Compensatory lengthening: phonetics, phonology, diachrony

By Darya Kavitskaya
Reviewed by Astrid Kraehenmann

Summary by the Author

My dissertation *Compensatory lengthening: phonetics, phonology, diachrony* focuses on descriptive and formal similarities and divergences between compensatory lengthening (CL) of vowels triggered by consonant and by vowel loss. The term *compensatory lengthening* refers to a set of phonological phenomena wherein the disappearance of one element of a representation is accompanied by a corresponding lengthening of another element. This dissertation is primarily concerned with CL processes as they affect vowel length; consonant length is considered only in connection with (de)gemination.

Descriptively, CL represents the situation in which the lengthening of a vowel is correlated with the deletion of a neighboring segment, either a consonant or a vowel. We distinguish two main types of CL of vowels. The first, CL through consonant loss (CVC CL), is the lengthening of a vowel which is correlated with the deletion of an adjacent consonant. The second, CL through vowel loss (CVCV CL), is a process whereby the loss of the second vowel in a CVCV sequence is correlated with the lengthening of the first vowel in this sequence.

CL through consonant loss is a typologically common process, and a survey compiled for the purpose of this study identified 58 languages belonging to 20 language families exhibiting this type of CL. CL through vowel loss is typologically a less common process than CL through consonant loss, though it is by no means rare or exotic. However, while CVCV CL is quite common historically, synchronic alternations of the type CVC → CV.C are not frequently found. Instead of mirroring its historical development, CL through vowel loss usually results in synchronic vowel length alternations which are either lexicalized or morphologized.

CL has been important for phonological theory for a long time, even though the reasons for its importance have changed with the advent of new theoretical frameworks. As a synchronic (morpho)phonological alternation, CL depends on two formally independent processes: the deletion of one segment and the lengthening of another. The challenge for phonological theories has always been in deciding whether these two phenomena should be unified in a single analysis, and if so, how.

There are two main theoretical approaches to CL: either to deny the connection between the loss of one segment and the lengthening of the other, or to treat CL as some kind of preservation of phonetic or phonological entities. The first approach is represented by the phonetic weakening hypothesis of de Chene & Anderson (1979). This hypothesis applies only to the CVC type of CL and holds that all instances of CL through consonant loss can be analyzed into two independently motivated diachronic processes of weakening of a consonant to a glide and subsequent monophthongization of a complex syllable nucleus. CL in de Chene & Anderson’s model is not a compensatory process but rather a sound change which proceeds in two steps.

The second type of analysis, of which the mora conservation hypothesis is perhaps the most influential and widespread contemporary treatment of CL, is more common. The idea behind the moraic conservation approach is that the deletion of a consonant leaves a stray mora to which the preceding vowel reassociates, acquiring an additional unit of length. This necessarily connects the deletion of one segment with the lengthening of the other.

It is shown in the dissertation that despite the improvements which moraic theory makes to a phonological account of CL over earlier conservational treatments, it is still insufficient to account for the full range of data, in that it both overgenerates and undergenerates possible types of CL. First, the moraic
approach predicts that, since only the deletion of a weight-bearing segment can trigger lengthening, a language must have an independently established weight distinction in order to have CL. However, languages with no evidence of moraic status of consonants (e.g., Piro or Ngajan) still exhibit CL. Second, moraic theory predicts the deletion of onsets not to cause CL, since onsets cannot bear weight. There is counterevidence to this claim as well (e.g., in Samothraki Greek, the loss of onset /r/ gave rise to CL). Third, according to the moraic approach, only weight-bearing segments can be relevant in CL processes. However, in some languages (e.g., in Friulian and in various Slavic dialects), the identity of the intervening non-moraic onset C2 in a C1V1C2V2 sequence affects the outcome of CL. For example, in Czech V1 lengthened as a consequence of the loss of V2 only when the intervening consonant was a sonorant or a voiced fricative. If the intervening consonant was a voiceless fricative or a stop, CL did not take place.

This thesis argues that to account for the full range of existing compensatory phenomena as well as for the absence of certain logically possible outcomes of CL, it is necessary to distinguish synchronic and diachronic aspects of CL. To account for the diachronic source of CL, a phonologization model is developed based on a listener-oriented view of sound change. It is shown that CL through consonant and vowel loss are similar diachronically: both arise through phonologization of inherent duration of vowels and neither involves any transfer of length or weight. Rather, intrinsic phonetic vowel durations in both types are reinterpreted as phonologically significant upon a change in the conditioning environment or syllable structure.

The differences between CVC and CVCV CL are illustrated by in-depth case studies of both types. The examination of data from languages with CL through consonant loss, such as Ancient Greek, Kabardian, Latin, Lithuanian, the Ngajan dialect of Dyirbal, and Turkish, reveals that the phonetic motivations for CVC CL are always twofold: on the one hand, it is only a subset of consonants which deletes in any given language, and there are always phonetic motivations (articulatory or perceptual) for why a certain consonant is lost in a particular environment (glides can be misheard as vowels, nasals are very often lost before fricatives or voiceless stops, h is often misheard as a part of a vowel, especially if it is followed by a sonorant, etc.). On the other hand, the deletion of a consonant does not always entail lengthening of the preceding vowel. When such lengthening does take place, there is a clear phonetic motivation for it. I propose that in the instances of consonant loss, only the deletion of certain consonants can give rise to CL. Either elongated transitions to such consonants can be misparsed as intrinsic to the vowel, or alternatively, the deleting consonant itself can be mistaken as a part of the vowel. In most cases of CL, lengthened vowels were phonetically longer in the environment of lost consonants and thus could be reanalyzed as phonetically long with the loss of the consonant through the mechanism of hypocorrection (Ohala, 1981). I also account for apparent counterexamples, such as CL through the deletion of glottal stops, templatic CL in Hebrew, and analogical CL through degemination in Indic.

The analysis of the diachronic development of CL through vowel loss concentrates mainly on Slavic, as it presents the most complex case. The outcome of CL in Slavic languages (schematically, C1V1C2V2 → CV1C) depends on the nature of the intervening non-moraic consonant (C2), as well as the nature of V1 (only mid vowels lengthen), and also on accentuation and on the position of the deleting vowel in the word. I argue that in the cases of CL through vowel loss, extra phonetic length is already present in the vowel. At the time when the second vowel in a CVCV sequence is lost, the first vowel finds itself in a closed syllable. Since the duration of a short vowel in an open syllable is usually much longer than the duration of a short vowel in a closed syllable, phonologization of that phonetic length occurs, so the vowel is reanalyzed as long.

Though similar diachronically, CL through consonant and through vowel loss function differently in synchronic grammars. Because of this split, purely phonological accounts, such as mora conservation, are inadequate to predict the full typology of CL. It is proposed that the nature of the split is due to a difference in the relationship between trigger and target for the two types of CL. Consonant loss in CVC CL is usually transparent, since it is always segmentally conditioned, assuring synchronic recoverability of its trigger and permitting synchronic CVC CL alternations to be modeled as moraic conservation within the syllable. By contrast, CVCV CL is rarely segmentally conditioned. Whenever the loss of diachronic conditioning environment results in opaque alternations which are not phonetically natural and thus not optimizing, a morphological or lexical approach is warranted. In those few cases where the loss of the trigger of CVCV CL is segmentally conditioned and thus synchronically recoverable, CVCV CL alternations remain transparent and formally comparable to CVC CL alternations.

Review by Astrid Kraehenmann

1. Synopsis

Kavitskaya’s dissertation is a thorough and noteworthy attempt to give a unified account of synchronic and diachronic compensatory lengthening of vowels. She proposes a model of “listener-induced phonologization” which is based, on the one hand, on principles of lengthening in production, such as vowels being phonetically longer in open syllables, before voiced sounds, in stressed positions, etc., and on the other hand, on perceptual misinterpretations of VCV-formant transitions, such
as vowel-sonorant or vowel-\(h\) sequences being “misheard” as vowel-vowel sequences. The dissertation covers a lot of ground and abounds with examples from various language families, which makes up for the fact that the author does not present any original material. Although Kavitskaya makes a number of strong and valid points regarding the insufficiency of current theories to account for compensatory lengthening on either purely phonological or purely phonetic grounds, the argumentation more than once is cut short, and consequently the superiority of her account is not as well established as it could have been.

2. Overview of Chapters

2.1 Chapter 1

Chapter 1 introduces the basic assumptions of the dissertation topic. Kavitskaya gives a concise definition of the term ‘compensatory lengthening’ (CL) and lays out the different CL types to be covered, namely the two types which cause vowel lengthening, one due to consonant loss, the other due to vowel loss. She discusses fairly briefly the previous approaches to CL and introduces her own phonologization model, which contends that (a) phonetic vowel length, conditioned segmentally (e.g. voicing of the following consonant) or prosodically (e.g. vowel in open syllable), is reinterpreted and phonologized, and (b) the two CL types pattern differently synchronically and thus must be distinguished from the diachronic phenomena. Kavitskaya claims that transfer of weight is not at issue in diachronic CL.

2.2 Chapter 2

In Chapter 2, the previous approaches to CL are taken up in a slightly longer treatment than in the introductory chapter. Kavitskaya argues that none of the approaches by itself can account for the full range of the attested diachronic and synchronic phenomena. The autosegmental account, which sees CL as the conservation of a timing unit (Clements & Keyser, 1983; Lowenstamm & Kaye, 1986) receives very brief attention more than once is cut short, and consequently the superiority of her account is not as well established as it could have been.

2.3 Chapter 3

Chapter 3 represents a thorough treatment of the conditions on diachronic CL triggered by consonant loss, “CVC CL” as the author terms it. Kavitskaya shows that the loss ofoda consonants as well as onset consonants can (but does not always have to) cause lengthening of a preceding vowel, thereby making a strong case for segment weight or rather weight preservation not being at issue in these phenomena. Based on cross-linguistic evidence from the literature it is demonstrated that only a proper subset of consonants in any given system may trigger lengthening. Those consonants that do cause lengthening invariably affect either the actual or the perceived phonetic duration of the target vowel, creating phonetic length alternations. For example, vowels followed by voiced segments are phonetically longer than when followed by voiceless segments; transitions from vowels to sonorants can be misinterpreted as vowel transitions. Upon removal of the trigger the phonetic differences in length are eventually phonologized. Consonants that do not have such acoustic or perceptual lengthening effects are predicted not to cause lengthening if deleted. It would have been very convincing at earlier points in the discussion if the author had included spectographic evidence of her claims about the acoustic properties of the triggering consonants. She adds one spectogram at the very end, in an attempt to show that the glottal stop in Farsi is fairly vocalic in nature and patterns as an approximant rather than as an obstruent. But she fails to draw attention to the very noticeable voice bar, which would have additionally supported her claim.

What is a bit disconcerting is that Kavitskaya includes in this diachronic chapter a number of phenomena that might be synchronic and even some that certainly are, namely optional Turkish glide and \(l\) loss, \(l\) deletion in Komi (which is mentioned again in Chapter 5 as synchronic), and Lithuanian nasal loss. Since she makes a point about the need of differentiating synchronic and diachronic phenomena for theoretical reasons, they should also have been kept apart in the data presentation.
At the end of the chapter, Kavitskaya also discusses apparent counterexamples to her phonologization theory: compensatory lengthening due to (a) loss of glottal stops, (b) morphological processes, and (c) degemination. The author analyzes the first cases as involving phonological approximants rather than obstructs and supports her claim with convincing spectrographic evidence. The second cases, dealing with a number of alternations with long vowel plus singleton (V:C₁) and short vowel plus geminate (VC₁C₂) in Hebrew, are dismissed as “purely morphological” and “required by language-specific, and moreover, morpheme-specific templatic requirements” (95). The final cases concern vowel lengthening due to degemination of obstruents in Indo-Aryan. Kavitskaya argues that due to the existence of synchronous VCV alternations in Pali, which came about through analogy – e.g. [hattum] – [ha: tum] ‘to hold’ – the equation of vocalic length with consonantal length could have been made. She does not mention that Moraic Theory would have a straightforward explanation for this state of affairs: a syllable with a long vowel is bimoraic just like a syllable closed by a geminate consonant. Moreover, analogy cannot be the explanation for the development of Pali to Bengali – e.g. Pali [satta] > Bengali [sat:] ‘seven’ – since in all the examples given, in addition to degemination and vowel lengthening, clearly there is also loss of the final mora (short vowels delete, long vowels shorten), which is not discussed at all.

2.4 Chapter 4
Diachronic CL triggered by vowel loss (“CVCV CL”) is the subject of Chapter 4. Kavitskaya argues that the change passes through three different stages. At the first stage the longer duration of penultimate vowels in open as opposed to closed syllables is recognized as a phonetic effect of syllable structure. When at stage 2 the final vowel disappears and the once open first syllable becomes closed the reason for longer vowel duration is made opaque, and as a consequence the previously phonetic length is reinterpreted as phonological length at stage 3. The author presents two case studies with which she illustrates her phonologization model, namely CL in Friulian and in Late Common Slavic.

Based primarily on data from Hualde (1990), Kavitskaya contends that in Friulian open syllable status in the initial stage was not enough to trigger length reinterpretation upon loss of a final unstressed vowel. On the one hand, the vowel to be lengthened had to bear main stress, and on the other hand, the intervening consonant also had to be voiced. All three factors by themselves – open syllable, stress, voicedness of following consonant – have the potential to phonetically lengthen a vowel. However, only the compounding effect seems to have made a penultimate vowel long enough to become reanalyzed as phonologically long. Thus, in a form like [u´mit] ‘humid (masc.)’ (< [úmídel]) the [i] is not lengthened because it does not bear main stress, while in [savít] ‘known (masc.)’ (< [savúdél]) all three factors coincide, and lengthening applies accordingly. Thus, CL in Friulian is segmentally as well as prosodically constrained.

In her second case study, following mainly Timberlake (1983, 1993), Kavitskaya discusses Slavic jer strengthening as an instance of CL. She argues very convincingly that, as in Friulian, there are segmental and prosodic conditioning factors.

The first segmental factor concerns the sonority of the consonant intervening between the target and the trigger of CL. The languages have different cut-off points: for example, in North Cakavian only sonorants allow lengthening (‘daru > da:r ‘gift’; but prag > prag ‘threshold’) while in Polish also voiced stops do so (*dom > du:m ‘house’, *bo:gi > bu:ﬁ ‘god’). The experiment, which tested the phonetic reality of sonorancy influencing preceding vowel duration, nicely complements the theoretical claims and assumptions that are made. A second factor is the nature of the targeted vowel. Kavitskaya demonstrates that the reason for mid vowels more readily undergoing lengthening than high or low ones has to do with the synchronic vowel system of Late Common Slavic. All peripheral vowels originated from distinctively long vowels, while the non-peripheral ones came from originally short vowels. Under the assumption that some of the old length had been retained in the high and low vowels, phonetic lengthening would not have been as noticeable as for short (i.e. mid) vowels. Therefore, mid vowels were more prone to a length reanalysis.

As for prosodic factors, Kavitskaya enumerates two: accent type and the position of the involved CVCV sequence in the word. While the short falling accent liberally allows lengthening, the rising accents are more restrictive. The author’s explanation is that vowels under the falling accent are phonetically longer than vowels under the rising accents and, therefore, are more likely candidates for a length reanalysis. She also shows that the word-position factor actually is connected with the accent-type factor in the following ways: if the CVCV sequence is final, CL under the new rising accent is more regular than under the old falling and rising accents; if it is internal, CL under the old accents is more regular.

This chapter also concludes with two apparent counterexamples for the proposed phonologization theory. One involves the development of Proto-Austro-Basque into Late Basque (e.g. ‘lima > ma: ‘five’), in which the first of two light syllables was lost and the second received vowel lengthening. Kavitskaya, however, rightly treats this as a minimal word effect rather than CL. The other case is Macushi Carib, which shows unstressed vowel deletion and lengthening in the following syllable (e.g. /wanamari/ > (wna:) (mrı´:) ‘mirror’). But these data are plausibly analyzed as involving iambic vowel lengthening.
Chapter 5 takes up the last issue, namely the difference between synchronic and diachronic CL. Kavitskaya argues that diachronic CL caused by consonant as well as vowel loss are phonetically similar because in both types inherent vowel duration is phonologized. She shows that, in contrast, synchronic CVC lengthening is different from synchronic CVCV lengthening, since the trigger of the process is usually recoverable in the former case but not in the latter. The author also claims that synchronic CL through consonant loss is analyzed as moraic conservation within a syllable or, in other words, optimization of syllable structure, and illustrates this claim in an optimality-theoretic account of Komi l-deletion. However, it is not clear why this type needs a separate analysis when the phonologization model is perfectly able to account for it. As for synchronic CL through vowel loss, Kavitskaya argues that for most of her data it is not appropriate to analyze this type as moraic conservation within a foot. She presents an alternative analysis in terms of lexically marked underlying forms in Hungarian and Friulian. Her main claims are summarized in Table 1.

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Conditioning factors</th>
<th>Transparency/recoverability of trigger</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diachronic CL</td>
<td>C-loss or V-loss segmental and prosodic</td>
<td>n.a.</td>
<td>phonologization of inherent V-duration</td>
</tr>
<tr>
<td>Synchronic CL</td>
<td>C-loss primarily segmental</td>
<td>yes</td>
<td>no transfer of length or weight</td>
</tr>
<tr>
<td>CVC → CV:</td>
<td>V-loss primarily prosodic</td>
<td>no (most)</td>
<td></td>
</tr>
<tr>
<td>CVCV → CV:C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Summary of main claims

3. Closing remarks
In spite of my criticisms given above, I think Kavitskaya’s dissertation contributes important and valuable insights into the theory of compensatory lengthening. She could have made her case for the phonologization model stronger on many occasions, not only by showing the inadequacies of other models more thoroughly, but also by emphasizing the strengths of the new model. Although the need for differentiating between synchrony and diachrony is not thoroughly established for compensatory lengthening caused by consonants, it is certainly there for compensatory lengthening caused by vowels.

References