Highly complex syllable structure: a motivated and stable feature

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Introduction

Most models of syllable structure are designed to account for phonotactic patterns which are frequent within and across languages. The CV shape is privileged in phonological, physiological, and acoustic-perceptual accounts.[1, 2, 3, 4]

Extreme deviations from the idealized CV type, as illustrated by the large onset in (1), present problems to abstract theoretical models:

(1) **Cocopa**[5] /pɻʧʃʔáːw/ 'I hang up several (things)'

Background

Patterns such as (1) are known to come about through vowel reduction and deletion.

The presence of vowel reduction is often associated with complex syllable structure in speech rhythm typologies.[6, 7]

The prevalence of vowel reduction, within and across languages, has been found to increase with increasing syllable structure complexity.[8] That is, such processes may remain productive even after they have altered syllable patterns in a language.

However, according to prevailing models of the syllable, we might expect languages with patterns such as (1) to also have processes 'repairing' these structures.

Research Question

➡ ***Which are more common in languages with highly complex syllable structure (HCSS): processes producing complex syllable patterns, or processes which simplify syllable patterns?***

Method

Defining *highly complex syllable structure (HCSS)*

➡ word-marginal sequences of **3 obstruents** or **≥4 Cs**

e.g., Itelmen[9]: *ɬqzuwen* 'he was' → 'prototypical'
Tashlhiyt[10]: *tk.kst* 'you took off' → 'prototypical'
Kunjen[11]: *albmb* 'opossum' → 'atypical'

Typological survey

- 24 languages with HCSS, representing 23 language families.
- 19 lgs. with 'prototypical' HCSS, 5 with 'atypical' HCSS patterns.

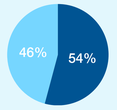
Data collection

Consulted language descriptions and recorded phonological processes affecting syllable structure: ***vowel reduction***, ***phonological vowel epenthesis***, and ***consonant deletion***.

Language sample *(24 lgs.)*

Results

Vowel reduction affecting syllable patterns



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Processes examined here are productive, ongoing patterns which are conditioned by the phonological environment and are often described as variable or optional.

Outcome: canonical tautosyllabic cluster
(N = 9)

e.g., **Qawasqar** (*Alacalufan*, Chile)[12]

canonical syllable structure: (**C**)(**C**)(**C**)(**C**)**V**(**C**)(**C**)(**C**)

/af.sa.naq/ > [fsa.naq] 'speak-EXIST'

cf. /fsaj.na/ 'grow'

Outcome: non-canonical tautosyllabic cluster
(N = 3)

e.g., **Nuuchahnulth** (*Wakashan*, Canada)[13]

canonical syllable structure: **CV**(**C**)(**C**)(**C**)(**C**)

/t͡ɬʼu.t͡ɬʼu.ʃi.nuk.ʃit͡ɬh.ts͡ʼi/ > [t͡ɬʼu.t͡ɬʼu.ʃink^{w}ʃt͡ɬhts͡ʼ]

'he was drying his hands at the fire'

6-C coda formed

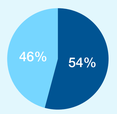
Vowel deletion processes yielding tautosyllabic clusters occur only in languages with ***prototypical HCSS patterns***. Resulting clusters tend to include sequences of (voiceless) obstruents, which are characteristic of prototypical HCSS patterns.

Other outcomes:

Simple onset → simple coda ..... 6 languages
Syllabic consonant ..... 4 languages
Entire syllable deleted ..... 1 language

All but one of these languages have ***prototypical HCSS patterns***.

Processes simplifying syllable patterns



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Phonological vowel epenthesis
(N = 8)

Processes examined here are productive patterns conditioned by the phonological environment and are described by authors as obligatory.

e.g., **Yakima Sahaptin** (*Sahaptian*, United States)[14]

/ʔínm/ > [ʔínim] 'excessively'

/t͡ɬʼjálm/> [t͡ɬʼjálim] 'Cle Elum (place name)'

There are two kinds of epenthesis patterns which are characteristic of the languages of this group: processes which break up sequences of sounds which are identical or highly similar (e.g., sequences of sibilants), and processes which break up sequences of two sonorants or a sonorant and obstruent.

2 of these languages have ***atypical HCSS patterns***.

Consonant deletion
(N = 9)

Processes examined here are productive, ongoing patterns which are conditioned by the phonological environment and are often described as variable or optional.

e.g., **Wutung** (*Skou*, Papua New Guinea)[15]

/hɲo/ > [ɲo] 'squeezings'

e.g., **Tehuelche** (*Chon*, Argentina)[16]

/kʼenm/ > [ken] 'do'

Such processes typically affect sonorants or glottal consonants in clusters.

4 of the languages with such processes have ***atypical HCSS patterns***.

Discussion

In this survey of languages with highly complex syllable structure (HCSS), we find that:

- roughly half of the languages have vowel reduction processes affecting syllable patterns, and
- roughly half of the languages have epenthesis or consonant deletion processes affecting syllable patterns.

However, the former tend to produce complex clusters in languages with ***prototypical HCSS patterns***, while the latter are more likely to simplify clusters in languages with ***atypical HCSS patterns***. The processes examined here generally reinforce obstruent clusters while simplifying clusters with sonorants.

This suggests that HCSS, in its prototypical form, is a relatively stable phonological feature. However, the cross-linguistic rarity and deviation of this type from the privileged CV type raises the following question:

➡ *How and why do such patterns arise and persist in speaker populations?*

Phonetic characteristics of HCSS

Obstruent clusters are often characterized by salient ***intrusive elements***: strong aspirated release, brief transitional vocoids, or 'anaptyctic' vowels whose quality is determined by surrounding consonants:

Camsá[17]: [tˢkaniɲe] 'broken,' [fʰi͡tseŋga] 'black'

These differ from phonological epenthetic vowels in that their occurrence is optional, their length and voicing are variable, they are 'invisible' to phonological processes, and speakers are often unaware of their presence. Intrusive elements are said to be acoustic manifestations of gestural timing lags or overlap in speech production.[18]

It has been suggested that ***perceptual recoverability*** motivates the intergestural timing patterns observed in consonant clusters in various languages.[19, 20, 21]

The salient phonetic properties of HCSS may also be an effect of the diachronic processes which create these structures. Sometimes the aspiration or transition carries a coloration of the reduced/deleted vowel:

Lezgian[22]: /tupʼal/ > [t^{hw}pʼal] 'ring'

Conclusion

The results indicate that despite theoretical issues of analysis, HCSSs are neither problematic for speakers nor unstable in speech communities.

The phonetic processes responsible for creating these syllable patterns appear to be both remarkably persistent and more prevalent than processes which 'repair' these structures.

I suggest that the perceptual properties of such sequences may facilitate the long-term stability and maintenance of HCSS.

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