

Chapter 3

Compensatory lengthening and structure preservation revisited yet again

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In their seminal paper, de Chene & Anderson (1979) make a strong claim that pre-existing vowel length contrast is a necessary condition for the phonologization of vowel length through compensatory lengthening. Compensatory lengthening is thus predicted to be always a structure-preserving change. Since that time, the claim has been challenged in numerous works (Gess 1998; Hock 1986; Morin 1992, among others). A closer examination of the cited counterexamples to de Chene and Anderson's claim reveals certain generalizations. Some apparent counterexamples, such as Samothraki Greek (Kiparsky 2011), involve the full vocalization stage of the consonant with the subsequent coalescence of that consonant with the preceding vowel. In other cases, such as Old French (Gess 1998) and Komi İzma (Hausenberg 1998), heterosyllabic or heteromorphemic identical vowel sequences are attested elsewhere in the language. The former cases involve the reanalysis of vowel length before weakened consonants that is indeed strengthened by the independent existence of the vowel length contrast in the languages in question, in support of de Chene and Anderson's claim. The former cases are not truly compensatory, and phonemic vowel length is introduced into the language through coalescence.

1 Introduction

In their seminal paper on compensatory lengthening (CL), de Chene & Anderson (1979) make a strong claim that the independent existence of a vowel length contrast is a necessary condition for the phonologization of vowel length through compensatory lengthening. CL is thus predicted to be always a structure-preserving change that cannot introduce contrastive vowel length into a language. Since that time, the generalization in its stronger version (certain sound changes are always structure preserving) or in its weaker version (structure preservation is a tendency in sound change) has been accepted and developed by linguists otherwise advocating very diverse and sometimes incompatible approaches to sound change, in particular, in research programs by Paul Kiparsky



Darya Kavitskaya. 2017. Compensatory lengthening and structure preservation revisited yet again. In Claire Bowerman, Laurence Horn & Raffaella Zanuttini (eds.), *On looking into words (and beyond)*, 41–58. Berlin: Language Science Press. DOI:10.5281/zenodo.495438

(Kiparsky 1995; 2003) and Juliette Blevins (Blevins 2004a; 2009). However, the generalization has also been challenged in several works. For instance, Gess (1998) takes issue with de Chene and Anderson's claim, suggesting that in general, "structure preservation is irrelevant as a theoretical construct" and proceeds to argue that de Chene and Anderson's interpretation of the Old French data, which is their main example, is incorrect, and that in Old French compensatory lengthening happened before the introduction of the other sources of length distinction into the language, contrary to de Chene and Anderson's analysis. CL through onset loss, such as in Samothraki Greek (Topintzi 2006; Kiparsky 2011; Katsika & Kavitskaya 2015), is also a potential counterexample to the claim that CL is a structure-preserving change, along with the case of Occitan (Morin 1992). In other languages without pre-existing vowel length contrast, such as Andalusian Spanish (Hock 1986), Ilokano (Hayes 1989) and the Ngajan dialect of Dyirbal (Dixon 1990), vowel length that is the result of CL remains allophonic and predictable. In yet another type of cases, such as Komi Ižma (Harms 1967; 1968; Hausenberg 1998), vowel length from CL appears to be quasi-phonemic and on its way to phonologization.

CL is a common sound change that has occurred independently in many languages across the world, and only a few potential counterexamples to de Chene and Anderson's claim have been reported. In principle, we could have been done simply restating this observation that supports a weaker but less controversial claim that there is a tendency for CL to occur in languages with pre-existing vowel length, in the spirit of proposals about structure-preserving sound change by either Kiparsky (2003) or Blevins (2009), but we will proceed to examining the most widely discussed counterexamples to de Chene and Anderson's claim. A closer examination of these counterexamples reveals certain generalizations. The working analyses of some cases proposed in the literature involve the full vocalization stage of the consonant with the subsequent coalescence with the preceding vowel, such as in Samothraki Greek (Sumner 1999; Kiparsky 2011). In other cases, such as Old French (Gess 1998) and Komi Ižma (Hausenberg 1998), heterosyllabic or heteromorphemic long vowels (or rather vowel sequences) are attested elsewhere in the language. We shall argue that the cases of CL that do not involve full vocalization (Hayes 1989; Kavitskaya 2002) are in a sense truly compensatory, as opposed to instances of consonant vocalization and subsequent vowel coalescence. The former cases involve the reanalysis of vowel length before weakened consonants that is indeed strengthened by the independent existence of the vowel length contrast in the languages in question. In the latter cases, phonemic vowel length is introduced into the language through coalescence.

2 The problem

CL through consonant loss is defined as a process whereby a vowel lengthens in compensation for the loss of a tautosyllabic consonant. CL through coda loss is the most typologically wide spread process, as either a diachronic change or a synchronic alternation.¹ An example of this kind of CL in the Ižma dialect of Komi (a Uralic language

¹ I do not address CL through vowel loss in this paper.

of the Permian subgroup) is shown in Table 1 (Harms 1967; 1968; de Chene & Anderson 1979).

Table 1: CL through coda loss in Komi Ižma (after Harms 1968: 104).

	Stem	Past 1sg	Infinitive	
a.	lij-	lij-i	lij-ni	‘shoot’
	mun-	mun-i	mun-ni	‘go’
b.	kil-	kil-i	ki:-ni	‘hear’
	sulal-	sulal-i	sulo:-ni	‘stand’

In Komi Ižma, the lateral /l/ deletes in the coda position with the lengthening of the preceding vowel, as illustrated in (b) of Table 1.² De Chene & Anderson (1979) propose that CL through consonant loss should be analyzed as an instance of the conversion of coda consonants, /l/ in the case of Komi Ižma, to glides (either semivocalic or laryngeal), /w/ in the case of Komi Ižma, with the subsequent monophthongization of the resulting vowel-glide sequence in the syllable nucleus, as in, for example, *kil.ni > *kiw.ni > ki:-ni ‘to hear’, with the intermediate stage unattested in Komi Ižma but present in other dialects of Komi, such as Vychegda Komi (Lytkin 1966; Lytkin & Teplyashina 1976).

De Chene and Anderson (1979: 508) emphasize that their account is phonetic in nature and accounts for CL as a historical sound change, and not as a synchronic alternation:

We will argue that these processes can be understood as the transition of the consonant, through loss or reduction of its occlusion, to an eventual glide G. It is the monophthongization of the resulting sequence (X)VG(Y) which gives rise to a syllable nucleus that is interpreted as distinctively long. In consequence, cases of apparent compensatory lengthening can be analysed (as far as their phonetic bases are concerned) as a combination of consonantal weakening in certain positions followed by monophthongization; and compensatory lengthening per se can be eliminated as an independent member of any inventory of phonetic process-types.

This insight into the phonetics of CL serves as the basis for the analysis developed in Kavitskaya (2002), who maintains that CL is the result of the reanalysis of the longer phonetic duration of vowels as phonological length with the loss of tautosyllabic consonants. Kavitskaya (2002) maintains that vowels are more likely to be reanalyzed as phonologically long in the environment of more sonorous consonants after the loss of the said consonants, which makes the differences in vowel length unpredictable. De Chene and Anderson’s (1979) analysis of CL as a process whereby consonants weaken to glides supports Kavitskaya’s phonetic analysis, which is shown in Table 2.

The schematic representation in Table 2 considers two possible situations where the consonants X and Y are lost. Prior to the deletion of the consonants, both vowels are

² The lengthened /a/ surfaces as [o:].

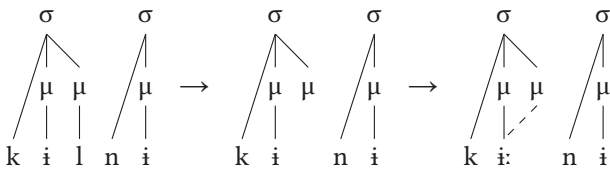
Table 2: CL through coda loss (Kavitskaya 2002: 9).

	Stage 1 (before consonant loss)	Stage 2 (consonant loss)	Phonologization
CVX	C V C <div></div>	C V <div></div>	C V:
CVY	C V C <div></div>	C V <div></div>	C V

correctly analyzed as phonologically short. In the case when the listener mishears the more sonorous consonant X as absent, the longer transitions are reinterpreted as a part of the vowel, which is subsequently reanalyzed as long. The vocalic transitions to the less sonorant consonant Y are shorter, and with the loss of this consonant, there is no reinterpretation of vowel length based on its duration. The divide between X and Y is arbitrary, and the more sonorous the deleting consonant is, the more likely its deletion to be compensated by the lengthening of the vowel.

Several later accounts of CL are mostly phonological. The most well-known of those is an account by Hayes (1989), who analyzes CL through consonant loss as the deletion of a weight-bearing coda while preserving its weight and reassigning it to the preceding vowel, as illustrated in (1) for Komi Ižma. The account holds that when the underlying coda /l/ is deleted, its mora is left behind (in an intermediate stage) and spreads to the preceding vowel, making it bimoraic and thus long:

(1) CL through coda loss in Komi Ižma (after Hayes 1989)



The reason for the necessity of the phonetic explanation in de Chene and Anderson’s analysis and its conspicuous absence from Hayes analysis lies in the difference between the general approaches to CL taken by these two accounts. De Chene and Anderson’s account carefully distinguishes between a sequence of phonetic processes that comprises the weakening of occlusion followed by a monophthongization of the resulting vowel-glides sequences and the phonological reinterpretation of some of the outputs of this monophthongization as long vowels. While Hayes uses historical examples to illustrate his points (one of the examples being Attic Greek, where CL is arguably only a historical process with no synchronic alternations), the account he proposes is synchronic in nature and does not consider either phonetic or phonological stages of the sound change analyzed by de Chene and Anderson.

One of the important predictions of de Chene and Anderson's account concerns the systemic constraints on the phonologization of vowel length. They propose that the phonologization of vowel lengthening as a result of CL can happen if and only if the language in question has a pre-existing vowel length contrast. This prediction does not follow directly from de Chene and Anderson's analysis, nor it is necessary for the accounts in the spirit of Hayes. In a sense, it is not a prediction *per se*, but rather a generalization about the nature of CL as a sound change. In the following sections, I will consider several counterexamples to this claim, discuss the similarities among these examples, and offer some speculation on why de Chene and Anderson's generalization is at least a tendency in the languages of the world.

3 CL with no pre-existing vowel length: Apparent counterexamples

As can be inferred from an (admittedly small) survey of languages with CL in Kavitskaya (2002), CL is more often a structure-preserving sound change. In the majority of the cases of CL, this tendency indeed holds: out of 80 languages with historical CL sound changes listed in Kavitskaya's (2002) survey, 72 or 90% occur in languages with pre-existing long/short vowel contrasts, while only 8 or 10% are found in languages without a pre-existing vowel length contrast.³ These 8 languages constitute counterexamples to the stronger version of the claim, which holds that CL as a sound change is always structure-preserving. However, first, the presence of counterexamples does not make the tendency false (it is just not a universal). Second, there seems to be an important difference between the cases that are structure-preserving and the cases in which vowel length (mostly allophonic) is potentially introduced into a language through CL.

3.1 Old French

Old French is the central example used by de Chene and Anderson to illustrate that CL as a sound change does not happen unless contrastive vowel length is independently present in the language. According to de Chene & Anderson (1979: 527–528), stated after Pope (1934: 79, 191), the diphthong [aw], inherited both from Indo-European and from Vulgar Latin, monophthongized to a short [o] in French by the middle of the 9th century, as in (2a). The loss of other consonants, such as velars before *l* and *n* and *p/b* and *t/d* before *p/b*, *t/d*, and *s*, that took place at approximately the same time, was not accompanied by CL either, as exemplified in (2b):

³ This information is not explicitly present in Kavitskaya (2002) and was compiled by Blevins (2009).

- (2) a. Monophthongization of [aw] to [o] in Old French (circa 850 AD)
or < *aurum* ‘gold’
oser < *ausare* ‘to dare’
forge ‘forge’ < **faurga* < *fabrica* ‘workshop’
parole < *paraula* < *parab(o)la* ‘word’
- b. Loss of consonants g, k, p, and d in Old French (before 850 AD)
agneau [aɲo] < *agnellum* ‘lamb’
maille [may] < *mac(u)lam* ‘stain’
route ‘road’ < (*via*) *rupta* ‘broken road’
après ‘after’ < *adpressum* ‘near’

Another wave of monophthongization, presumably through the weakening of the coda [l] to a labiovelar glide, happened in Old French by the 16th century, this time resulting in a long [o:], as illustrated in (3a). The loss of other pre-consonantal consonants, such as nasals (complete by the middle of the 16th century) and fricatives *s* and *z* (earlier), was accompanied by CL. Examples of the loss of fricatives are in (3b), and CL through the loss of nasals is illustrated in (3c).

The examples in (3b) show the orthographic *s* that was preserved in such words until 1740 (de Chene & Anderson 1979: 520). However, Pope (1934: 151) mentions that 12th century poetry suggests that the fricative had begun to drop before voiced consonants by this period. French loanwords in English, such as *blame*, *male*, and *isle*, do not have a pronounced [s], which adds more support to this conclusion:

- (3) a. Monophthongization of [aw] < [al] to [o:] in Old French (16th century)
autre [o:tr] < *alterum* ‘other’
aube [o:b] ‘dawn’ < *alba* ‘white’ (fem.sg.)
- b. Loss of fricatives with CL in Old French (12th century)
mêler (ModFrench) < *mesler* (Old French) < *misculāre* ‘to mix’
île (ModFrench) < *isle* (Old French) < *insula* ‘island’
- c. Loss of nasals with CL in Old French (16th century)
fendre [fã:dr] < *findere* ‘to split’
rompre [rõ:pr] < *rumpere* ‘to break’

De Chene and Anderson claim that the difference between the outcomes of the two Old French monophthongizations, as well as between the loss of consonants without and with vowel lengthening, lies in the fact that in the 9th century, the Old French vowel system did not exhibit contrastive vowel length, and so vowels did not lengthen as a response to the loss of consonants, while by some time in the 12th to 16th century a vowel length distinction was introduced into the system independently, and this pre-existing vowel length contrast made it possible for the reanalysis of the vowels that preceded the lost consonants as long.

It is argued in de Chene (1985) that languages typically acquire vowel length through vowel coalescence (dubbed as vowel hiatus or geminate vowel clusters, de Chene & Anderson 1979: 520). De Chene and Anderson (1979) state that French obeys this rule

and acquires long vowels through the deletion of intervocalic consonants and subsequent vowel coalescence in the period between the changes exemplified in (2) and (3). The examples of consonant loss and vowel coalescence are presented in Table 3.

Table 3: Intervocalic consonant loss between identical vowels (de Chene & Anderson 1979 after Pope 1934).

Modern French	Old French	Latin	
bâiller	baailler	bataculare	‘to yawn’
	graal	gradalem	‘dish’
	aates	adaptas	‘suitable’ (fem.acc.pl)
sceau	seel	sigillum	‘seal’

Gess (1998) takes issue with de Chene and Anderson’s claim that CL is only possible in languages with a preexisting vowel length contrast. He argues with the claim on the basis of the evidence from Old French. The objection is that the putative long vowels are treated as disyllabic in 12th and 13th century poetry in Old French, as shown in (4) for one of the examples in Table 3. From the scansion of the octosyllabic line in (4), it is evident that *graal* ‘dish’ consists of two syllables for the purposes of poetic syllabification:

- (4) Le Roman de Perceval, late 12th century (Roach 1959: 3, 11, 76–77; Gess 1998: 357)
Ce est le contes de GRAAL,
1 2 3 4 5 6 7 8
‘This is the story of the Grail,’
Dont li quens li bailla le livre.
‘About which the count gave him the book.’

The evidence from the scansion provided by Gess (1998) is questionable since syllabification in poetry is often conservative and reflects an earlier stage of the language. The scansion is also consistent with the possibility that vowel coalescence has already happened and long vowels scan as two syllables, with a poetic line becoming mora-counting rather than syllable-counting (see discussion in de Chene (1985: 76, 84ff) about such developments in Japanese and Tongan).⁴ If this is the case, then Old French does not constitute a counterexample to de Chene and Anderson’s generalization.

The metrical evidence presented by Gess (1998) is thus inconclusive. However, even if Gess’ interpretation is correct and indeed his examples illustrate that at the time of CL in Old French there were heterosyllabic sequences of identical vowels, it could have been sufficient to strengthen the possibility of CL, as we shall further discuss for another example in the next section.

⁴ I am grateful to a reviewer for the discussion of this point.

3.2 Komi Ižma

It would be informative now to return to Komi Ižma, which does not have contrastive long vowels in the inventory, or any other allophonically long vowels, except for those that are derived by CL (Lytkin 1966; Lytkin & Teplyashina 1976; Hausenberg 1998). Thus, in principle, Komi Ižma constitutes a counterexample to de Chene and Anderson's claim interpreted broadly, as noticed by Gess (1998). The forms in Table 4 illustrate CL alternations in Komi Ižma:

Table 4: CL through coda loss in Komi Ižma (after Harms 1968: 104–105).

Stem	Past 1sg	Infinitive	
kil-	kili	ki:ni	'to hear'
sulal-	sulali	sulo:ni	'to stand'
Indefinite	Definite	Dative	
pi	pijɪs	pili	'son'
pi:	pilis	pi:li	'cloud'
və:	vəlis	və:li	'horse'

The deletion of *l* in Komi Ižma went through the stage of the loss of the occlusion of the liquid to the labiovelar glide *w*, followed by the monophthongization of the *Vw* sequence.⁵ The diphthongal stage is synchronically attested in related dialects of Komi, spoken in Vychegda and Syktyvkar, and there is also a dialect group in Komi that preserves the lateral (cf. *və:* /*vəl*/ 'horse' in Komi Ižma vs. *vəv* /*vəl*/ 'horse' in Vychegda Komi vs. *vəl* /*vəl*/ 'horse' in Komi Yazva) (Lytkin 1966: 44–49, Lytkin & Teplyashina 1976: 106–115).⁶

De Chene and Anderson (1979) maintain that Komi Ižma data do not counterexample their generalization since the language has heteromorphemic long vowels (or vowel sequences), so sufficient contrast in vowel duration is present for CL to go through. Hausenberg (1998: 309) states that in dialects long vowels may develop through assimilation in forms like *una-an* < *una-ən* 'many', *baba-as* < *baba-is* 'his wife'.

In a narrower sense, Komi Ižma is not a counterexample since CL does not introduce vowel length contrast into the language: vowel length is allophonic and predictable, and even though 'son' and 'cloud' look like a minimal pair, they are underlyingly /*pi*/ 'son' vs. /*pil*/ 'cloud'. Abondolo (1998: 13) calls vowel quantity in Komi Ižma "nascent", thus interpreting vowel length distinction in the language as quasi-phonemic and possibly on its way to phonemicization. However, another view on the facts of Komi Ižma CL is possible that provides additional evidence in support of de Chene and Anderson's claim.⁷

⁵ Syllable-final /*l*/ frequently undergoes vocalization; cf., for instance, *l*-vocalization in BCS (South Slavic): *beo* /*bel*/ 'white-MASC' (vs. *bela* 'white-FEM'), *video* /*videl*/ 'see-PAST.MASC' (vs. *videla* 'see-PAST-FEM').

⁶ Yet another dialect of Komi, Komi Inva, vocalizes /*l*/ into [w] in all positions (Lytkin 1966: 44–49).

⁷ I am much indebted to a reviewer for the following discussion of vowel length and morphology.

These long vowels can arise through either inflection, as in Table 4, or derivation, as in (5):

- (5) CL in Komi Ižma (Collinder 1957: 309 via de Chene & Anderson 1979: 525)
 perna-al-as
 cross-VERB-3SG.PRES
 ‘he hangs (TRANS), as a cross on one’s breast’

In an important paper that defines the place of morphology in grammar, Anderson (1982) proposes that the traditional category of inflection is the subset of morphology that is relevant to the syntax. As a consequence, inflection depends on the results of syntactic operations and is post-syntactic, while derivation happens before syntax. Thus, according to Anderson’s model, the units of lexical storage are stems that “include all internal structure of a derivational sort” (Anderson 1982: 592). Endorsing this approach amounts to saying that, since long vowels resulting from the addition of derivational material are robustly attested in Komi Ižma, the language has lexical long vowels even if none of them are morpheme-internal.

3.3 Samothraki Greek

One of the languages in which CL introduces phonemic vowel length into a system without pre-existing vowel length contrast is a dialect of Greek spoken on the island of Samothraki (Newton 1972a,b; Hayes 1989; Katsanis 1996; Sumner 1999; Kavitskaya 2002; Topintzi 2006; Kiparsky 2011; Katsika & Kavitskaya 2015). Samothraki Greek is not a usual case of CL in yet another respect since it is the loss of the onset, not the coda, that triggers tautosyllabic vowel lengthening, as illustrated in Table 5.

In Samothraki Greek, the prevocalic *r* deletes with the lengthening of the following vowel in a) the word-initial onset of either stressed or unstressed syllable, as in Table 5a, and b) after a consonant in a complex onset, both in biconsonantal clusters, as in Table 5b, and triconsonantal clusters, as in Table 5c, both in stressed and unstressed word-initial and word-medial/final syllables:

Table 5: CL through onset loss in Samothraki Greek (after Katsika & Kavitskaya 2015).⁸

	Standard Greek	Samothraki Greek	
a.	‘ri.zɐ	‘i:.zɐ	‘root’
	rɛ.‘vi.θɕɐ	i:.’vi.θɕɐ	‘chickpeas’
	rɔ.‘ðɛ.ci.nɐ	u:.’ðɛ.ci.nɐ	‘peaches’
b.	‘vri.si	‘vi:s	‘faucet’
	‘θri.mi	‘θi:m	‘shard’
c.	‘ɛ.sprɔs	‘ɛ.spu:s	‘white’

The examples in Table 6 show the synchronic status of *r*-deletion in Samothraki Greek: the rhotic surfaces in the coda and as a first consonant in a complex onset, but deletes intervocalically. On the basis of such alternations, Kiparsky (2011) argues that the presence of *r*-zero alternations constitutes evidence for the synchronic status of CL in the language:

Table 6: Alternations in Samothraki Greek (Katsika & Kavitskaya 2015: 7).

ʕɛr	‘hand’	pɔ.ðɛr	‘foot’
ʕɛ.rjɐ	‘hands’	pɔ.ðɛ.rjɐ	‘feet’
çi.ʕ.ðjɐ	‘little hands’	pɔ.ðɛ.ʕ.ðjɐ	‘little feet’

However, as Katsika & Kavitskaya (2015) point out, there are no synchronic alternations where the deletion of /r/ is accompanied by vowel lengthening. In other words, there are no attested examples in which one member of a semantically related pair has a surface [r], while the other exhibits a long vowel as a consequence of the *r*-deletion. On the basis of this, Katsika & Kavitskaya (2015) conclude that it would be more accurate to analyze *r*-zero alternation as a synchronic process, and CL through the loss of *r* as a sound change in Samothraki Greek.

CL through onset loss presents a problem for the theories that treat CL as weight conservation (such as Hayes 1989), which predict that only the deletion of coda consonants can result in vowel lengthening. It is generally assumed that, unlike codas, onsets cannot bear weight and do not count as moraic.⁹ Several such problematic cases, including CL through onset loss in Samothraki Greek, are reanalyzed in Hayes (1989). Hayes extends Newton’s (1972) idea that *rC* clusters underwent vowel epenthesis of the form *VrC* → *VriC* → *ViC* and proposes that identical vowel epenthesis happened in *Cr* clusters as well, yielding *CrVi* → *CV_irVi* → *CV_iː*. The deletion of the intervocalic *r* could then be followed by vowel coalescence, just like in other *VrV* → *Vː* cases in Samothraki Greek.

However, as shown by Topintzi (2006), the Samothraki Greek CL resists such a reanalysis since the deletion of the word-initial *r* cannot be accounted for by metathesis. In addition, Kiparsky (2011) claims that Hayes’ analysis is problematic because it incorrectly predicts the merger of the outputs of the *r*-deletion from *CrV* and *VrV*. While after the loss of *r*, the original **rV* sequence where the vowel is accented becomes a long vowel accented on the first mora, as in *θrími* → *θíim* ‘shard’, the original **VrV* sequence where the second vowel is accented becomes a long vowel accented on the second mora, as in *xará* → *xaá* ‘joy’. However, Heisenberg (1934: 91) notes that if *r*-deletion results in a sequence of identical vowels with the stress on the second vowel, the stress shifts from the second vowel to the first one, as in /karávi/ → [káav] ‘ship’. Newton (1972a: 79)

⁸ In Samothraki Greek, unstressed high vowels /i/ and /u/ delete unless the deletion creates phonotactically unacceptable structures. Unstressed mid vowels /ɛ/ and /ɔ/ raise to [i] and [u] (Newton 1972a: 79).

⁹ Ryan (2014) presents statistical evidence from stress and meter showing that onsets are factors in syllable weight, though they are subordinate to the rhyme with respect to weight. For the discussion of the possibility of moraic onsets, see Curtis (2003), Davis (1999), among others.

interprets the stress shift as evidence for vowel contraction (coalescence), while Heisenberg (1934: 90) and Margariti-Rogka & Tsolaki (2011) ascertain that the vowels remain separate and belong to different syllables in such cases.

While the moraic weight approach does not seem to account for the Samothraki Greek CL, Kavitskaya (2002) proposes a phonetic/historical account. According to Kavitskaya (2002: 99), *r* is vocalic enough to be reinterpreted as additional vowel length. Kiparsky (2011) argues that neither purely phonetic models nor purely phonological (weight conservation) models are sufficient to account for CL in Samothraki Greek. He develops an account that relies on the observation that *r* is excluded from the onset position cross-linguistically (Zec 2007). Typologically, high sonority segments are dispreferred in the onset, which is evident from the fact that many languages, such as Korean, various Turkic languages, Basque, Piro, Telefol, etc., do not allow rhotics in word-initial or syllable-initial positions (de Lacy 2001; Smith 2003) even though they have some type of *r* in their consonant inventories. Languages employ different strategies to avoid onset rhotics, such as prothesis, deletion, fortition, anti-gemination, and incorporation into the nucleus (Kiparsky 2011: 26). Specifically, in Samothraki Greek the prohibition on the rhotic in the onset is resolved through the latter strategy: the rhotic is syllabified as a part of the nucleus so that the *r* and the following vowel form a rising diphthong, and then deletes with CL. Katsika & Kavitskaya (2015) develop an articulatory phonetic account of Samothraki Greek CL that builds both on Kavitskaya (2002) and Kiparsky (2011). To resolve the dispreference for the onset rhotic, the tongue tip constriction of the *r* is deleted, but the tongue body constriction is kept, preserving some of the segmental and temporal information of the *r*. The resulting segment is highly vocalic and is subsequently incorporated into the nucleus. Thus, Katsika and Kavitskaya's (2015) account provides articulatory motivation to Kiparsky's idea that in Samothraki Greek, the onset *r* goes through a vocalic stage followed by the coalescence with the following vowel.

We can thus conclude that the best analysis of Samothraki Greek CL treats it as a two-stage process, under which the vocalization of the onset *r* happens first, followed by the coalescence of the two vocalic elements.¹⁰

3.4 Towards the explanation of CL as a sound change

From the point of view of contrast maintenance and loss, CL can be described as the loss of contrast in a certain position. In the case of CL through the loss of consonants, it is usually the coda consonant that deletes with the lengthening of the tautosyllabic

¹⁰ A reviewer points out that there are cases when the deletion of a coda consonant happens simultaneously with intervocalic deletion of the same consonant, as, for example, in Turkish (de Chene & Anderson 1979, Kavitskaya 2002: 23). The reviewer suggests that this renders such examples consistent with de Chene and Anderson's generalization. If the same was the case in Samothraki Greek, and the coalescence was phonetically complete at the time of *r*-deletion, this, by itself, would be enough to exclude Samothraki Greek from potential counterexamples to de Chene and Anderson's generalization. I believe, however, that CL through onset loss in Samothraki Greek is best re-analyzed as vowel coalescence, in the spirit of Kiparsky (2011).

vowel. In a system with no phonologically long vowels, the result of this process could in principle be the introduction of a new vowel length contrast (the phonologization of vowel length in a narrow sense). However, in the case of the pre-existing vowel length distinction, the result is the introduction of the merger of the new long vowels with existing long vowels (the phonologization of vowel length in a certain position, in a broader sense of phonologization).

On the basis of the examples discussed above as well as other instances of CL, it can be argued that CL as a sound change should indeed be defined as the lengthening of the vowel after the loss of the tautosyllabic consonant as a result of the phonological reanalysis of the additional vowel length, either in the spirit of de Chene & Anderson (1979) or of Kavitskaya (2002). De Chene & Anderson (1979) dub this process “monophthongization”, that is, roughly, a vowel shift under which a monosyllabic vowel of two vowel qualities becomes a monosyllabic vowel of one vowel quality (as exemplified by Old French and Komi Ižma, among many others). From our admittedly incomplete survey of CL, some kind of a pre-existing length contrast is a necessary condition for CL in the cases where such reanalysis is involved, and no clear cases that counterexemplify this prediction have yet been found if this contrast is interpreted as including heterosyllabic and heteromorphemic sequences of identical vowels. Thus, CL is best described as phonologization in a broader sense, that is, a merger of existing long vowels with new long vowels that are the result of CL. It is possible that Samothraki Greek could also be reanalyzed along these lines (as discussed in footnote 10), but, according to Kiparsky’s (2011) account and the phonetic evidence amounted in Katsika & Kavitskaya (2015), it stands out since the sound change goes through an intermediate stage, whereby the consonant becomes a full vocalic entity. CL in this case is a misnomer, and Samothraki Greek is really an instance of vowel coalescence, which is a well-known and uncontroversial source of vowel length in the languages of the world.

We can thus conclude that Samothraki Greek is not a counterexample to the generalization because the lost consonant vocalizes completely and then vowel coalescence happens, with the result that is reminiscent of CL as it has the initial stage of consonant plus vowel and a final stage of a long vowel, but is not, in fact, CL, but rather an instance of $VV > V$: coalescence. In turn, Old French is not a counterexample because, even if Gess’s analysis of the Old French on the basis of the metrical scansion is correct, the presence of a sequence of identical heterosyllabic vowels, which are likely to be phonetically identical to long vowels, provides sufficient contrast. Finally, Komi Ižma is not a counterexample to the most restricted version of the generalization because the presence of a sequence of identical heteromorphemic vowels is sufficient contrast.

4 Sound change, mergers, splits, and contrast

A broad question that remains to be discussed is the reason for why the CL sound change that proceeds by gliding followed by monophthongization (de Chene & Anderson 1979) tends to be structure-preserving, that is, is more likely to acquire vowel length in certain positions with the loss of the consonant if vowel length is already contrastive elsewhere in the system?

Two distinct proposals in the literature address the question of the relevance of structure preservation to sound change. One view on the structure-dependence of sound change is expressed in Kiparsky (1995; 2003) and is to various extent present in other work by Paul Kiparsky. Another view on structure-preserving sound change is presented in Blevins (2004a) and developed in Blevins (2009). As Anderson (2016) notes, Blevins and Kiparsky advocate quite different views on the explanation of sound change. While Blevins (2004a; 2006) puts the main burden of explanation of the sound change on the phonetic factors, Kiparsky (2006) in a critique of Blevins' program views individual grammars as a result of both "what change can produce and of what the theory of grammar allows" (Anderson 2016: 17). Interestingly, both Blevins and Kiparsky see a place for structure preservation in the theory of sound change, either as belonging to the grammar (Kiparsky 1995; 2003) or emerging through acquisition (Blevins 2004a; 2009).

Kiparsky (2003: 328) comments on "the textbook story" of phonologization, where redundant features become phonemic with the loss of conditioning environment (e.g., in the CL sound change, vowel length phonologizes with the loss of the tautosyllabic consonant). However, as Kiparsky (2003) points out, in many similar cases the redundant features fail to phonologize and disappear with the loss of the conditioning environment. Kiparsky goes on to posit a priming effect, which is a diachronic manifestation of structure preservation, formulated as in (6):

- (6) Priming effect in phonologization (Kiparsky 2003: 328)
 Redundant features are likely to be phonologized if the language's phonological representations have a class node to host them.

Kiparsky (2003) distinguishes between the two types of sound change, perception-based and articulation-based, and claims that while perception-based changes, such as CL, metathesis, tonogenesis, and assimilation, are more likely to be structure-preserving (phonologization in a broad sense, as defined in §3.4), articulation-based changes, such as lenition, umlaut, etc., are usually structure-changing (phonologization in a narrow sense, as defined in §3.4). Among the structure-changing processes that create long vowels are vowel coalescence and also vowel lengthening in specific prosodic conditions (for instance, under stress). Kiparsky (2003: 329) notes that Korhonen (1969: 333–335) suggested that only certain allophones have a functional load that allows for the phonemicization with the loss of conditioning environment. Korhonen (1969) dubs these allophones *quasi-phonemes*. Having claimed that the classical phoneme is "something of a straightjacket" when it comes to understanding of the introduction and loss of phonological contrast, Kiparsky (2013) proposes a system, where he distinguishes between contrastiveness, as a structural notion, and distinctiveness, as a perceptual notion, as shown in Table 7.

By the system in Table 7, quasi-phonemes are not contrastive, but distinctive, and thus they represent a necessary stage to the secondary split. Since distinctiveness is a perceptually-defined notion, only those sound changes that are perceptually-based are predicted to follow this pattern. As was discussed in §3.3, vowel length in Komi Ižma is quasi-phonemic and thus is a likely candidate for the phonologization of vowel length in the language.

Table 7: Contrastiveness vs. distinctiveness (Kiparsky 2013).

	Contrastive	Non-contrastive
Distinctive	Phonemes	Quasi-phonemes
Non-distinctive	Near contrasts	Allophones

Blevins (2004a; 2009) pursues a research agenda that is very different from Kiparsky's theory of sound change. However, she also notes that certain sound changes tend to be structure-preserving, and that these changes tend to be perceptually-based. Blevins (2004a) posits a principle of structural analogy, stated in (7):

- (7) Structural Analogy (Blevins 2004a: 154)
 In the course of language acquisition, the existence of a (non-ambiguous) phonological contrast between A and B will result in more instances of sound change involving shifts of *ambiguous elements* to A or B than if no contrast between A and B existed.

The consequence of such principle for sound change is a tendency towards structure preservation. Blevins (2009) presents an overview of two known cases of sound changes that have this tendency, such as CL (de Chene & Anderson 1979; Kavitskaya 2002) and metathesis (Blevins & Garrett 1998; Blevins 2004a,b; Hume 2004) and then proceeds to a case study of the Principle of Structural Analogy, unstressed vowel syncope in Austronesian.

According to Blevins (2009), unstressed vowel syncope in the Austronesian languages discussed is a perceptually-based sound change that is the result of the ambiguous vocalic status of hypoarticulated short unstressed vowel. The loss of the second vowel in a CV.CV.CV sequence creates a structure CVC.CV where the first syllable is closed. The Principle of Structural Analogy predicts that languages that contrast open and closed syllables will have a stronger tendency towards this kind of syncope. Indeed, as Blevins (2009) shows, the prediction is borne out.

Blevins' (2009) example is different from the case of CL in an interesting and fundamental way. While CL as a sound change amounts to the introduction of a new allophone and potentially a new phoneme with a positional loss of a segment, unstressed vowel syncope is the introduction of a new prosodic structure with a positional loss of a segment.¹¹ This example provides additional support to the generalization that the presence of contrast in the system affects sound change that potentially creates similar structures.

¹¹ As a reviewer notes, length is prosodic structure as well, and in this sense, there is little difference between the case discussed by Blevins and the cases of CL. However, while CL (potentially) introduces a new element to the inventory of phonemes, Blevins discusses an example that introduces a new structure to the inventory of syllables.

5 Conclusions

De Chene and Anderson (1979) had an important insight about the structure-preserving nature of CL that holds in the majority of the languages with this sound change and thus cannot be ignored. I have presented examples in which systemic considerations play an important role in the phonologization of newly introduced phonetic detail in perception-based sound changes, such as vowel duration in CL. I have shown a way to address potential counterexamples to the generalization, reanalyzing CL in Samothraki Greek as vowel coalescence and arguing that in the cases of Old French and Komi Ižma the presence of identical tautosyllabic vowels elsewhere in the system might have constituted a sufficient contrast for the phonologization of vowel length through CL.

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