthening. According to **Abbott (1991**: 145), "[t]he final CV in a phonological phrase (i.e. a phrase bounded by a pause) is always long and stressed." Abbott describes rhythmically derived length on even-numbered V or CV syllables, counting from the left, as well as on final syllables. Again, though, **Hawkins (1950)** says nothing about lengthening in any context, and does not indicate it in any transcriptions. Nevertheless, **Kager (1997)** introduces foot-level lengthening systematically in forms taken from both authors, as well as syncope in forms where Abbott indicates none. **Hawkins (1950)** does discuss "stress contours" in which the contour consists of "a stretch of speech marked by loud stress on the last vowel," and he notes that "[w]hen more than one word occurs in a stress contour, the last vowel in each non-final word in the contour is retained." However, retention of a vowel is a far cry from lengthening.

Carson (1981) does not indicate final lengthening either. **Kager (1997)** chooses to ignore the data from **Carson (1981)**, cited above, noting that she posits "lexical tone rather than stress," and that her data must be "based on a different dialect than those studied by Hawkins and Abbott" (1997: 466). In fact Carson describes lexical pitch accent (1981: 42–45), which may be "disturbed" at the phrasal level (1981: 46). If Carson is correct, that the variety she documented manifests pitch accent, then the lengthening she describes cannot appropriately be attributed to iambic lengthening.

Two points arise from the preceding discussion. First, it is not clear that rhythmic lengthening, independent of vowel reduction or deletion, does occur in the Macuxi variety described by **Abbott (1991)** (and **Hawkins 1950**, if lengthening other than in final syllables even occurs in the variety he describes). Second, the lengthening described by **Carson (1981)** cannot be dismissed on the grounds suggested by **Kavitskaya (2002)**.

An important question arises with respect to the first point in the preceding paragraph: If rhythmic lengthening is always tied to vowel reduction or deletion, can it properly be considered compensatory lengthening? Kavitskaya's point is that it is not – that it is better in this case to consider it a property of iambic systems, together with rhythmic vowel deletion. It is unclear, however, why a foot-based process that can be described as CVCV > CvCVː (where "v" represents a reduced vowel) should be treated any differently than one that can be described as CVCV > CVːCv, i.e. the fairly common type of compensatory lengthening described in (3) (1C in **Table 64.1**), that is uncontroversially labeled as such.

Two other types of compensatory lengthening can result from a triggering vowel preceding the target vowel, in these cases with no intervening consonant. The first of these is compensatory lengthening through glide formation (typically from high vowels), a relatively common synchronic process in Bantu languages (e.g. Ganda li+ato/ 'boat' → [ljaato]; **Clements 1986**: 47). The other type of process is also attested in Ganda, involving the deletion of non-high vowels in prevocalic position (e.g. /ka+oto/ 'fireplace (DIM)' → [kooto]; **Clements 1986**: 49).

1.5 Type 2A *(Target C; Trigger / ___ C)*

(6) *Semitic* (Lipiński 2001: 195)

*usˤtabbit	>	usˤsˤabbit	'he imprisoned'	(Assyro-Babylonian)
*atˤtarad	>	atˤtˤarad	'I sent'	(Assyro-Babylonian)
*itˤtalaba	>	itˤtˤalaba	'he sought'	(Arabic)
*ʔətzəkkar	>	ʔəzzəkkar	'I remember'	(Ge'ez)
*jilkədenhu:	>	jilkədennu:	'he shall capture him'	(Hebrew)
*gəma:lathu:	>	gəma:lattu:	'she weaned him'	(Hebrew)
*wɛsfi	>	wɛssi	'awl'	(Gurage)
*nisf	>	nəsˤsˤ	'half'	(Colloquial Arabic)

This type of compensatory lengthening appears to be relatively uncommon, and like the type described in the following section, it is not formally distinguishable from total assimilation.

1.6 Type 2B *(Target C; Trigger / C ___)*

(7) *Bengali* (Hayes and Lahiri 1991: 81)

bɔrʃa	~	bɔʃʃa	'rainy season'
bɔrdi	~	bɔddi	'elder sister'
bʰorti	~	bʰotti	'full'
kortʃʰe	~	ko-tʃʰe	'do-3PRES'
kor-lo	~	kol-lo	'do-3FUT'

Although this type of compensatory lengthening is quite common, unlike the type illustrated in (6), it shares with that process the lack of any formal distinctiveness from total assimilation.

1.7 Type 2C *(Target C; Trigger / ___ V)*

(8) *Bulgarian* (Shishkov 2002)

'balite	>	'bal':te	'the bales'
er'genite	>	er'gen':te	'the bachelors'
ku'ʃarite	>	ku'ʃar':te	'the (sheep) pens'
'belezite	>	'beles:te	'the scars'
'babinata	>	'babin:ta	'the grandmother's (things)'
ven'tʃiloto	>	ven'tʃil:tu	'the wedding'
ameri'kancite	>	amer:'kancite	'the Americans'
done'sa	>	don:'se	'bring (3SG)'

Cases such as the one illustrated in (8), in which a consonant is lengthened before a following reduced vowel, appear to be isolated. It is noteworthy that the consonants involved in the Bulgarian process are of relatively high sonority – only sonorants and /z/, although there is at least one attested case of synchronic compensatory lengthening in this category in which sonority does not appear to be relevant (compensatory lengthening resulting from glide formation, as in Ilokano /'luto+en/ → /lutt'w-en/ 'cook-GOAL FOCUS'; **Hayes 1989**: 269).

1.8 Type 2D *(Target C; Trigger / V ___)*

(9) *Ganda* (adapted from Clements 1986: 62–63)

/li + kubo/	>	[kkubo]
/li + tabi/	>	[ttabi]
/li + daala/	>	[ddaala]

According to **Clements (1986**: 6), the synchronic rule deriving geminates from a CV prefix is "a restructuring of the historical situation, in which a phonetically motivated rule is replaced by a morphologically conditioned one." Clements assumes the geminates to have arisen historically from earlier *Vi sequences (*i* represents an upper high front vowel), "with

the process giving rise to consonant gemination [being] one in which the articulation of a consonant is anticipated on a preceding postvocalic *[i]" (1986: 65). They are now associated with a certain class of nominal prefixes.

2 Approaches to compensatory lengthening

Most documented cases of compensatory lengthening, at least those formally distinguishable from total assimilation of adjacent consonants, involve the compensatory lengthening of vowels. Furthermore, the most common types of compensatory lengthening of vowels involve those in which the trigger follows, rather than precedes, the target – i.e. the types of cases illustrated in §1.1 and §1.3. These two types of compensatory lengthening are commonly referred to as CVC and CVCV compensatory lengthening, respectively. In this section, I focus on these most common types and, since synchronic cases of compensatory lengthening are derived from historical ones, I focus on the diachronic instantiation of the processes.

I first summarize three general approaches to compensatory lengthening, all of which have in common an implicit assumption that the phenomenon is speaker-controlled. A fourth section outlines an alternative approach put forth in **Kavitskaya's (2002)** quite comprehensive treatment of compensatory lengthening, which may be considered somewhat radical in proposing a strictly listener-oriented account of the process. The relevance of the various approaches to synchronic cases of compensatory lengthening, as well as to the other types illustrated in §1, is discussed in §4.

The first three approaches to be examined in this section fall into two categories, as described by **Kavitskaya (2002)**: one that treats compensatory lengthening as a type of conservation and one that does not. The first category is the most common, and assumes that compensatory lengthening is fundamentally teleological in that its goal is to preserve length present in the input in the output string. Being the most common category, it comprises two of the three approaches: a phonetic conservation approach and a phonological conservation approach. The third approach, in a category of its own, is the non-conservation approach, which denies the existence of any intrinsic connection between the loss of a segment and the lengthening of another.

2.1 Phonetic conservation approach

In a phonetic conservation approach, compensatory lengthening is viewed as a goal-oriented process functioning to preserve some or all of the physical duration of lost segmental material.

Timberlake (1983) discusses a case in Slavic in which a number of modern dialects have long or tense vowels in syllables that preceded a weak jer in Late Common Slavic (see also **CHAPTER 122**: SLAVIC YERS). This is a case of CVCV compensatory lengthening (Timberlake does not discuss CVC cases). According to Timberlake, a long reflex of a vowel in a syllable before a Late Common Slavic weak jer "is in some way a result of the phonetic weakening and the eventual phonemic loss of the following jer vowel" (1983: 293). He suggests that:

> Late Common Slavic was subject to a constraint on the preservation of word timing, such that phonetic reduction in one syllable (containing the "weak" jer) was compensated for by increased phonetic duration in the preceding, "strong" syllable.

In Timberlake's model, compensatory lengthening takes place phonologically through re-analysis. Re-analysis depends upon both the phonemic elimination of jers and the surpassing of a "critical duration" on the part of the phonetically lengthened preceding vowel. If, when jers are "eliminated phonemically, either by identification with another vowel or by identification with null" (1983: 299), phonetically lengthened vowels are sufficiently lengthened, the latter are reanalyzed as phonemically long (or tense). Timberlake sets the critical duration for re-analysis arbitrarily at anything beyond 1.5 times "full duration (nearly or exactly 1.0 morae. […] numerical values for duration […] are intended to be highly approximate)" (1983: 298).

Timberlake's model is an additive one, "in which the duration of vowels is adjusted by adding or subtracting increments of duration depending on various factors." The various factors at play in Late Common Slavic were the consonant intervening between the jer and the lengthened preceding vowel; the position of the CVCə sequence in the word (final or internal); and the accent of the lengthened vowel.

The phonetic process of compensatory lengthening is described by **Timberlake (1983**: 298) as in (10).

(10) *Compensatory lengthening as a phonetic process*

$/CVC\text{ə}/ > [CV^{1.0+\alpha}C\text{ə}^{-\alpha}]$

The formula in (10) states that for any reduction of value α in the phonetic length of a jer, a preceding vowel is realized at full duration (1.0) plus α.

In order to model the gradual nature of phonetic lengthening, Timberlake breaks the process down into discrete stages, arbitrarily shown in 0.2 increments, as illustrated in (11), from **Timberlake (1983**: 298).

(11) *Jer reduction and compensatory lengthening*

a. /CVCə/ > [$CV^{1.2}Cə^{-0.2}$] {α = 0.2}
b. /CVCə/ > [$CV^{1.4}Cə^{-0.4}$] {α = 0.4}
c. /CVCə/ > [$CV^{1.6}Cə^{-0.6}$] {α = 0.6}
d. /CVCə/ > [$CV^{1.8}Cə^{-0.8}$] {α = 0.8}

Finally, as indicated above, Timberlake assumes re-analysis at anything beyond 1.5 times full duration. Regarding the cut-off, **Timberlake (1983**: 299) explains:

> When reduced jers were eliminated phonemically, the phonetic phase of CL was necessarily interrupted, and the lengthened variant of a vowel in strong position had to be identified as phonemically long (tense) or short (lax).

This view of re-analysis is illustrated schematically in (12).

(12) *Phonemic analysis*

a. [$CV^{1.2}Cə^{-0.2}$] ⇒ /CVC/ {α = 0.2}
b. [$CV^{1.4}Cə^{-0.4}$] ⇒ /CVC/ {α = 0.4}
c. [$CV^{1.6}Cə^{-0.6}$] ⇒ /CV:C/ {α = 0.6}
d. [$CV^{1.8}Cə^{-0.8}$] ⇒ /CV:C/ {α = 0.8}

Timberlake's account of CVCV compensatory lengthening can be straightforwardly extended to CVC compensatory lengthening. A demonstration of this is provided in Gess (forthcoming).

Explicit criticisms of phonetic conservation approaches to compensatory lengthening are minimal. The most obvious thing to point out here is the limited relevance of this approach to synchronic cases of compensatory lengthening. That is, while the approach may be useful in showing how compensatory lengthening may arise historically, it is not well suited for modeling the processes in synchronic grammars unless the process at hand is, or at least could be, a change in progress (i.e. it is a gradient, post-lexical process). Another problem with the phonetic conservation approach, pointed out by Gess (forthcoming), is that its extension to CVC cases of compensatory lengthening, while straightforward in a mechanical sense, seems to entail at least implicitly the problematic assumption that moras associated with consonants are equivalent in duration to those associated with vowels. This problem could be overcome by making assumptions regarding the formalisms used more explicit.

2.2 Phonological conservation approach

In a phonological conservation approach, compensatory lengthening is viewed as a goal-oriented process functioning to preserve some aspect of the phonological representation (a suprasegmental unit) associated with the loss of segmental material. In fact, compensatory lengthening phenomena crucially informed the debate as to the best way to characterize the prosodic tier (or timing tier) assumed in autosegmental phonology, i.e. in terms of C- and V-slots, X-slots, or moras (**McCarthy 1979**; **Clements and Keyser 1983**; **Hyman 1984, 1985**; **Levin 1985**; **Lowenstamm and Kaye 1986**; **McCarthy and Prince 1986**; **Hayes 1989**; **Beltzung 2008** (especially Chapter 3); see also **CHAPTER 54**: THE SKELETON).

In order to explain constraints on compensatory lengthening (e.g. that triggers in CVC cases are only coda consonants and not onset consonants [an assumption later proven problematic; **Topintzi 2006**; **Beltzung 2008**], and even more specifically that coda consonants are triggers only when they contribute to syllable weight in the language in question), **Hayes (1989)**, in probably the most influential single article on compensatory lengthening, suggests that lengthening only occurs when deletion results in an empty prosodic position and that only a prosodic frame defined in terms of moras yields the correct typological results. (**Hayes 1989**: 260–261 also provides a simple and straightforward demonstration of the inability of a linear approach to account for compensatory lengthening.)

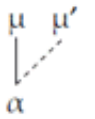
Hayes (1989) accounts for CVC compensatory lengthening as illustrated in (13), with Latin [kasnus] > [ka:nus] 'dog'.

(13) *Compensatory lengthening in* CVC *sequences* (Hayes 1989: 262)

a. */s/-deletion*

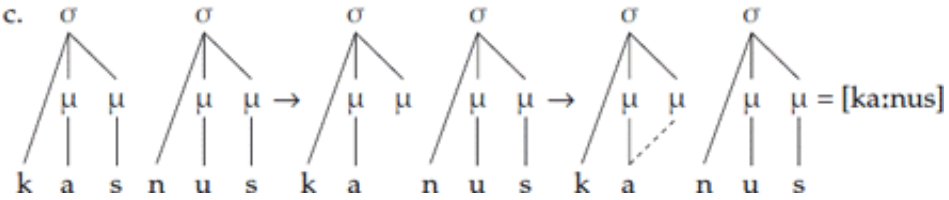
$s \rightarrow \emptyset \; / \; \_ \begin{bmatrix} +son \\ +ant \end{bmatrix}$ (segmental tier only)

b. *Compensatory lengthening*



where μ′ is a segmentally unaffiliated mora

c.

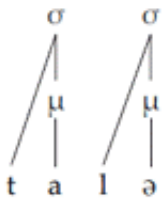


A theory assuming a prosodic frame defined in terms of X-slots can account for the example above, but not for the fact that in the same language (Latin), /s/ -deletion does not trigger lengthening when it is word-initial, as in *snurus* > *nurus* (the same problem holds for the type of compensatory lengthening illustrated in §1.2). In a segmental theory based on X-slots, any deleted segment should trigger lengthening, whereas in a moraic theory only those segments that are mora bearing will do so.

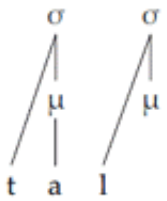
The moraic theory of compensatory lengthening accounts for CVCV cases as illustrated in (14) with Middle English [talə] > [ta:l] 'tale' (see **Minkova 1982** for an in-depth discussion of this case).

(14) *Compensatory lengthening in* CVCV *sequences* (Hayes 1989: 268–269)

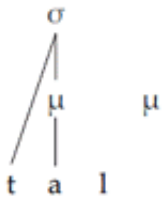
a. Input



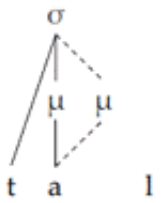
b. Schwa drop



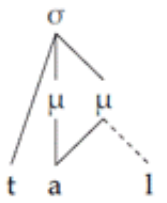
c. Parasitic delinking



d. Compensatory lengthening



e. Resyllabification



= [ta:l]

Parasitic delinking, illustrated in (14c), is a principle that eliminates ill-formed syllable structure, caused in this case by the loss of the vowel segment via schwa drop.

A very positive aspect of **Hayes (1989)** is that a wide range of cases of compensatory lengthening are discussed (although a potentially problematic empirical gap is discussed below). Besides the classic CVC and CVCV cases, **Hayes (1989)** treats the so-called "double flop" cases in which the deletion of a glide triggers compensatory lengthening of a vowel in a preceding syllable, as in Ancient Greek *odwos > /o:dos/ (1989: 265–266), and compensatory lengthening from glide formation, as in the Ilokano case mentioned earlier /'luto+en/ → /lutt'w-en/. He also mentions (without providing a formal treatment) "straightforward" cases like compensatory lengthening through progressive and regressive total assimilation of consonants, compensatory lengthening through prenasalization, and so-called "inverse compensatory lengthening," which involves the lengthening of a consonant triggered by the shortening or loss of a vowel (1989: 279–281).

Fox (2000) points out a number of what he sees as problems for **Hayes's (1989)** approach. The first is that the principle of parasitic delinking is "a radical measure which is not required in most other processes of Compensatory Lengthening." The second relates to the required linking of the vowel of the first syllable to the mora stranded by deletion of the second syllable. According to **Fox (2000**: 100–102), this is:

> unmotivated by the normal principles of the model, since, according to one view at least, the syllable would be perfectly well-formed without this linking; the final mora would be linked to the final consonant and is thus not left stranded.

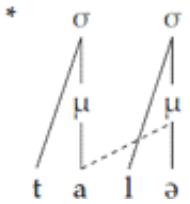
Finally, **Fox (2000)** suggests that **Hayes's (1989)** principle of mora conservation is inappropriate as a motivation for CVCV compensatory lengthening. This is because Hayes defines the mora as "the basic unit for syllable weight" (1989: 285) and syllable weight is not maintained in these cases. Rather, what is maintained is the length of the foot (2000: 101).

One might also argue that a problem for phonological conservation approaches generally is that they are ill equipped to deal with the gradual nature of diachronic compensatory lengthening. For example, the Middle English case discussed above did not take place as a discrete change in one fell swoop. According to **Minkova (1982**: 50):

> Before becoming identified with existing long vowels or developing into new ones, i.e. prior to the establishment of a phonological length contrast, the short vowels in the environment / ___ $C^1{}_1$e# undergo phonetic lengthening. […] In a situation where forms with and without the second syllabic element, the *-e*, are both available to the speaker, there will be a negative correlation between it and the first syllabic element. Phonetically, "the word as a whole has a certain duration that tends to remain relatively constant." (**Lehiste 1970**: 40)

One way to show intermediate length in moraic phonology is to have segments share a mora. In this case, a standard interpretation of the formalism prevents this because it would involve the crossing of association lines, as illustrated in (15).

(15) *Potential inadequacy of Hayes's mora conservation approach with respect to modeling gradual change:* CVCV *cases*



If one adopts a strict and unnuanced view of the ban on crossed association lines, since parasitic delinking (illustrated in (14c)) is triggered only when ill-formed syllable structure is present, the moraic account of compensatory lengthening is only able to succeed if the final vowel is entirely deleted and parasitic delinking applies. That is, the account is unable to account for the allophonic lengthening that must be assumed to precede phonemic lengthening. However, a more relaxed view might interpret the ban on crossed association lines as applying separately to distinct C and V tiers.

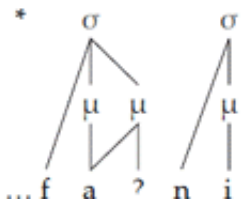
Gradual change might also be seen as a problem for the mora conservation approach in diachronic cases involving CVC compensatory lengthening. **Hock (1986)** mentions a case reported in Brockelman (1908) from Tunisian Arabic (with similar instances in Ge'ez and Tigrinya), in which a preconsonantal glottal stop is reduced (not deleted), with compensatory lengthening on the preceding vowel. The examples provided are shown in (16).

(16) *Compensatory lengthening triggered by segmental reduction in Tunisian Arabic* (Hock 1986: 444)

ʃeffaʔni > ʃeffa:ʾni
smaʔtkum > sma:ʾtkum

In autosegmental representation, the output of this process would be as illustrated in (17).

(17) *Potential inadequacy of Hayes's mora conservation approach with respect to modeling gradual change:* CVC *cases*



While the shared mora representation in (17) is adequate for representing an intermediate stage between a fully moraic glottal segment following the short vowel and a long vowel with no following glottal, one might argue that it cannot represent any more than a single such stage, whereas more stages might well be warranted. However, this potential criticism disregards the possibility of a single phonemic representation having different phonetic interpretations at different periods (or indeed across speakers at a single period).

We must also note (as have others) one apparent empirical weakness with the phonological conservation approach, as put forth in **Hayes (1989)**. This involves cases in which compensatory lengthening is triggered by a prevocalic consonant that in normal circumstances would not be associated with a mora. Some such cases are discussed in **Hock (1986)**, a paper cited

by **Hayes (1989)**, but without mention of these specific examples. Strangely, the cases are also problematic for Hock, although he does not treat them as such. Hock's interest in the cases is that they involve compensatory lengthening triggered not by deletion of a segment, but by its weakening only (as in the case illustrated in (17), but in intervocalic position). The first case is from Tyrone Irish (as discussed in **Stockman and Wagner 1965**), where:

> vowels are dialectally distinctively lengthened before the highly reduced glottal-fricative outcome of earlier voiceless fricatives (as well as before sonorant + consonant etc. and in "ordinary" CL environments, *but not in open syllables*). (**Hock 1986**: 443–444, emphasis added – RG)

The fact that Hock takes care to note that compensatory lengthening does not take place in open syllables suggests that the reduced segments in question might be ambisyllabic, but this is not made explicit anywhere, including in the original source. If it is the case that the segments in question are ambisyllabic, then an argument could be made that they are doubly linked – to a mora in the first syllable and to the onset of the second. The relevant data are shown in (18).

(18) *Compensatory lengthening triggered by segmental reduction in Tyrone Irish* (Hock 1986: 444)

srathar	[stra:^{h}ər]
tachas	[tɔ:^{h}əs]

The second problematic case mentioned by **Hock (1986)** is from the Westphalian dialect of Soest, as reported in **Holthausen (1886**: 28–29). In this dialect, as illustrated in (19), compensatory lengthening occurs before highly reduced, voiced labial and velar fricatives, and before a deleted "secondary" (analogically reinserted) voiced alveolar stop.

(19) *Compensatory lengthening triggered by segmental reduction in Westphalian* (Hock 1986: 444)

*hege	'hedge'	>	(*)hiəgə	>	hi:əɣə
*seven	'seven'	>	(*)siəv(e)n	>	si:əvn
*snede	'slice'	>	(*)sniəde	>	sni:ə (*with* əə > ə)

Again, there is no suggestion that the consonants triggering compensatory lengthening in these cases were ambisyllabic, nor is there any reason to believe that they were. This case therefore represents an apparent problem for **Hayes's (1989)** mora conservation approach, aside from the issue of the gradient nature of the triggering segmental reduction. (The case also poses a problem for **Hock 1986**, which represents a mora conservation approach as well, although one not couched in an autosegmental framework.) As mentioned earlier, other cases of compensatory lengthening triggered by the loss of intervocalic consonants are discussed by **Beltzung (2008**: especially ch. 2).

Finally, the phonological conservation approach à *la* **Hayes (1989)**, particularly in the case of CVC compensatory lengthening, has proven difficult to model in Optimality Theory (OT). The basic problem is that in order for lengthening to occur, consonants must be assigned weight before deletion happens, thus suggesting a serial analysis. Getting around this problem has necessitated the abandonment of some of the basic tenets of OT. For example, one could simply assume that consonants are moraic in the input (**Sprouse 1997**), but this requires a sidestepping of OT's principle of Richness of the Base, whereby output well-formedness is determined solely by constraints and their ranking, and not by restrictions on input. Other ways of handling the problem involve treatments designed to handle opacity more generally, such as stratal OT (**Kiparsky 2000**), which rejects strict serialism, Turbidity Theory (**Goldrick 2001**), Sympathy Theory (**McCarthy 2003**), or OT with candidate chains (**McCarthy 2005**; **Shaw 2009**), which require reference to what amounts to one or more intermediate representations.

2.3 Non-conservation approach

In an influential article, **de Chene and Anderson (1979)** take a novel approach to compensatory lengthening by rejecting the notion that such a process exists as "an independent mechanism of phonetic change" (1979: 505) (they discuss only cases of CVC compensatory lengthening). For them, putative cases of compensatory lengthening can be decomposed into two independent processes: weakening of the consonant in question to a glide, and subsequent monophthongization of the resulting vowel + glide sequence. De Chene and Anderson further contend that monophthongization will result in a long vowel only if the language in question has a pre-existing vowel length distinction. The latter claim is about a structure-preserving condition on compensatory lengthening and not about the process itself. Discussion of it is explored further in §3. For now, let us look in more detail at the first claim.

The proposal that cases labeled compensatory lengthening are in fact the result of two unrelated processes has generated much discussion. **Gess (1998)** points out that it has been challenged by numerous scholars, including **Hock (1986)**,

Poser (1986), Sezer (1986), and Gildea (1995). According to Gess (1998: 353), "[E]ach of these scholars provides a strong case against the view that compensatory lengthening is always decomposable into two distinct stages. The ensemble of their arguments renders this claim simply untenable." Without laboring the point, then, we simply illustrate de Chene and Anderson's hypothesis with one straightforward example. According to de Chene and Anderson (1979: 512):

> In Latin, compensatory lengthening involving loss of a dental spirant is limited in source to *V*z*[C, +dent] sequences, where **z* is the reconstructed allophone of **s* before a voiced segment. Thus we have **ni-sd-o* > *nīdus* 'nest' and **si-sd-ō* > *sīdō* 'I sit down', both involving the zero grade of **sed* 'to sit' (cf. *sedeō* 'I sit').

De Chene and Anderson continue: "Our posited intermediate development involves the loss of occlusion in (preconsonantal) *[z], leading to the voiced glottal spirant [ɦ]" (1979: 512). In this type of analysis, de Chene and Anderson were not in fact alone. Jeffers and Lehiste (1979) propose the analysis in (20) for the remarkably similar change from Proto-Indo-European (PIE) *nisdo to Sanskrit /ni:ɖa-/.

(20) *Jeffers and Lehiste's analysis of* PIE *nisdo > *Sanskrit* /ni:ɖa-/ (as presented in Hock 1986: 435)

nisd-	
nizd-	voicing assimilation
niẓd-	retroflexion
niẓḍ-	retroflex assimilation
nijḍ-	gliding
ni:ḍ-	contraction

In noting the similarity in analyses, Hock (1986: 435) points out that what distinguishes Jeffers and Lehiste's analysis from de Chene and Anderson's is the fact that the former is "not proposed as explanations for *all* cases traditionally labeled loss with compensatory lengthening, but only for a certain subset, however poorly that subset may be defined." (Note that Kavitskaya 2002: 38 incorrectly interprets this sentence as referring to de Chene and Anderson 1979, rather than to Jeffers and Lehiste 1979.)

Hock (1986: 435) continues by saying that he is:

> ready to concede that many instances of what has traditionally been called loss with compensatory lengthening may well be ambiguous, and can be analyzed either as weakening-cum-assimilation or as cases of loss-with-mora-retention. However, in light of the fact that there are [...] cases of loss with CL which cannot be explained in terms of weakening-cum-assimilation, any theory which recognizes only the latter process must be considered insufficient.

One of the examples provided by Hock that is not amenable to explanation under de Chene and Anderson's non-conservation approach is from Icelandic, and is provided in (21).

(21) *Compensatory lengthening in Icelandic* (Hock 1986: 442)

*liugan	'lie'	>	lju:ga
*keosan	'choose'	>	kjo:sa
(*)priar	'three-FEM'	>	prja:r
(*)se:an	'see'	>	sja:

In this case, which is similar to the Ganda case at the end of §1.4, although there is weakening to a glide, it involves a preceding vowel rather than a following consonant, and there is no monophthongization involved.

Hock's (1986: 435) reproach of de Chene and Anderson (1979) for proposing an alternative explanation of all cases traditionally called compensatory lengthening while neglecting to treat all types extends to other cases as well. For example, while de Chene and Anderson are aware of CVCV compensatory lengthening, they choose not to discuss it (1979: 506, n. 1).

2.4 Kavitskaya (2002)

Kavitskaya (2002) puts forth a model of compensatory lengthening that can be considered a radical departure from previous treatments, in that it assumes the process to be entirely listener-oriented (see CHAPTER 98: SPEECH PERCEPTION AND PHONOLOGY). In this respect, her model is representative of the overall approach to phonological change espoused in Blevins (2004, 2006), Evolutionary Phonology. This is a model that rejects any explanations for historical phenomena that involve

the synchronic phonologies of speakers (e.g. by assuming a role for phonological rules or markedness constraints) when there is an alternative, diachronic explanation available. This essentially removes the speaker from the story of phonological change, except as a source of variation from which potential changes may or may not take root through "innocent misperception" on the part of the listener. This variation is constrained by

> speaker-specific anatomical differences, and within the speech of a given speaker, due to phonetic transforms of speech dependent (at least) on: rate of speech; degree of physical effort involved; and the humanly physical impossibility of making exactly the same sound twice. (**Blevins 2006**: 125–126)

According to **Kavitskaya's (2002)** listener-oriented account of compensatory lengthening:

> diachronic CL through consonant loss [CVC > CV:] ultimately has its origin in the phonetic lengthening of vowels in the environment of neighboring consonants; the subsequent loss of a consonant conditioning such length causes the length to be re-analyzed as phonological. (**Kavitskaya 2002**: 8)

Further, according to Kavitskaya, with respect to diachronic compensatory lengthening through vowel loss [CVCV > CV:C]:

> Prior to the deletion of the final vowel, the longer vowel duration characteristic of open syllables is correctly parsed by listeners as a phonetic consequence of syllable structure in the first syllable of a CVCV sequence, and is discounted [...] Upon deletion of the final vowel, however, the duration of the vowel in the newly-closed syllable becomes inexplicable, since it is longer than is expected in the closed syllable. (**Kavitskaya 2002**: 9)

If Kavitskaya's arguments are right, then compensatory lengthening is not really compensatory in nature. For the process to be compensatory, the compensatory aspect would rely on a role for the speaker, as is assumed at least implicitly in all other models of compensatory lengthening.

In so far as **Kavitskaya (2002)** is representative of the Evolutionary Phonology framework proposed in **Blevins (2004, 2006)**, it is susceptible to the general criticisms that have been leveled against that framework. **Lindblom (2006)** criticizes the Evolutionary Phonology framework for its reliance on so-called "extra-phonological" explanations over phonological accounts. According to **Blevins (2006**: 20), "principled extra-phonological explanations for sound patterns have priority over competing phonological explanations unless independent evidence demonstrates that a purely phonological account is warranted." Lindblom takes exception to this stance on the grounds that it highlights a "phonetics/phonology split" and traps the framework in "the conceptual prison of the form/substance distinction" (2006: 242).

As the title of his response to **Blevins (2006)** declares very loudly, **Lindblom (2006)** rejects the phonetics/phonology split. Lindblom admonishes us to:

> Deduce sound structure from language use. Anchor theory construction in the universal conditions under which all speech communication must take place. Start from "first principles" and not circularly from the data to be explained (cf. "markedness"). At the level of the individual user, model *phonological structure*, not as autonomous form, but as *an emergent organization of phonetic substance* acquired by each native speaker in the context of socially shared, ambient knowledge. At the population level, model this knowledge as a use- * user-dependent process that undergoes change along the historical time scale. Get rid of the distinction between "phonological" and "extraphonological." Here is a key step: *Make the "intrinsic content" an integral part of the theory from scratch*. Treat "intrinsic content" as the source that helps generate discrete structure and that constrains both synchronic and diachronic phonological patterning. (2006: 243)

In §4, we will explore how a rejection of the phonetics/phonology split might be helpful in accounting for the many types of compensatory lengthening as a unified phenomenon. We conclude this section by looking at an empirical challenge to Kavitskaya's listener-oriented approach – a synchronic case of compensatory lengthening that suggests an explanation in terms of speaker-controlled behavior.

McRobbie-Utasi (1999) provides evidence for a synchronic case of compensatory lengthening that is apparently speaker-controlled and that suggests the relevance of a principle of isochrony in a synchronic production grammar. In an acoustic analysis of quantity in Skolt Saami, McRobbie-Utasi shows a clear connection between the distribution of duration in V1, intervening C, and V2 sequences in disyllabic groups, and a phonological process realized as "an optional rule that either reduces word-final short vowels or deletes them" (1999: 111). Deletion of the final vowel is a feature of casual speech. The relevant optional rule is shown in (22).

(22) *Word-final vowel deletion in Skolt Saami* (McRobbie-Utasi 1999: 111)

$V \rightarrow \emptyset$ / __ #

Vowel deletion rule
A word-final vowel is optionally deleted in Type 1–5 disyllabics.

It is important to note that in the V1, intervening C, and V2 sequences, the intervening C can be long and ambisyllabic (in four of the five types mentioned), or short and affiliated as the onset of the second syllable.

The principal relevant passage from **McRobbie-Utasi (1999)** is shown below, where the "stress-group locations" referred to are the V1 and following C in the relevant sequences. V2 constitutes a third "stress-group location." According to **McRobbie-Utasi (1999**: 114–115):

> From the […] measurements an important tendency can be deduced: namely, that the presence or absence (or reduced duration) of the vowel in the second syllable has clear consequences for the distribution of duration in the first syllabic vowel and the consonant(s) following it. Thus, an increase in duration takes place as a result of compensatory lengthening. It will be recalled that second syllabic vowel durations were constant in all the structural types once they were realized as full vowels, with an average of 87 msec […]; also, that durations signaling differences between the structural types and/or gradation types are manifested in the first syllabic vowel and the consonant(s) following it. The fact that the presence or absence of the second syllabic has a considerable effect on these durational distributions in the segments preceding has important implications. The durational changes noticeable in these two stress-group locations (i.e. first syllabic vowel and the consonant(s) following) must be recognized as exemplifying the phenomenon of compensatory lengthening. The absence or reduced status of the second syllabic vowel results in an increase of duration in both of the stress-group locations referred to above.

Compensatory lengthening in Skolt Saami, triggered by the reduction or deletion of a final vowel, affects both the preceding vowel and consonant in four of five types (those in which the consonant is long and ambisyllabic), and the lengthening that occurs does so in a way that precisely preserves the overall V/C ratio. In the remaining type, in which the consonant is short and syllabified as the onset of the second syllable, "reduced duration of the second syllabic vowel results in compensatory lengthening in the first syllabic *vowel* only. There is practically no durational increase in the consonant following this vowel" (**McRobbie-Utasi 1999**: 118).

It is difficult, although perhaps not impossible, to reconcile **McRobbie-Utasi's (1999)** findings with a listener-based approach. Although McRobbie-Utasi's study involved only two speakers of Skolt Saami, their behavior with respect to the 550 test words used (recorded three times by both speakers, for a total of 3079 usable tokens) was remarkably consistent. Nor do the types of sequences involved lend themselves readily to Kavitskaya's line of explanation for CVCV compensatory lengthening, since they do not involve (except for Type 3) phonetically lengthened vowels in open syllables. (As expected, V1 in Type 3 sequences is longer than in other types, both when V2 is fully realized and when it is not.) Nor has any re-analysis occurred (whatever that might look like given the sequences involved and their variety [five types]) since the trigger for compensatory lengthening is still synchronically recoverable. Rather, it appears that the speakers are guided directly or indirectly by a principle of isochrony with respect to the disyllabic group.

Other empirical problems for Kavitskaya's approach, from historical French (manifesting types 1A and 1C), are discussed in Gess (forthcoming).

3 A putative constraint on compensatory lengthening

This section briefly explores the second claim made by **de Chene and Anderson (1979)**: that compensatory lengthening can only occur in a language with a pre-existing vowel length contrast – i.e. that it is strictly structure preserving (**CHAPTER 76**: STRUCTURE PRESERVATION: THE RESILIENCE OF DISTINCTIVE INFORMATION). This issue is discussed in detail in **Gess (1998)**, which treats the very data from Old French on which de Chene and Anderson base their claim, thus adding a particularly severe blow to a claim already questioned in other work (for example, in **Hock 1986**, **Hayes 1989**, **Morin 1994**, and **Lin 1997**, as well as two further cases discussed more recently in **Beltzung 2008**: 20–21).

According to **de Chene and Anderson (1979**: 517), "a necessary condition for the development of contrastively long vowels through monophthongization is the independent existence of a length contrast in the language." With respect to historical French, de Chene and Anderson compare two distinct processes (in the ninth and sixteenth centuries) of monophthongization of the diphthong [aw]. At the earlier stage, the resulting monophthong [o] was short. However, at the later stage, the outcome was the long vowel [oː]. (Strangely, de Chene and Anderson (1979: 519) also suggest a sixteenth-century date for the loss of preconsonantal [l] – the same century in which they contend that monophthongization of the vowel + glide sequence resulting from its loss had occurred. However, **Gess (1999)** provides strong evidence for a much earlier date for the loss of syllable-final [l], after the latter part of the eleventh century – and many scholars assume a much earlier date still.)

The difference in outcomes in the monophthongization of derived [aw] was due, according to de Chene and Anderson, to the introduction of vowel length into the language via the loss of intervocalic consonants, in the late ninth and early tenth centuries (1979: 521). This introduction of vowel length also allowed for compensatory lengthening, according to de Chene and Anderson, following the loss (through an intermediate stage as a glide) of syllable-final [z], [s], and nasals. Loss of the latter is incorrectly dated by de Chene and Anderson in the sixteenth century, while loss of the former, [z] and [s], is dated in the twelfth and thirteenth centuries. According to **Gess (1999)**, loss of nasal consonants dates from the thirteenth century, and loss of [z] and [s] dates from the eleventh to the thirteenth centuries.

De Chene and Anderson (1979: 522) make the following claim with respect to the establishment of long vowels in Old French:

> There is a solid body of long vowels, however, that were established by 1100 through deletion of the consonant in original V_iCV_i sequences. In these cases, no leveling or assimilation being necessary, a long vowel is the automatic result of loss of the consonant.

They go on to provide a list of several words illustrating the relevant consonant loss and the resulting putative long vowels. However, **Gess (1998)** found each of the forms listed by de Chene and Anderson in twelfth- and thirteenth-century Old French poetry and, in each case, the forms are clearly treated as consisting of two syllables. **Gess (1998**: 358) "found many other examples of orthographic geminate vowels in 12th and 13th-century Old French poetry, all of which are treated as bisyllabic."

The fact that sequences of two vowels were still counted as bisyllabic in the thirteenth century, when the loss of [z] at the very least had occurred, with compensatory lengthening, shows that a pre-existing vowel length contrast in the language was not a prerequisite for compensatory lengthening to take place. Rather, **Hayes's (1989)** assumption is likely the right one, that a syllable weight distinction in the language in question is necessary and, crucially, sufficient for compensatory lengthening to take place. **Gess (1998**: 364) points out that from an optimality-theoretic perspective this would be a rather unsurprising consequence of the general principle of minimal violation, in this case of faithfulness to the input. While a given constraint ranking may allow for the erosion of segmental features, it may still protect prosodic structure.

4 Assessment and recent directions

§2 outlined various approaches to compensatory lengthening: a phonetic conservation approach, a phonological conservation approach, a non-conservation approach, and a listener-based approach. We saw that the non-conservation approach, proposed only in the context of CVC compensatory lengthening, is basically untenable, both because it fails to account for any other type of compensatory lengthening and because there are instances of CVC compensatory lengthening that appear not to be decomposable into the stages suggested by **de Chene and Anderson (1979)**. This leaves us with two conservation approaches, both suggestive of a speaker-based process, and a listener-based approach.

We have noted problems with each of these approaches, which I will summarize briefly here. We have observed that the phonetic conservation approach proposed in **Timberlake (1983)** is most relevant to those instances of compensatory lengthening that are gradient in nature and that may be characterized as changes in progress. This approach seems ill suited for dealing with synchronic cases of compensatory lengthening that involve complete loss of the trigger. Without some refinement, the approach also has difficulty with CVC cases of compensatory lengthening given the assumption implicit in its formalism that moras associated with consonants are of equal duration to those associated with vowels.

With respect to synchrony/diachrony dichotomy, the phonological conservation approach suffers the opposite problem from the phonetic conservation approach. That is, while it can account for most, if not all, cases of synchronic compensatory lengthening, it is not ideally suited to account for compensatory lengthening as a gradual diachronic process or as a process that involves a trigger that is only reduced and not entirely lost. Other criticisms of the phonological conservation approach relate to formalisms (e.g. motivation for parasitic delinking in a rule-based approach and required mechanisms for dealing with opacity in an OT approach) and empirical weakness (its inability to account for compensatory lengthening involving non-moraic segments).

The listener-based approach is explicitly an historical approach. That is, it aims to account only for the diachronic development of compensatory lengthening and does not attempt to model synchronic instantiations of the process. For synchronic cases, it is compatible with (but also limited by) the formalisms required by the phonological conservation approach so long as the process involves a trigger that is synchronically recoverable (see **Kavitskaya 2002**: ch. 5). The principal problem with the listener-based approach is its inability to account for cases that do not lend themselves to re-analysis via misperception. One such case is the synchronic process in Skolt Saami, which involves a prevocalic VC complex as the target, with lengthening affecting the complex as a whole, and with VC ratios precisely maintained. Also problematic for the listener-based approach is left-to-right CVCV compensatory lengthening (1D), which is why it is so important for Kavitskaya to dismiss such cases as instances of non-compensatory, rhythmic lengthening. Further research is necessary to shed light on this particular issue.

The listener-based approach will also have difficulty accounting for left-to-right compensatory lengthening processes in

which both target and trigger are consonants (2A). Note that this difficulty will obtain for an Evolutionary Phonology inspired approach whether one labels the process as compensatory lengthening or as total assimilation since the second consonant in such sequences will normally be perceptually stronger. Further challenges for the listener-based approach come from the compensatory lengthening of consonants triggered by either a following vowel (2C) or a preceding one (2D). Whether the approach can be developed sufficiently to meet these challenges will be interesting to see.

It may be worthwhile for future work to explore the compatibility of the different approaches to compensatory lengthening. Note, for example, that a phonetically based speaker-oriented analysis neither denies a role for the listener, nor necessarily discounts phonological (e.g. moraic) structure. **Timberlake (1983)**, for example, makes clear reference to the mora as the "full duration" of a vowel. **Hock (1986**: 432), who does not cite **Timberlake (1983)**, also points out that "at least some traditional historical linguists have offered a phonetic explanation of CL in terms of the concept 'mora'." Note that mora-based phonological approaches do not necessarily deny a gradual, phonetic aspect either, at least those prior to autosegmentalist accounts. **Minkova (1982)** provides a clear phonological account of compensatory lengthening in Middle English, based on syllables and rhythmic units (metrical feet) "described [...] with reference to their phonological/moric composition" (1982: 48), but is careful to "complete the picture by adding some considerations of purely phonetic nature" (1982: 50). Minkova also touts as an advantage of her revised environment for Middle English Open Syllable Lengthening the fact that "it is the only way in which the shift from allophonic to phonemic length of the stressed vowel can be accounted for" (1982: 51).

Hock (1986: 434) cites the "striking extent" to which historical evidence coincides with "fine-phonetic" experimental data. Indeed, Hock goes even further (1986: 445), citing the apparent fact "that CL may set in *before* the complete loss of a segment, simply as the result of TC [temporary compensation] for the *reduction* of the segment" (emphasis in the original). An important consequence of this is that:

> the situation just described requires an important modification of the notion "mora": Rather than referring to a temporal unit measureable in terms of segment length, it must – at least for CL – be permitted to refer to time spans which are fractions of ordinary segment length. (**Hock 1986**: 445)

This view of the "mora" is entirely in keeping with an analysis along the lines of the one proposed in **Timberlake (1983)**. It is also in keeping with the spirit of **Lindblom's (2006)** view of phonological structure as non-autonomous and emergent from phonetic substance, at least if we assume both that the mora is an abstract temporal unit *and* that reference is permitted to time spans that may be fractions thereof.

A rejection of the phonetics/phonology split with respect to the mora may be the only way to achieve real explanatory adequacy with respect to compensatory lengthening. It allows us to explain the gradual nature of compensatory lengthening – a clearly phonetic aspect of the process. On the phonological side, it also accounts for the fact that CVC compensatory lengthening tends to occur mostly in languages with moraic consonants and for the fact that the process in general functions to preserve moraic structure. In conceptual terms, it is the phonological status of the mora, as an abstract unit of weight functioning in the grammar, that provides the motivation for preserving it when an associated segment is subject to gradual reduction and eventual elimination. On the other hand, it is the physical timing associated with moraic elements that guides the actual articula-tory implementation of reduction with concomitant compensatory lengthening, a process that is gradual (and variable) in nature. Since all segments have physical timing associated with them, the only (unsurprising) assumption we have to make is that preservation of timing associated with weight-bearing units is generally privileged over the preservation of timing associated with units that do not bear weight.

Recent work by **Topintzi (2006)** and **Beltzung (2008)** demonstrates the continuing relevance of compensatory lengthening for phonological theorizing. It has directly tackled the problems that compensatory lengthening poses for OT and manages to maintain the basic tenets of the framework. Both pieces of work must be categorized as phonological conservation approaches, both seek to expand the empirical coverage of previous approaches (notably to account for non-moraic consonant triggers of compensatory vowel lengthening), and, interestingly, both demonstrate the need for formal appeal to the preservation of segment positions in addition to moras. Both appear compatible, therefore, with a rejection of the phonetics/phonology split as described above (whether or not the authors themselves agree with such a rejection). Both also appear compatible with a potential complementary, phonetically based OT approach that might focus on the functional motivation for and phonetic implementation of non-categorical reduction with concomitant lengthening, as it has for assimilation (**Jun 1995**) and lenition (**Kirchner 1998, 2004**; **Gess 2003, 2004, 2009)** (again, whether or not the authors themselves agree with such a move, which is not part of the OT orthodoxy). It seems safe to conclude that compensatory lengthening will continue to be a topic of some interest in the phonological community.

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