

Inverse compensatory lengthening in Latin: weight preservation or phonologisation?

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The sporadic Latin sound change known as the ‘*littera*-rule’ changed sequences of a long vowel followed by a short consonant (V:C) into forms with a short vowel followed by a geminate consonant (VCC), thus *littera* > *littera* ‘letter’. This development occurred in early Latin (3<sup>rd</sup>-1<sup>st</sup> cents. BC) to judge from inscriptional evidence, e.g. LEITERAS in the *Lex Repetundarum*, 122-123 BC (reflecting /ei/ before monophthongisation to /i:/, providing an input to the *littera*-rule). The change is categorised as ‘inverse compensatory lengthening’ in Hayes’ (1989) typology, and can be straightforwardly accounted for by weight preservation: the lengthening of a consonant (non-moraic to monomoraic) in compensation for the shortening of a vowel (bimoraic to monomoraic).

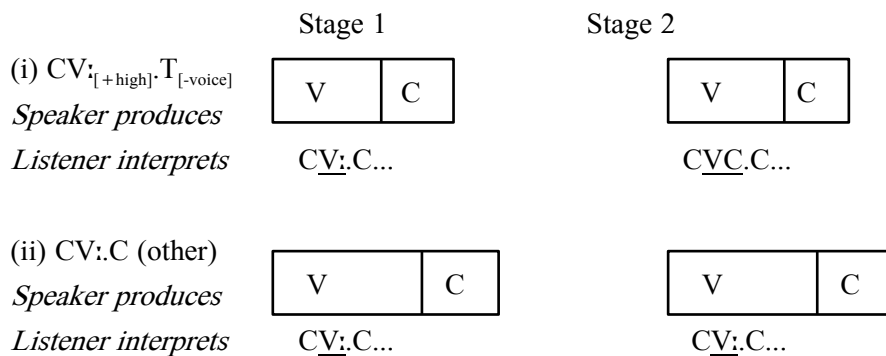
However, the rule can be further distilled into three phonetically-guided processes (Table 1), providing evidence for Kavitskaya’s (2002) phonologisation model of compensatory lengthening. To illustrate, the diachronic development V:C > VCC occurred in ‘high vowel + voiceless obstruent’ (e.g. *littera*): high vowels are intrinsically the shortest, and vowels are commonly shorter before voiceless obstruents than before voiced obstruents and sonorants (see Keating 1985: 120). Therefore, the *phonologically long* vowels which were *phonetically shortest* by nature, in the environment where they were *phonetically shorter* still, became *phonologically short*, by phonologisation of that short duration (relative to other vowels and in other contexts). The concomitant lengthening of the consonant (at first glance good evidence for weight preservation) can be explained by the hypothesis, supported by several Latin phenomena, that closed-syllable vowels in Latin were longer than their open-syllable counterparts (Sen 2012), contrary to near-universal expectations, but as paralleled in Anatolian Turkish (Jannedy 1995), and languages which have longer vowels before geminate than singleton consonants, e.g. Finnish (Lehtonen 1970), Japanese (Han 1994), and Tehrani Persian (Hansen 2004). Therefore (see Figure 1), the short phonetic duration of high vowels before voiceless obstruents resulted not simply in their shortening, but in their reanalysis from long vowels in open syllables to short vowels in closed syllables, a structural context to which their longer-than-expected phonetic duration could be attributed. The only segment which could be causing the closure was the following consonant, which was therefore realised as a geminate with minimal phonetic difficulty, as maintaining voiceless stops presented no aerodynamic problems. The second (‘/a/ + sonorant’) and third (‘high/mid front vowel + /l/’) phonological contexts for the phenomenon in Table 1 can be similarly analysed.

The process can therefore be explained by a reductionist account of diachronic phonology, appealing to phonetic pressures alone (e.g. Blevins 2004), rather than invoking structural influences beyond a simple long-short distinction, such as ‘weight preservation’, as forces constraining the change. The compensatory lengthening occurred by the reanalysis of perceptual information from one synchronic structure to another, and not due to the diachronic influence of a structural constraint.

Table 1. Forms categorised according to the three phonological patterns

High V + voiceless stop	/a/ + sonorant	High/mid front V + /l/
<i>balbuttio</i> : <i>balbutio</i>	<i>ammentum</i> : <i>a:mentum</i>	<i>camellus</i> : <i>came:lus</i>
<i>cippus</i> : <i>Ci:pus</i>	<i>ammissam</i> : <i>a:missam</i>	<i>cella</i> : <i>*ke:la</i>
<i>cuppa</i> : <i>cu:pa</i>	<i>carro</i> : <i>ca:ro</i>	<i>crocodillus</i> : <i>crocodi:lus</i>
<i>cuppe:s</i> : <i>*ku:pe:ds</i>	<i>damma</i> : <i>da:ma</i>	<i>fillius</i> : <i>fi:lius</i>
<i>futilis</i> : <i>fu:tilis</i>	<i>flamma</i> : <i>fla:ma</i>	<i>loquella</i> : <i>loque:la</i>
<i>guttus</i> : <i>gu:tus</i>	<i>lammina</i> : <i>la:mina</i>	<i>querella</i> : <i>quere:la</i>
<i>Iuppiter</i> : <i>Iu:piter</i>	<i>narro</i> : <i>*gna:ro</i>	
<i>littera</i> : <i>li:tera</i>	<i>parret</i> : <i>pa:ret</i>	
<i>littus</i> : <i>li:tus</i>	<i>parrici:da</i> : <i>pa:rici:da</i>	
<i>mitto</i> : <i>*mi:to</i>		
<i>muccus</i> : <i>mu:cus</i>		
<i>mutto</i> : <i>mu:to</i>		
<i>puppa</i> : <i>pu:pa</i>		
<i>succus</i> : <i>su:cus</i>		

Figure 1. Phonologisation analysis of (i) the *littera*-rule, (ii) no change



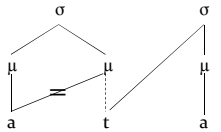
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- Han, M. S. (1994). 'Acoustic manifestations of mora timing in Japanese'. *Journal of the Acoustical Society of America* 96 [1]: 73-82.
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- Sen, R. (2012). 'Reconstructing phonological change: duration and syllable structure in Latin vowel reduction'. *Phonology* 29 [3]: 465-504.

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## INVERSE COMPENSATORY LENGTHENING

- Hayes' (1989) typology: CV:C → CVC:
- Diachronically in Luganda, Pali, LATIN?
- Opposite development to common 'classical compensatory lengthening': CVC → CV:
- DOES DIACHRONIC INVERSE CL CONSTITUTE EVIDENCE FOR STRUCTURAL CONSTRAINT ON SOUND CHANGE?



## LATIN LITTERA-RULE

- Sporadically, long vowel + single consonant (V:C) > short vowel + geminate consonant (VCC)  
*littera* > *littera* 'letter'  
*Iūpiter* > *Iūppiter*
- Occasionally, both forms found side by side  
*sūcus* : *succus* 'juice, sap'  
*mūcus* : *muccus* 'mucus, mould'
- N.B. Segmental length contrastive in Cs and Vs  
*liber* 'book' : *liber* 'free'  
*ager* 'field' : *agger* 'rampart'  
*anus* 'old woman' : *annus* 'year' : *anus* 'ring, anus'
- Evidence from:
  - Orthography in inscriptions and MSS
  - Grammarians' statements
  - Verse scansion
  - Etymology, Indo-European comparison
  - Romance developments
- Sound change in early Latin (3rd-1st cents. BC):
  - Inscriptional LEITERAS (*Lex Repetundarum*, 122-123 BC)
  - EI reflects /ei/ before monophthongisation to /i:/ → Input to *littera*-rule
- Structurally constrained sound change?

### STRUCTURAL ACCOUNT

Mora/weight stability in diachronic change

- Independent existence of weight units
- CL analysed as delinking and relinking of weight unit to segments (Hayes 1989)
- Predictions:
  - Only mora-bearing rime positions result in CL
  - Quality of V+C not intrinsically bound to process

**POSITION: Synchronic structure directly guides and constrains compensatory lengthening**

'CLASSICAL COMPENSATORY LENGTHENING'  
CVC > CV:

Instantiations in several languages, inc. Latin

- Nasal loss via nasalisation  
\*kom.sol > con.sol > cō.sol 'consul'
- /s/-loss via debuccalisation  
\*kos.mis > cō.mis 'friendly'

Conform to predictions of reductionist phonologisation account per Kavitskaya (2002)

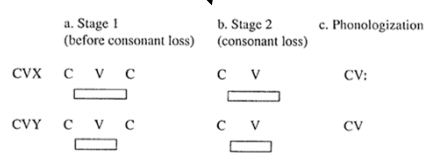
**INTERIM CONCLUSION: Structural constraints unnecessary (and insufficient)**

### REDUCTIONIST ACCOUNT

Phonologisation of phonetic duration

- When the phonetic cause for that duration is no longer felt by the listener (Kavitskaya 2002)
- Causes?
  - Cs with long transitions
  - Vs before nasals
  - Vs in open syllables (but opposite in Latin!)
- No longer felt? Deletion (perceptually poor cues)

**POSITION: Phonetics and simple structural categories sufficient to explain sound change**



## SUMMARY

Forms categorised according to the three phonological patterns		
High V + voiceless stop	/a/ + sonorant	High/mid front V + /l/
<i>balbutiō</i> : <i>balbūtiō</i>	<i>ammentum</i> : <i>āmentum</i>	<i>camellus</i> : <i>camēlus</i>
<i>cippus</i> : <i>Cīpus</i>	<i>ammissam</i> : <i>āmissam</i>	<i>cella</i> : * <i>kēla</i>
<i>cuppa</i> : <i>cūpa</i>	<i>carrō</i> : <i>cārō</i>	<i>crocodillus</i> : <i>crocodilus</i>
<i>cuppe:s</i> : * <i>kūpēds</i>	<i>damma</i> : <i>dāma</i>	<i>fillius</i> : <i>filius</i>
<i>futtilis</i> : <i>fūtilis</i>	<i>flamma</i> : <i>flāma</i>	<i>loquella</i> : <i>loquēla</i>
<i>guttus</i> : <i>gūtus</i>	<i>lammina</i> : <i>lāmina</i>	<i>querella</i> : <i>querēla</i>
<i>Iuppiter</i> : <i>Iūpiter</i>	<i>narrō</i> : * <i>gnārō</i>	
<i>littera</i> : <i>litera</i>	<i>parret</i> : <i>pāret</i>	
<i>littus</i> : <i>litus</i>	<i>parricida</i> : <i>pāricida</i>	
<i>mittō</i> : * <i>mītō</i>		
<i>muccus</i> : <i>mūcus</i>		
<i>muttō</i> : <i>mūtō</i>		
<i>puppa</i> : <i>pūpa</i>		
<i>succus</i> : <i>sūcus</i>		

### METHODOLOGY

Data gathering and evaluation

- Sources of Latin examined from the earliest attestations (7<sup>th</sup> cent. BC) to imperial times (excluding late and ecclesiastical Latin)
- Candidates evaluated according to likelihood of reality of rule, based on types of evidence stated
- 30 forms remain

### GENERALISED PATTERNS I

(1) High V + voiceless stop

- Clear diachronic developments have V<sub>[+high]</sub>T<sub>[-voice]</sub>
- High Vs intrinsically shorter (e.g. Keating 1985)
- Vowels often shorter before voiceless obstruents than before other Cs (e.g. Keating 1985)
- Voiceless stop can lengthen with minimum aerodynamic difficulty
- Precisely where diachronic V-shortening expected and not vice versa (no evidence of opposite)
- Lengthening of V to preserve mora count?

**CONCLUSION: Phonologisation of short V duration possible, but why concomitant lengthening of C?**

### GENERALISED PATTERNS II

(2) /a/ + sonorant

- Low Vs longer than high Vs
- Vs longer before voiced obstruents/sonorants
- Difference between long and short /a/ was smaller proportion of the length of the whole V
- Nasalised Vs phonetically longer than oral Vs
- Rhotic: variation in timing of first closure of trill; long transitions in approximant
- Variation in interpreting [aām] as /amm/ or /a:m/?

**CONCLUSION: Phonetic transition between V and C interpreted as either vocalic or consonantal**

### GENERALISED PATTERNS III

(3) High/mid front V + /l/

- Notoriously difficult to pinpoint the vowel-lateral boundary in high, front vowel + clear /l/ sequences (e.g. Olive, Greenwood & Coleman 1993: 207-215), and the geminate /ll/ in Latin was always clear
- Evidence leans towards leans towards diachronic development in this sequence

**CONCLUSION: Basis for reductionist analysis**

### LATIN VOWELS IN CLOSED SYLLABLES PHONETICALLY LONGER IN DURATION THAN IN OPEN SYLLABLES (SEN 2012)

Based on further evidence from:

- Vowel reduction (greater in open syllables)
- Degemination (V:CC > V:C, NOT VCC)
- V shortening in \*CV:CV > CVC
- Paralleled in Anatolian Turkish, historically in Uyghur (Jannedy 1995, Barnes 2006), and in pre-geminate v pre-singleton V duration in Finnish (Lehtonen 1970), Japanese (Han 1994), Tehrani Persian (Hansen 2004)

**CONCLUSION: Concomitant C-lengthening in littera-rule not necessarily to 'retain mora count'**

- But to accommodate influence of syllable shape on vowel duration
- Closed-syllable vowel duration perceived
- Only following C could be closing the syllable, so single C reanalysed as geminate

### ARGUMENT

Phonologisation account of (1)

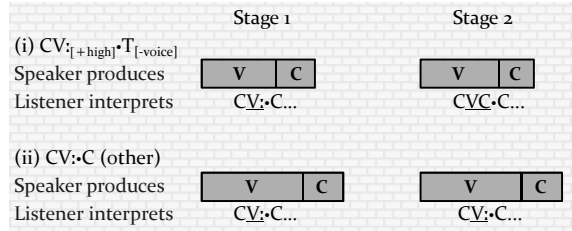
- Phonologically long vowels which were phonetically shortest by nature (HIGH)...
- ...in the environment where they were phonetically shorter still (BEFORE VOICELESS STOP)...
- ...became phonologically short by phonologisation of that short duration...
- ...because of perceived similarity with their corresponding duration in closed syllables...
- ...resulting in reanalysis of following C as geminate to close the syllable...
- ...with minimum aerodynamic difficulty

**CONCLUSION: Structural constraints unnecessary**

## THERE IS A PROBLEM

- Numerous attempts to account for *littera*-rule from late 19<sup>th</sup> cent. onwards, e.g. Brugmann & Delbrück (1897-1916)
- Niedermann (1906): 'What makes this phenomenon disconcerting is firstly that it seems to have been absolutely sporadic and next that, most of the time, the old form with the simple consonant and long vowel remained in use beside the later form with a double consonant and short vowel. There remains a very complex problem there which awaits solution' (my translation)
- More recently, invoked to posit etymologies, e.g. Rix coined the term '*littera*-Regel'; used in *Lexikon der indogermanischen Verben* (Rix & Kümmel 2001)

## ANALYSIS



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Does inverse CL provide evidence for structural constraints on sound change? I.e. mora preservation

Reductionist account without appeal to structure possible for some types of CL: Phonologisation of phonetic duration (Kavitskaya 2002)

Latin *littera*-rule shows three phonological patterns, each of which can be explained by phonologisation

Concomitant lengthening of C explicable if typologically unusual Latin V duration patterns taken into account: longer in closed syllables

Phonologisation account based on phonetics and simple structural categories (long vs. short) necessary and sufficient (e.g. Blevins 2004)

Further evidence to support reductionist view that structural constraints on sound change might not be required (but Latin syncope is counter-evidence)