What drives compensatory lengthening? Beyond moraic conservation
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Abstract

Compensatory Lengthening (CL) refers to processes where deletion of a segment leads to lengthening of another segment. The deleted segment (trigger) and the lengthened segment (target) can be either a vowel or a consonant. Previous research has focused mainly on cases of vowel lengthening, paying less attention to consonant lengthening. The goal of this paper is to argue for two different motivations driving consonant lengthening in different languages, based on the typological comparison between vowel and consonant lengthening developed in Campos-Astorkiza (2005). Traditionally, CL has been explained through moraic conservation (Hayes 1995), according to which the trigger is always a moraic segment and upon its deletion, the stranded mora is attached to an adjacent element resulting in lengthening. However, moraic conservation has been challenged and, based on typological considerations, the current study argues that not all instances of consonant CL have the same motivation. I propose that phonologization and perceived similarity play a role in different cases. According to the phonologization account (see Kavistskaya 2002 for vowel lengthening), the phonetic consonant duration is reanalyzed as phonological upon loss of the conditioning environment. This analysis is illustrated with data from the Greek dialects of Lesbian and Thessalian. The perceived similarity approach, based on work by Steriade (2001), argues that the result of compensatory lengthening is more similar to the original sequence than the result of only deleting. Hungarian presents a case of compensatory lengthening where perceived similarity offers an explanation to the observed pattern.
1. Introduction

The term compensatory lengthening (CL) is used in the literature to refer to a process by which deletion of a segment leads to lengthening of another segment. Let us illustrate CL with two examples: Turkish vowel lengthening and Eastern Andalusian Spanish consonant lengthening. In Turkish, optional deletion of /h/ before a continuant or nasal leads to lengthening of the preceding vowel (Sezer 1986). This process is illustrated in (1a), where the two variant pronunciations are included. /h/ preceding an oral stop is not subject to optional deletion (1b), and consequently, no CL applies.

(1) Turkish compensatory vowel lengthening (Sezer 1986).
(a) [kahja] ~ [kajja] ‘steward’
[ahmet] ~ [amet] man’s name
(b) [sahte] ~ *[saːte] ‘counterfeit’
[sobbet] ~ *[soːbet] ‘chit-chat’

Eastern Andalusian Spanish (EAS) presents a case where obstruent deletion occurs together with lengthening of the following consonant (Gerfen 2001, 2002, Penny 2000), as exemplified in (2a). The deleted segment in EAS is a coda obstruent in preconsonantal position and upon its deletion, the following consonant gets lengthened. It is relevant to notice that in EAS there are morphological alternations where the trigger obstruent surfaces, for example when this consonant occupies a prefix final position and the following stem begins with a vowel (2b).

(2) EAS compensatory consonant lengthening\(^1\).
(a) [dennibel] ‘unevenness’ (/des+nable/)
[summarnino] ‘submarine’ (/sub+marino/)
[bokke] ‘forest’ (cf. boske in Standard Peninsular Spanish)
(b) [desato] ‘I untie’ (/des+aeto/)
[subordinado] ‘subordinate’ (/sub+ordinado/)

In cases of CL, the deleted element is the trigger and the lengthened segment is the target. These two terms, trigger and target, will be used from now on to refer to the segments involved in CL. There are four logically possible types of CL. The target can be either a vowel or a consonant, and the trigger can also be a vowel or a consonant. Table 1 shows these four possibilities.

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\(^1\) The symbol + stands for a morpheme boundary.
Table 1  
*Four possible types of CL*

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>C</td>
<td>V</td>
</tr>
<tr>
<td>V</td>
<td>C</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>

There are two main types of CL depending on the target segment: vowel lengthening or consonant lengthening. Previous research has looked mainly at cases of vowel lengthening, paying less attention to consonant lengthening. This paper focuses on consonant lengthening. Its goal is to argue for two distinct motivations driving this type of lengthening in different languages, based on the typological comparison between vowel and consonant lengthening developed in Campos-Astorkiza (2005). Traditionally, CL has been explained through moraic conservation (Hayes 1989), according to which the trigger is always a moraic segment and upon its deletion, the stranded mora is attached to an adjacent element resulting in lengthening. However, moraic conservation has been challenged and, based on typological considerations, the current study argues that not all instances of consonant CL have the same motivation. I propose that the sound change mechanism of phonologization (defined in section 3.1), and perceived similarity play a role in different cases. According to the phonologization account (see Kavitskaya 2002 for vowel lengthening), the phonetic consonant duration is reanalyzed as phonological upon loss of the conditioning environment. This analysis is illustrated with data from the Greek dialects of Lesbian and Thessalian (see examples in section 3.2 below). The perceived similarity approach, based on work by Steriade (2001), argues that the result of compensatory lengthening is more similar to the original sequence than the result of only deleting. Hungarian presents a case of compensatory lengthening where perceived similarity offers an explanation to the observed pattern (see section 4 below for illustrative examples).

The paper is structured as follows. In section 2, I present a typological comparison between compensatory vowel and consonant lengthening with respect to the directionality of the process, adjacency of trigger and target and the type of trigger, based on Campos-Astorkiza (2005). In section 3, the phonologization analysis of compensatory vowel lengthening developed by Kavitskaya (2002) is presented. An extension of this analysis is considered for the phenomenon of consonant lengthening. Section 4 introduces the Theory of Perceived Similarity developed by Steriade (2001) and applies it to some instances of consonant lengthening. In section 5, I present the moraic conservation approach to CL, focusing on the main problems with this account. Section 6 summarizes the main proposal put forth in this paper and suggests venues for future research.
2. Typological comparison between compensatory vowel and consonant lengthening

In this section, I present a typological comparison between compensatory vowel and consonant lengthening, based on the main generalizations reached by Campos-Astorkiza (2005), which are summarized below. Several differences and similarities are identified with respect to adjacency between the trigger and target, directionality of the process, i.e., where the target and the trigger occur with respect to each other, and type of trigger.

2.1. Adjacency

In this section, adjacency requirements between the trigger and the target of CL are examined. In cases of vowel lengthening through consonant loss, the trigger and the target must be strictly adjacent to each other, as we saw in Turkish. Kavitskaya (2002) presents Ancient Greek as an apparent exception. As (3) illustrates, glide deletion in Ancient Greek leads to lengthening of a vowel across an intervening consonant (Ingria 1980, Wetzels 1986). CL in Ancient Greek is considered in more detail in section 3. As for vowel lengthening through vowel deletion, the trigger and the target are not adjacent but separated by an intervening consonant. The scheme CVCV → CV:C represents the behavior of these cases.  

(3) Ancient Greek compensatory vowel lengthening.

*klinjο > [klinor] ‘tend’
*pʰɛɾjo > [pʰɛro] ‘destroy’

The typological evidence gathered in Campos-Astorkiza (2005) indicates that the trigger and the target in consonant lengthening are strictly adjacent in all cases, as Eastern Andalusian Spanish illustrates. There are no instances where the trigger and the target consonant are separated by some other element, i.e., there are no cases of long distance compensatory consonant lengthening.

2.2. Directionality

The directionality of compensatory vowel lengthening processes is usually right-to-left. This means that the trigger or deleted segment is to the right of the target or lengthened vowel. The Turkish data in (1) illustrate right-to-left directionality (e.g. [kahja] ~ [ka:ja] ‘steward’). There seem to be some exceptions to this generalization. In some languages, deletion of an onset liquid

2 Campos-Astorkiza’s (2005) generalizations with respect to vowel lengthening are based on Kavitskaya (2002).

3 Note that even if the two vowels are not acoustically adjacent, in articulatory terms they are, given that vowel production is continuous and any intervening consonant is superimposed on the vowels (Öhman 1967, Fowler 1983). Thus, from an articulatory perspective, it could be claimed that the trigger and target are strictly adjacent.
leads to lengthening of the following vowel. In these cases the directionality is left-to-right. Languages that exemplify this pattern include Romanesco Italian, Samothraki Greek and Onondaga. In Samothraki Greek, postconsonantal and word-initial /r/ deletes with subsequent lengthening of the following vowel (Kavitskaya 2002, Topintzi 2006). Some illustrative data are given in (4).

(4) Compensatory vowel lengthening in Samothraki Greek.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Samothraki</th>
</tr>
</thead>
<tbody>
<tr>
<td>[adras]</td>
<td>[adags]</td>
</tr>
<tr>
<td>[ruxa]</td>
<td>[upxa]</td>
</tr>
</tbody>
</table>

Turning now to compensatory consonant lengthening, left-to-right directionality is found in most cases, i.e., the trigger is to the left of the target consonant, as we saw for EAS in (2) (e.g. /des+nibel/ = [dennibel] ‘unevenness’). The exceptions to this generalization are all cases where the deleted segment is the glide /j/. The languages that exhibit this exceptional right-to-left directionality in consonant lengthening are the Greek dialects of Lesbian and Thessalian and Hungarian. Let us illustrate this pattern with some data from Hungarian given in (5), where /j/-deletion is accompanied by lengthening of the preceding consonant (Kenesei, Vago & Fenyvesi 1998).

(5) Hungarian /j/ deletion with preceding consonant lengthening

/maːs+jo/ → [masʃɔ] ‘climbDEF.3SG’
/baːc+jo/ → [baʃɛɔ] ‘elder brotherPOSS.3SG’

In Hungarian, /j/ deletes after sibilant and palatal consonants. The relevant environments where deletion applies result only from stem+suffix concatenation, since sibilant-/j/ or palatal-/j/ sequences do not occur morpheme internally (Kenesei, Vago & Fenyvesi 1998). This might seem to suggest that the exceptional right-to-left directionality shown in (5) is due to root control, i.e., the root consonant is preserved at the expense of deleting the initial suffix /j/ (McCarthy & Prince 1995). However, in Hungarian there is another case of compensatory consonant lengthening, which displays the mainly attested left-to-right directionality. This CL involves /l/-deletion before /r/ or /j/ with lengthening of the following consonant. The stem+suffix forms in (6) exemplify this process.

(6) Hungarian /l/ deletion with following consonant lengthening

/bol+rɔl/ → [borrɔl] ‘leftDEL’
/tol+juk/ → [tojɯk] ‘pushDEF.1PL’

These examples show that Hungarian CL is not root-controlled since there are cases where a root consonant is subject to deletion. In section 4 I seek an explanation for the apparent counterexample to the directionality
generalization in the nature of \( /\j/ \), since it is the only consonant trigger that gives rise to right-to-left compensatory consonant lengthening.

2.3 Type of consonant trigger

Compensatory vowel lengthening presents a limited set of consonants that might act as triggers of the lengthening. Deletion of glides, liquids, nasals and the fricative \( /\h/ \) might lead to CL. On the other hand, deletion of stop consonants does not trigger vowel lengthening. Kavitskaya (2002) argues that this is the expected result given her phonologization analysis (see section 3).

With respect to consonant lengthening, the data from EAS show that deletion of a stop consonant, more precisely an obstruent, can trigger the lengthening. Hungarian illustrates a case of CL after elision of liquids and glides. So, unlike in vowel lengthening, there seem to be no restrictions on the consonant trigger in compensatory consonant lengthening.

2.4 Summary of differences between vowel and consonant lengthening

Table 2 summarizes the differences and similarities between compensatory vowel and consonant lengthening with respect to adjacency of trigger and target, directionality and type of trigger. It becomes clear that both types of compensatory lengthening do not display the same behavior. In the following sections, I argue that these asymmetries suggest different analyses for the two distinct phenomena. More precisely, I propose two novel analyses for compensatory consonant lengthening based on phonologization and perceived similarity. I show that the nature of the segments involved and the motivation for consonant deletion play an important role in determining the CL analysis.

<table>
<thead>
<tr>
<th>Table 2 Summary of asymmetries between consonant and vowel lengthening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V-lengthening</strong></td>
</tr>
<tr>
<td>adjacency</td>
</tr>
<tr>
<td>directionality</td>
</tr>
<tr>
<td>type of trigger</td>
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<td></td>
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</tbody>
</table>

3. Compensatory lengthening as phonologization

In this section, I introduce Kavitskaya’s (2002) phonologization analysis of compensatory lengthening. Kavitskaya restricts her study exclusively to vowel lengthening and does not refer to cases of consonant lengthening. Therefore, I consider the possibility of extending her phonologization account to this type of CL.
3.1 Phonologization of vowel lengthening

Kavitskaya (2002) develops a phonologization model based on a listener-oriented view of sound change (Ohala 1981). According to this perspective, the acoustic or perceptual characteristics of the signal are responsible for changes and alternations in the phonologies of human languages. Accordingly, intrinsic phonetic properties of speech can be misparsed and reinterpreted, giving rise to phonologization. Phonologization is a sound change process by which contextual variation is reinterpreted as part of the phonological system (Hyman 1977).

According to Kavitskaya, in cases of compensatory vowel lengthening, the intrinsic phonetic vowel duration is phonologized, i.e., perceived as phonemic, upon loss of the conditioning environment. In vowel lengthening through consonant loss, represented as CVC → CV:, the vowel is phonetically longer in the original environment, i.e., preceding the consonant (Kavitskaya 2002: 39). Consequently, once this consonant is lost, the extra phonetic length in the vowel is reanalyzed as phonemic. Interestingly, the phonologization analysis makes a prediction about the possible consonant triggers of vowel lengthening: only deletion of consonants whose transitions can be mistaken for part of the preceding vowel or those that can affect the perceived duration of this vowel can give rise to compensatory vowel lengthening. This prediction is borne out since, as noted in section 2.3, stops, whose acoustic characteristics makes it hard to mistake them for part of the vowel, do not participate in this process.

Let us illustrate the phonologization analysis with an example of compensatory vowel lengthening through liquid deletion from the Ngajan dialect of Dyirbal (Kavitskaya 2002). In Ngajan, both /l/ and /ɾ/ are lost at the end of a syllable. The cognates in (7) from Ngajan and Mamu, a closely related dialect, exemplify this liquid loss and the concomitant vowel lengthening found in the former dialect. It is relevant to notice that the rhotic is an approximant sound rather than a trill or a tap (Dixon 1990). In fact, there is another rhotic in the system, more precisely a trill, which is retained in Ngajan.

(7) Mamu       Ngajan
    maɾbu       maɾbu         ‘louse’
    gɯɾgu       gɯɾgu         ‘brought together’

The phonologization analysis explains the pattern of CL illustrated in (7) by taking the phonetic properties of liquids into account. The vocalic transitions from a vowel into a liquid are relatively long. Thus, when the liquid is lost, the transitions are reanalyzed as part of the vowel and the vowel is phonologized as long. Kavitskaya (2002) notes that the properties of liquids vary cross-linguistically. Only those liquids that are approximants are expected to trigger CL, given that approximant liquids are the ones that display long vocalic transitions. On the other hand, the transitions into trills and taps are short and thus, these consonants are less likely to give rise to CL.
In vowel lengthening through vowel deletion (schematized as CVCV → CV:C), syllable structure is the relevant conditioning environment that is lost. Vowel deletion affects the syllabic shape of the word: the syllable structure changes from two open syllables to one closed syllable. Maddieson (1985) points out that vowel duration is longer in open syllables. So, when the vowel is lost, the phonetically longer duration of the preceding vowel is reanalyzed as phonemic in the new closed syllable.

The advantage of the phonologization analysis is that the generalizations about directionality and adjacency follow from it. In cases of consonant loss, the trigger affects the duration of its adjacent vowel and this explains the left-to-right directionality of the process. The loss of a vowel changes the structure of the preceding syllable where the lengthened vowel is the nucleus. This accounts for the non-adjacency between trigger and target in vowel lengthening. The phonologization analysis also offers an explanation for the restrictions on the type of consonant trigger, as shown above.

Next, the question to ask is whether the phonologization analysis can be extended to cases of compensatory consonant lengthening. In order for this analysis to hold, it must be the case that some environment, in which the deleted segment plays an important role, conditions the phonetic duration of the target consonant. As noted in section 2.2, compensatory consonant lengthening through consonant loss is the result of deleting a consonant to the left of the target. Then, according to the phonologization account the trigger or deleted consonant is expected to affect the intrinsic duration of the following target consonant. For instance, in the case of compensatory consonant lengthening in EAS the trigger obstruent would influence the duration of a following consonant and upon loss of this conditioning environment, the phonetically longer consonant would be phonologized. However, there seems to be no claims in the literature pointing to this type of durational effects among adjacent consonants. Thus, the phonologization analysis seems hard to apply at least to some cases of consonant lengthening. On the other hand, I argue that the examples of /j/-deletion found in Greek and Hungarian discussed in section 2.2 can be analyzed as the result of a phonologization process, where the deleted segment conditions the phonetic duration of the target consonant. Let us illustrate this proposal with the process of /j/-deletion in Ancient Greek.

3.2 Phonologization of consonant lengthening

Section 2.2 showed that the directionality pattern for consonant lengthening is left-to-right, i.e., the trigger is to the left of the target. However, two cases of /j/-deletion found in Lesbian/Thessalian Greek and Hungarian show exactly the opposite direction. Here, I focus on the Lesbian and Thessalian dialects of Greek and claim that these apparent counterexamples to directionality are instances of phonologization.

Ancient Greek shows a dialectal split with respect to /j/-deletion (Ingria 1980). In Lesbian and Thessalian, consonant lengthening obtains while in all the other dialects vowel lengthening is the outcome of this deletion. The conditions for deletion and lengthening are the same for all dialects (Ingria
1980, Wetzels 1986). /j/ deletes in the context /V1RjV/, where R stands for a sonorant and V1 is [i, e, u], leading to consonant lengthening in Lesbian/Thessalian (L/T) and vowel lengthening in other dialects. The forms in (8) illustrate this pattern.

(8) L /T Elsewhere
   *klinjɔ: [klinnɔ:] [klinɔ:] ‘tend’
   *pʰerjɔ: [pʰɛrɔ:] [pʰɛrɔ:] ‘destroy’

In the same /V1RjV/ environment, we observe sonorant-/j/ metathesis when V1 is [a, o]. This is true for all dialects as the examples in (9) show.

(9) All dialects
   *panjɔ: [pajnɔ] ‘show’
   *morja [mojra] ‘fate’

In cases where the sonorant is /l/, there is /j/ deletion with /l/ lengthening regardless of the preceding vowel. As seen in (10), this applies to all dialects.

(10) All dialects
   *angeljɔ: [angellɔ:] ‘announce’
   *baljɔ: [ballo] ‘throw’

Kavitskaya (2002) proposes a phonologization analysis for the Greek dialects where vowel lengthening takes place. Let us go through the main points of this analysis, which relies mainly on the acoustic effects of /j/ in neighboring segments. Palatalization of a sonorant affects the whole segment, so that F2 and F3 values are higher throughout the sonorant. On the other hand, palatalization of a stop only affects the release of the stop and is manifested as a palatal off-glide. Another important element in the analysis of Greek is the fact that F2 and F3 targets for a vowel preceding a palatalized consonant are higher than before a non-palatalized one. This results in perception of a palatal glide before the consonant. But why do we get lengthening of only /i, e, u/? These vowels are high and/or front so they have relatively high F2 and F3 values. A change from these into a /j/ is not easily detectable, leading to the reanalysis of the /j/ as part of the vowel. However, /a, o/ have lower F2 and F3 values and the transition from these vowels into /j/ is easy to identify and no reanalysis takes place. Finally, phonologization explains the behavior of /l/. This segment is already palatalized so that /j/ does not affect its F2 and F3 or of its preceding vowels. Then, given the long transitions from /l/ to /j/, the sequence /lj/ is reinterpreted as a long lateral /ll/ (Kavitskaya 2002: 47-49).

Now, let us turn to Lesbian and Thessalian in order to illustrate how the phonologization analysis can be extended to consonant lengthening. Most of Kavitskaya’s explanation holds for these cases. The only difference is that in these dialects, the sequences that are reinterpreted as long are formed by a
sonorant and /j/. The key here is that sonorant consonants, unlike obstruents, have formant-like transitions, very much like vowels, but characterized by lower energy (Ladefoged 2001). Furthermore, there are no clear discontinuities from a sonorant to /j/ and vice-versa (Javkin 1979). When /j/ is not perceived, i.e., after high, front vowels (see above), the /j/-sonorant transitions may be reinterpreted as part of the sonorant, giving rise to a long sonorant.

Ancient Greek illustrates a case where two possible reinterpretations of phonetic duration are possible. The vowel-glide transitions can be reanalyzed as part of the vowel, resulting in a lengthened vocalic segment. But also the sonorant-glide transitions might be misperceived as extra duration on the sonorant, leading to a lengthened sonorant. These two possibilities give rise to dialectal differences: Lesbian and Thessalian choose the last option and the other dialects opt for the former one.

### 4. Perceived similarity in compensatory consonant lengthening

As mentioned earlier, not all cases of compensatory consonant lengthening can be accounted for by phonologization. In this section I pursue a new line of analysis for CL in the spirit of work on perceived similarity by Steriade (2001). Steriade advances the claim that in order to satisfy some phonotactic restriction, speakers choose the minimal change with respect to the underlying form. This minimal change is evaluated against the similarity between the input and output forms. Thus, a given form is preferred over other candidate forms if it is the most similar to the input and satisfies the phonotactic constraint. For instance, the phonotactic restriction against word final voiced obstruents is always repaired through devoicing. According to Steriade, this is the preferred solution because the change from voiced to unvoiced is the minimal change to satisfy the constraint. A form such as [mop] is more similar to [mob] than any other form (e.g. insertion [mope], deletion [mo]).

Extending the Theory of Perceived Similarity to instances of compensatory consonant lengthening, I argue that the result of consonant deletion and following consonant lengthening is more similar to the original consonant sequence than the result of deletion only. This is shown schematically in (11), where “\(\succ\)” means “is more similar than”.

\[
\text{(11) } C_1C_2 \text{ vs. } C_2C_2 \succ C_1C_2 \text{ vs. } C_2
\]

Relevant here is that the perceived similarity analysis predicts restrictions on the target so that only consonants that are relatively similar to the trigger may be subject to lengthening. Hungarian presents a very restricted type of CL that seems to have a similarity analysis flavor. Hungarian shows /l/-deletion preceding /r/ or /j/ together with lengthening of this following consonant (Kenesei, Vago & Fenyvesi 1998). The data in (12) illustrate this process.
Hungarian /l/ deletion and CL

\( /\text{bol} + \text{rol} / \rightarrow [\text{borrol}] \) ‘leftDEL’

\( /\text{tol} + \text{juk} / \rightarrow [\text{tojju}k] \) ‘pushDEF.1PL’

Given their acoustic features, /l, r, j/ are more similar to each other than to obstruents or nasals. These three segments have formant-like structure, with lower energy than vowels, and they all have oral flow exclusively. I hypothesize the following hierarchy of perceived similarity, given in (13):

\[
(13) \quad /lr/ \text{ vs. } /rr/ , /lj/ \text{ vs. } /jj/ \Rightarrow /lr/ \text{ vs. } /r/ , /lj/ \text{ vs. } /j/
\]

This means that /l/ deletion with lengthening of the following segment is perceived as more similar to the original /l/-sequence than /l/ deletion without lengthening. Following Steriade, this similarity hierarchy can be implemented within Optimality Theory by translating it into a fixed ranking of faithfulness constraints. The relevant constraints and their ranking are given in (14):

\[
(14) \quad \text{MAX}(l)/_r, \text{MAX}(l)/_j, \text{DEP}(F)/_r, \text{DEP}(F)/_j \gg \text{IDENT}(l)/_r, \text{IDENT}(l)/_j
\]

- **MAX**: no deletion of a given segment
- **DEP(F)**: no insertion of new features
- **IDENT**: no change in the featural content of a given segment.

MAX(l) constraints prevent deletion of /l/ before /r/ and /j/. The low ranking of IDENT(l) allows for changing its featural content. Due to the high ranking of DEP(F), there is no insertion of new features but lengthening of the melodic elements from the following segment. A markedness constraint against the relevant sequences */lr/ and */lj/ is top ranked, disallowing the occurrence of these sequences in Hungarian. In the current analysis, this constraint is satisfied by changing the featural content of the first element in the relevant sequences. Let us illustrate this analysis with a case where /l/ is deleted before /r/. Tableau 1 shows the interaction of the relevant constraints with respect to four candidates.

Tableau 1 /bolr2ol/ → [borl2ol] ‘leftDEL’

<table>
<thead>
<tr>
<th>/bolr2ol/</th>
<th>*/lr/</th>
<th>MAX(l)/_r</th>
<th>DEP(F)/_r</th>
<th>IDENT(l)/_r</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [bolr2ol]</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. [borr2ol]</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. [bomr2ol]</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>d. [boml2ol]</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

According to Steriade (2001), the P-map is in charge of projecting the faithfulness constraints from the perceived similarity hierarchy.
Candidate (a) violates the markedness constraint against /lr/ sequences. Candidates (b) and (c) violate the highly ranked faithfulness constraints against /l/ deletion before /r/ and against insertion of new features before /r/, respectively. The last candidate (d) is the optimal output since it satisfies the top-ranked constraints at the expense of the low ranked constraint against featural change of /l/ before /r/. Summarizing, this analysis illustrates the main idea proposed in this section, namely that the result of compensatory lengthening is perceived as more similar to the original sequence than the result of only deleting.

5. Moraic conservation and compensatory lengthening

The traditional approach to CL is based on moraic conservation (see Hayes (1989) for a detailed overview). The main claim of this analysis is that CL takes place in order to preserve a mora stranded after segment deletion. Therefore, CL is predicted to occur only when a mora-bearing segment is deleted, i.e., either a vowel or a moraic coda consonant. This prediction is generally supported by typological evidence: Hayes (1989) reports that there are no cases of onset deletion leading to CL (but see below).

However, the moraic conservation approach faces several issues. Directionality needs to be captured in any analysis of CL. In moraic analyses, directionality is just stipulated, without any clear explanation of the observed patterns. Also the choice of segment target to link the mora, thus giving rise to either vowel or consonant lengthening, needs to be addressed. This preference does not seem to be restricted by language-particular distributions. It is not the case that the choice between vowel and consonant lengthening depends on the existence of long vowels or consonants in the language, since as Gess (1998) shows, compensatory lengthening is not a structure-preserving process. For example, EAS shows consonant lengthening, although this variety does not have long vowels or consonants. The moraic account must also take care of the adjacency requirement between target and trigger. It should include some provision so that the relevant mora gets linked to an adjacent element, rather than getting anchored to distant positions. This kind of account normally assumes that the stranded mora is linked to an adjacent segment but there is no mechanism to restrict the possible landing sites so that in principle, the mora could end up linked to a distant element.

Furthermore, the moraic conservation account has been challenged by several languages that show compensatory lengthening after onset deletion. This pattern is explicitly ruled out by the moraic approach, since onset consonants are assumed to be non-moraic. In section 2.2, I introduced some languages that display compensatory vowel lengthening through onset deletion: Samothraki Greek, Romanesco Italian and Onondaga. Kavitskaya (2002) accounts for these facts within the phonologization framework.

Also, it is worth considering whether the fact that triggers of CL tend to bear a mora is due to syllabic considerations, i.e., the moraic status of segments, or to segment sequencing. Wilson (2001) states that in consonant cluster
reduction, the segment that systematically deletes is the first consonant. Wilson explains this fact in perceptual terms. He claims that the lack of strong perceptual cues in preconsonantal contexts motivates the preference for deleting consonants in these environments as opposed to in prevocalic contexts. Thus, if the target of the deletion repair is the first consonant, then presumably this segment is potentially always moraic. A kind of language that bears on this issue is one that has prevocalic consonant deletion to avoid consonant clusters. However, according to Wilson’s prediction this kind of languages might be hard to find. Also, if an intervocalic consonant deletes, it might not lead to lengthening due to a cross-linguistic dispreference for sequences of three vowels. These are interesting ideas that will benefit from further research.

6. Conclusion

The term compensatory lengthening covers a complex array of cases where deletion of a segment leads to lengthening of an adjacent element. The first basic split is that between instances of vowel lengthening and cases of consonant lengthening. Three main asymmetries (regarding directionality, adjacency and type of trigger) emerge when comparing these two types of CL, suggesting that not all instances of CL have the same motivation. Traditionally, compensatory lengthening has been analyzed as the result of moraic conservation but this approach is shown to face serious challenges, making it desirable to explore other possible driving forces behind CL.

Kavitskaya’s (2002) phonologization approach is presented as a possible and appealing analysis of vowel lengthening. Phonologization is argued to also play a role in languages where /j/ deletion leads to lengthening. This is illustrated with the Lesbian and Thessalian dialects of Greek where the acoustic effects of the glide on the adjacent consonant motivate the lengthening. The next step would be to apply this analysis to other cases of /j/ deletion driving consonant lengthening, for instance that found in Hungarian (see examples in (5)). However, phonologization does not seem to explain all cases of compensatory consonant lengthening. Thus, a new approach is advanced based on the notion of perceived similarity. The claim here is that consonant deletion with lengthening is more similar to the underlying form than only deletion. In order to further develop this new proposal, similarity judgments for the relevant forms would be necessary to verify this hypothesis. Also, we expect to find cases where the similarity between the trigger and the target becomes relevant in determining the application of lengthening. These issues are left for future research.
References


