

Typological analysis of compensatory consonant lengthening¹

Rebeka Campos-Astorkiza

rebekaca@usc.edu

Abstract-Goals of Presentation

- Introduce consonant Compensatory Lengthening (CL).
- State typological differences between consonant CL and vowel CL: frequency of occurrence, adjacency, directionality, type of trigger.
- Develop analysis for consonant CL:
 - Phonologization
 - Perceived similarity
- Further research and conclusion.

1. Introduction

CL Definition: deletion of a segment together with lengthening of another segment.

- **Trigger** = deleted segment
- **Target** = lengthened segment.

(1) Four logical types of CL:

Trigger	Target
V	V
C	V
V	C
C	C

- 2 main types of CL depending on target:
 - V-lengthening (Kavitskaya 2002)²
 - **C-lengthening** (our presentation)

¹ I'd like to thank Rachel Walker and the USC PhonLunch audience for their remarks and suggestions.

² In this presentation, all the generalizations about compensatory V-lengthening are taken from Kavitskaya (2002).

Example: Turkish – (optional) CL with C-loss and V-lengthening:

- (2) Turkish optional *h*-deletion with preceding **V-lengthening** (Sezer 1986)
- | | | | |
|-----------|---|-----------|-------------|
| [kahja] | ~ | [ka:ja] | “steward” |
| [fihrist] | ~ | [fi:rist] | “index” |
| [tahsil] | ~ | [ta:sil] | “education” |

Example: Eastern Andalusian Spanish (EAS) – synchronic CL with C-loss and C-lengthening:

- (3) EAS obstruent deletion with following C-lengthening (Gerfen 2001)
- | | | | |
|----------------|-----------|---|----------------|
| /des+koser/ | → | [de#nniβel] | “unsew” |
| /sub+marino/ | → | [su#mmarino] | “submarine” |
| (cf. [des#ato] | “I untie” | [sub#ordinado] | “subordinate”) |
| [bokke] | “forrest” | (cf. <i>boske</i> in SPS (Standard Peninsular Spanish)) | |
| [atto] | “apt” | (cf. <i>apto</i> in SPS) | |

2. Asymmetries between V-lengthening and C-lengthening

2.1. Frequency of occurrence

- V-lengthening is more frequent than C-lengthening:
 - Kavitskaya (2002) presents 79 languages with compensatory V-lengthening (58 languages w/ C-loss and 21 languages w/ V-loss)
 - Some works treat CL as only V-lengthening: de Chene and Anderson (1979), Hock (1986), Kager (1999), Lowenstamm and Kaye (1986), Whitney (1889).
 - More difficult to find cases of CL with C-lengthening (Arvaniti p.c.)

2.2. Adjacency

- V-lengthening:
 - Through C-loss (CVC→CV:):
 - Trigger and target must be adjacent to each other.
 - Ancient Greek³ is an exception: perceptually glide and vowel are adjacent (Kavitskaya 2002: 48) (to be analyzed later).

³ Except Thessalian and Lesbian dialects.

(4) Ancient Greek /j/-loss (Ingria 1980)

*klinj^o: > kli:no: “tend”
*ktenj^o: > kte:no: “kill”

- Through V-loss (CVCV → CV:C):
 - Trigger V and target V are not adjacent but separate but some C.
 - No long distance compensatory V-lengthening
- C-lengthening:
 - Trigger and target are strictly adjacent.

2.3. Directionality

- V-lengthening:
 - Right-to-left: trigger is to the right of the target.
 - Exception: onset liquid loss leads to following V-lengthening in Romanesco Italian, Samothraki Greek and Onondaga (left-to-right).

(5) /r/ loss in Samothraki Greek (Kavitskaya citing Newton (1972))

<i>Standard</i>	<i>Samothraki</i>	
ad <u>r</u> as	ada:s	“man”
samaθ <u>r</u> aki	samaθ <u>a</u> :ki	“Samothraki”
<u>r</u> uxa	<u>u</u> :xa	“clothes”

- C-lengthening:
 - Left-to-right: in most cases found for this presentation the trigger is to the left of the target (see EAS example).
 - Exception: /j/ deletion in Lesbian/Thessalian Greek and Hungarian

(6) /j/ deletion in Hungarian (Kenesei, Vago & Fenyvesi 1998):

/ma:s+j^o/ → [ma:sso] “climb.3sg.Def”
/hoz+ja:k/ → [hozza:k] “bring.3pl.Def”
/ba:c+j^o/ → [ba:cco] “elder brother.3sg.Poss”

- Not root-controlled since we find left-to-right CL in Hungarian:

(7) Hungarian: /l/-deletion & following C- lengthening (Kenesei, Vago & Fenyvesi 1998):

/bɔ**l**+rɔl/ → [bɔ**rr**ɔl] “left.Del”
/te:**l**+rɛ/ → [te:**rr**ɛ] “winter.Sub”
/to**l**+jʊk/ → [to**jj**ʊk] “push.1pl.Def”

2.4. Type of C-trigger

- V-lengthening:
 - Limited set of Cs: *stops* deletion does not trigger V-lengthening.
- C-lengthening:
 - No restrictions: deletion of any type of consonant may lead to C-lengthening.

2.5. Summary of generalizations

	<i>V-lengthening</i>	<i>C-lengthening</i>
frequency	More frequent	Less frequent
adjacency	V-C adjacency V-V non-adjacency	V-C adjacency C-C adjacency
directionality	Right-to-left	Left-to-right
type of C-trigger	No stops	Any consonant

Next: *our analysis* for C-lengthening through C-deletion – extending previous approaches and new ideas

3. CL as Phonologization

- Phonologization (Ohala1981):
 - View of sound change
 - Intrinsic phonetic properties of segments can be misparsed and reinterpreted so that they become phonologized.
 - Phonetic property becomes phonemic.

- Kavitskaya (2002):
 - Compensatory **V-lengthening** arises through phonologization of intrinsic phonetic V-duration upon loss of conditioning environment.

- CVC → CV:
 - Deleted consonant affects the perceived duration of preceding vowel.
 - Loss of consonant leads to reanalysis of V-duration as phonological.
 - Prediction: deleted Cs are those whose transitions can be mistaken for part of the preceding vowel or those that can affect the (perceived) duration of the preceding vowel (stops do not participate in this CL).

- CVCV → CV:C
 - Deletion of vowel affects syllable structure: from open syllable to closed syllable.
 - Vowel duration is longer in open syllable (Maddieson 1985).
 - When vowel is lost, phonetic vowel duration in open syllable is reanalyzed as phonemic in closed syllable.

- Advantages of phonologization analysis:
 - Generalizations about directionality and adjacency follow from this analysis.
 - It accounts for the restrictions on type of consonant trigger.

Can we extend the phonologization analysis to cases of compensatory C-lengthening?

- **No, we can't:**
Deleted segment doesn't affect target C-duration (e.g. EAS).
- **Yes, we can:**
Deleted segment conditions phonetic duration of target C (e.g. /j/-deletion in Ancient Greek).

3.1 Phonologization of C-lengthening

- /j/-acoustics affects neighboring elements duration.
- Phonologization explains unexpected right-to-left directionality.

- Ancient Greek shows dialectal split w.r.t. /j/ deletion:
 - In Lesbian/Thessalian (L/T) dialects, C-lengthening
 - In all other dialects, V-lengthening

- Conditions are the same for all dialects (Ingria 1980):

- /j/ deletes in V_1RjV , where V_1 is [i, e, u] and R stands for a sonorant:

(8)	<i>L/T</i>	<i>Elsewhere</i>		Dialectal split
*klinjo:	klinno:	kli:no:	“tend”	
*pterjo:	pterro:	pte:ro:	“destroy”	

- Extend phonologization analysis to this case:
 - Kavitskaya’s analysis for Greek dialects w/ V-lengthening:
 - Palatalization of sonorant affects the whole segment → higher F2 and F3 throughout the sonorant
 - /j/-perception before sonorant due to preceding V’s high F2 &/or F3
 - Change from [i, e, u] to /j/ is not easily detectable given their high F2 &/or F3 → **reanalysis of /j/ as part of V**

- **Extension of phonologization to C-lengthening in L/T:**
 - Same explanation as before holds except...
 - Sonorants have transitions (opposed to obstruents) (Ladefoged 2001) → no clear discontinuities in transitions from sonorant to /j/ or vice-versa (Javkin 1979)
 - When /j/ is not heard (after high, front Vs) /j/-sonorant transitions are reinterpreted as part of the sonorant.

- Ancient Greek shows a case where two possible reinterpretations of duration give rise to dialectal differences.

4. Perceived similarity and CL

- **Main idea:**
 - Lengthened segment is perceived as more similar to original sequence than only deletion.

- Steriade (2001):
 - Speakers choose minimal change to satisfy phonotactic constraints.
 - Minimal change evaluated w.r.t. similarity between input & output.
 - Resulting form is that form that is most similar to the input and satisfies phonotactics.
- Example: **devoicing** to satisfy ban against on final voiced obstruents:
 - voiced-to-unvoiced is minimal change to satisfy ban.
 - In given environment, unvoiced form is perceived as most similar to voiced input.
- Extending Steriade’s theory on perceived similarity:
 - Result of deletion + lengthening is more similar to original sequence than only deletion:

(9) C_1C_2 vs. $C_2C_2 \succ C_1C_2$ vs. C_2 (\succ = is more similar than)

4.1 Hungarian CL and similarity

- Similarity approach predicts **restrictions on the target**:
 - Only Cs similar to trigger might be subject to lengthening.

- In Hungarian, we find a restricted type of CL, which has similarity approach flavor (data from (7)):

(10) /l/-deletion before /r/ or /j/ & following C lengthening

/bɔ l + r ɔl/	→	[bɔ rr ɔl]	“leftDEL”
/te: l + r ɛ/	→	[te: rr ɛ]	“winterSUB”
/go: l + j ɔ/	→	[go: jj ɔ]	“goalPOSS.3SG”
/to l + j uk/	→	[to jj uk]	“pushDEF.1PL”

- Given their acoustic features, /l, r, j/ are more similar to each other than to obstruents or nasals:
 - They have formant-like structure and/or exclusively oral airflow.
- Hierarchy of perceived similarity (intervocalic):

(11) /lr/ vs. /rr/, /lj/ vs. /jj/ \gg /lr/ vs. /r/, /lj/ vs. /j/

- Translate similarity hierarchy into fixed faithfulness constraints rankings⁴:

(12) Max(l)/_r, Dep(F)/_r, \gg Ident(l)/_r

(13) Max(l)/_j, Dep(F)/_j, \gg Ident(l)/_j

-High ranking of Max prevents l-deletion before /r, j/.

-Low ranking of Ident allows for /l/-featural change.

-High ranking of Dep(F) prevents insertion of new features \rightarrow lengthening

-High ranked markedness constraints */lr/ & */lj/.

- This tableau shows the interaction of the relevant constraints with respect to four candidates.

/bɔl ₁ r ₂ ɔl/	*/lr/	DEP(F)/_r	MAX(l)/_r	IDENT(l)/_l
a. bɔl ₁ r ₂ ɔl	*!			
b. bɔr ₂ ɔl			*!	
c. bɔm ₁ r ₂ ɔl		*!		
d. bɔr ₁ r ₂ ɔl				*

Candidate (a) violates the markedness constraints against pre-/r/ laterals.

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/.

5. Moraic conservation and CL

- **Traditional analysis** of CL (Hayes 1989):
 - CL takes place to preserve mora of deleted segment.
 - *Prediction*: only deletion of moraic segments leads to CL.

⁴ P-map is responsible for this translation (Steriade 2001).

- Issues hard to explain:
 - Choice between V-or C-lengthening.
 - Directionality and adjacency (how to restrict mobility of moras).
- Only moraic segments drive CL?
 - Cases of word initial onset deletion & CL (see (5))
- Moraic status or segment sequencing? – source or accidental?:
 - CL might be the result of C-cluster reduction due to some phonotactic restriction ($C_1C_2 \rightarrow C_2C_2$).
 - Wilson (2001): in C-cluster reduction, first C systematically deletes (which is potentially moraic).
 - Deleted C would potentially be coda/mora-bearing. How can we distinguish between the result of segment sequencing and the result of moraic status?

6. Conclusions

- V- and C-lengthening show different patterns.
- Phonologization and perceived similarity help understand some cases of consonant CL.

7. Future research

- Cases such as EAS- phonologization or similarity don't seem to account for them.
- Review moraic approach in connection to these cases.

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