# Today's irregular morphology is yesterday's regular phonology: The history and trajectory of morphophonological patterns in the complex verbal morphology of Mapudungun

Aldo Berríos Castillo
University of Edinburgh

This study presents new evidence of how morphophonological patterns can emerge from historical phonological processes, an idea with a longstanding tradition in linguistics (Wurzel, 1980; Joseph & Janda, 1988; Anderson, 1992; O'Neill, 2024;). In particular, I describe and propose a diachronic analysis of the final root alternation of *-(ɨ)m* causatives in Mapudungun, as well as other patterns, using the assumptions and predictions of the Life Cycle of Phonological Processes (Bermúdez-Otero, 2007, 2015).

Mapudungun is a language with complex morphology, still spoken and transmitted in the central and southern regions of Chile and southwestern provinces of Argentina. One of the few morphophonological processes in the language is the alternation of the final consonants of a closed set of roots that can be causativised with the now unproductive *-(ɨ)m* suffix. Examples 1 to 3 illustrate three pairs of intransitive and transitive roots that are historically related by a morphological causative construction with the suffix *-(ɨ)m*. The first verbs in these pairs correspond to roots ending in a fricative, while the second verb can be interpreted as the same root surfacing with an homorganic stop or affricate when causativised with this suffix.

(1) le**f**-'run'; le**p**ɨm- 'make run'
(2) na**ɣ**-'get down'; na**k**ɨm- 'lower something down'
(3) pɨ**ʐ**- 'to become dyed'; pɨ**ʈʂ**ɨm- 'dye in general'

This pattern can be explained by positing a historical process of fricativisation which targeted ancestral stops in final position (Adelaar, 2004; Pache, 2014). Word-internally, the transitive counterparts in these pairs of verbs exhibit a surviving [-continuant] obstruent from this erstwhile phonological process. We propose that the causative *-(ɨ)m*, being part of a special category of stem-forming suffixes in old Mapudungun (Molineaux, 2023), placed the stop and affricate outside the phonological context of fricativisation, which operated at the stem level. Eventually, the surface forms of this closed set of intransitive roots were interpreted as the underlying forms of the language. Once stored as such, they effectively extinguished the fricativisation rule, while the transitive stems became allomorphic.

By mining the historical record of Mapudungun — which spans more than 400 years — we uncover additional historical evidence for this posited trajectory, such as lexicalised morphological patterns (see example 4) where fricativisation seems not to have been triggered, thus fossilising the historical stop-alternant.

(4) ʈʂa̲f 'together', ʈʂa**p**el- 'to tie up'

Similarly, we show direct historical evidence of forms with stops in syllable-final position (see example 5), as written in a Mapudungun wordlist from the mid-1600s. We argue these would have avoided fricativisation by being word-internal at a stage when the rule was a word-level process.

(5) le**p**-toki 'fast-chief, i.e. a general'
le**p**-tu-ŋej 's/he is fast' (IPA adapted from Brouwer & Herckmans, 1647)
Cfr. le̲f 'fast' in present-day Mapudungun

According to the Life Cycle model adopted here, phonetics, phonology and morphology/lexicon are modular elements in the architecture of grammar, with three domains for phonological representations (phrase, word and stem). Using these assumptions and combining cases previously reported in the literature, I propose a path for this process from an early stage, in which the [±continuant] alternation was a synchronically active fricativisation rule affecting the set of obstruents as a natural class, to its current stage, in which this process is preserved as a fully morphologised feature.

Table 1 below shows two proposed stages in the development of the postulated domain-final fricativisation rule. In the first, partially attested stage, a word-level rule affects adjectival forms like *lep* → *lef*, but bypasses compounds (such as the attested old form *leptoki* 'a general') and causativised verbs, where the target segment is word-internal. In stage two, the rule narrows to the stem level, affecting adjectives and compounds where the target is stem final, but not causativised verbs, where the causative blocks fricativisation by being stem-final itself, while keeping the target stop stem-internal. I assume that the stem-level alternation, which was inaccessible to the phonological rule, was then morphologised, creating root allomorphy.

| | Stage 1<br>word level operation | Stage 2<br>stem level operation |
|---|---|---|
| */lep/* fast 'fast (adjective)' | ⟦$_{w}$⟦$_{s}$ le**p**⟧⟧ → [le**f**] | ⟦$_{w}$⟦$_{s}$ le**p**⟧⟧ → [le**f**] |
| */lep-toki/* fast-chief 'a general' | ⟦$_{w}$⟦$_{s}$ lep⟧⟦$_{s}$ toki⟧⟧ → [leptoki] | ⟦$_{w}$⟦$_{s}$ le**p**⟧⟦$_{s}$ toki⟧⟧ → [le**f** toki] |
| */lep-m-n/* 'run-CA-INF 'make run' | ⟦$_{w}$⟦$_{s}$ lepm⟧n⟧ → [lepimin] | ⟦$_{w}$⟦$_{s}$ lepm⟧n⟧ → [lepimin] |

Table 1: Two stages of fricativisation gradually interacting with the phonology.

This paper provides evidence for modelling the diachronic and synchronic interaction between phonology and morphology, with theoretical implications regarding what is possible in language change, and it does so in a less-studied language with complex morphology. It also sheds light on past stages of Mapudungun, thus contributing to the internal reconstruction of this language isolate.

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