



The diachrony of Mapudungun stress assignment

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Abstract

Stress assignment is one of the most widely-known and controversial aspects of present-day Mapudungun (aka Araucanian) phonology. Here, the diachrony of the phenomenon is explored based on the available written record spanning 1606–1936. Having surveyed these sparse but suggestive data, and contrasted them with present-day evidence, we suggest four distinct stages of development. Ultimately, we go on to argue that Mapudungun has undergone changes both to the morphological and metrical domains which determine stress assignment. At the level of the morphology, stress appears to have changed from marking the edge of verbal roots, to marking the edge of stems. In terms of metrical units, the apparent lack of weight-sensitivity in the earliest stages of the language is replaced by a decidedly weight-sensitive system towards the end. Finally, it is argued that stress assignment in Mapudungun is subordinate to morpho-phonological transparency both synchronically and diachronically, allowing the position of stress to vary in order to highlight the morphology.

1 Introduction

Mapudungun, the ancestral language of the Mapuche people of south-central Chile and Argentina, has a recorded history of just over four centuries. As with most languages of the Americas, the diachronic dimension of Mapudungun has attracted only limited attention, much to the detriment of our understanding of the history of the language and region, as well as to that of the typology of language change as a whole. As we shall see, although the record is somewhat patchy and often difficult to interpret, it contains enough data in order to suggest an account of at least some features of previous stages of the language, and propose a path of development into the present day.

In this paper we focus on stress, for which Mapudungun is well known in the typological literature, albeit under the exonym ‘Araucanian’.¹ Based on a single article — Echeverría & Contreras (1965) — virtually all major typological accounts of stress-assignment systems include the language as a potential case for the existence of quantity-insensitive iambs (cf. Hyman 1977: 41-2, Kager 1993: 409, 2007: 205-6, Hung 1993: 177-80, 1994, Kenstowicz 1994: 556, Hayes 1995: 266, Gordon 2002: 522, 2011: 143 Hyde 2002, 2011: 1055-65, McGarrity 2003: 59-61, Tesar 2004: 220-21, Hermans 2011: 982-984, Goedemans, Heinz & van der Hulst 2014, Martínez-Paricio & Kager 2015). Crucially, this initial description has been shown to be empirically suspect (de Lacy 2014); to be at odds with most other descriptions of present-day Mapudungun (cf. Echeverría 1964, Salas 1976, 1992, Catrileo 1995, Zúñiga 2006b, Smeets 2008, Sadowsky, Painequeo, Salamanca & Avelino 2013, Molineaux 2014); and to fail to address the interaction of stress and morphology (cf. Augusta 1903, Echeverría 1964, Molineaux 2014, 2016a).

The data we survey are substantially different from those available for Indo-European languages, where historical depth and close genetic affiliation allow for a broader view of the phenomena in context. Our knowledge of Mapudungun, in contrast, begins only in 1606, and for lack of conclusive evidence, the language is deemed an isolate.² Furthermore, as no written record exists of the language prior to European arrival, and writing has only recently become more widespread amongst some native speakers, the older Mapudungun records are all provided by non-native speakers (predominantly missionaries). Finally, as no truly consistent marking of stress is given in the available sources (it seems clear that it was never phonemic), and no major synchronic or diachronic stress-related alternations have been put forth, we must rely mostly on explicit descriptions of stress given in grammars.

¹ ‘Araucanian’ — Spanish *Araucano* — is a term imposed by the *conquistadores* for both the people and their language. It probably originates from the demonym for *Arauco* a place name based on Mapudungun [rau ko] ‘muddy water’. Today, the endonyms *Mapuche* ([mapu-tʃe] ‘land-people’), for the people, and *Mapudungun* ([mapu-θuŋun] ‘land-speech’), for the language, are preferred.

² Proposed genetic affiliations range from near-neighbours to the north — such as Quechua, Aymara (Englert de Dillingen 1936) and Pano-Tacanan (Loos 1973, Key 1978, 1981) — and to the south — Kawésqar, Yaghan and Chon (Tierra del Fuego, now extinct, see Greenberg 1978, Key 1981) — as well as membership in more distant families such as Arawakan (Payne 1984, Croese 1989, 1991, Díaz-Fernández 2011), Mayan (Stark 1970, but see Hamp 1971, Campbell 1997: 207), or Aztec and Uto-Aztecan (Key 1981).

Of course, these types of data are less than ideal. Although some of the early grammars show careful exemplification and details as to contextual variation in the position of stress, others give little or no examples whatsoever. While some give explicit stress rules for specific items and categories, others are extremely broad, omitting forms that are known to display idiosyncratic behaviour in the Present-Day Mapudungun (PDM) data, as well as in other grammars. As a result of the non-trivial limitations in the historical data, my analysis is speculative in nature.

2 Present-Day Mapudungun and the stress literature

Although there are important differences in the primary data on placement of stress in PDM, accounts agree on the non-contrastive nature of the phenomenon, as well as a certain perceptual ‘weakness’ to stressing, and a tendency for it to shift position in particular domains. Crucially, there are no clear phonological patterns conditioned by stress. Potential candidates, such as vowel neutralisation or deletion in unstressed syllables, have been shown either to have no empirical basis (cf. Sadowsky, Painequeo, Salamanca & Avelino 2013: for unstressed vowel inventories) or to have alternative, more parsimonious analyses (cf. Molineaux 2014: 35–38 and below for epenthesis vs. vowel deletion).

While the Mapudungun-specific literature on stress presents some minor discrepancies, the predominant view tends to consider stress as trochaic (cf. Suárez 1959, Salas 2006, Zúñiga 2006b, Sadowsky, Painequeo, Salamanca & Avelino 2013, Molineaux 2014). Based on Echeverría & Contreras (1965), on the other hand, typological studies take Mapudungun to be iambic (cf. Hyman 1977, Kager 1993, Hayes 1995, Gordon 2002, Tesar 2004, Martínez-Paricio & Kager 2015). As a matter of fact, Mapudungun-specific and typological approaches tend to differ in all basic parameters for stress assignment (cf. Table 1).

	FOOT	WEIGHT	DIRECTION	ITERATION
MAPU.-SPECIFIC	Trochaic	Sensitive	Right-Left	No
TYPOLOGICAL	Iambic	Insensitive	Left-Right	Yes

Table 1: Two competing accounts of stress placement in Mapudungun

As bizarre as this misalignment may seem, it is my claim that the main differences in these analyses can be explained by taking into account the brevity of most simplex words, and the morphological boundaries of the

more complex ones. The baseline for doing so may be established by examining nouns, which rarely present any complex morphology whatsoever, and so need not correspond to more than a single layer for stress assignment.

2.1 Morphologically simplex nouns in PDM

A representative sample of, di- and trisyllables and their relevant stress patterns (from Molineaux 2014) are presented in (1) and (2).

(1) Stress-placement in PDM monomorphemic nouns

- | | | | | | |
|----|--------------|------------------|----|---------------|----------------|
| a. | [pu.'kem] | 'winter' | b. | [ʌaf.'keŋ] | 'sea' |
| c. | [a.ʈʃa.'waʌ] | 'hen' | d. | [a.ʈʃuʌ.'peŋ] | 'floating ash' |
| e. | [ma.'wi.θa] | 'woodland' | f. | [pʊŋ.'pu.ja] | 'armpit' |
| g. | [pi.'fiʌ.ka] | 'two-tone flute' | | | |

Leaving aside the data for disyllables ending in a vowel (2), this first approximation points strongly to a weight-sensitive system, or more specifically to a right-aligned moraic trochee as the basic foot structure of Mapudungun nouns.³ Final closed syllables are uniformly stressed (1a–d), as final heavy feet (cf. [a.ʈʃuʌ.('peŋ)]). Where there is no final closed syllable, the penult (1e–g) bears stress, either with a branching foot made up of two light syllables [pʊŋ.('pu.ja)], or as a heavy syllable followed by an unfooted light one (cf. [pi.('fiʌ).ka]). For simplex nouns, then, this analysis is more parsimonious than the left-aligned quantity insensitive iambic analysis, which predicts all second syllables are stressed. Indeed, trisyllables ending in a closed syllable (1c–d) present a challenge to this analysis, even if they are a relatively infrequent type of monomorpheme.

(2) Stress-placement in PDM simplex vowel-final disyllabic nouns

- | | | |
|----|------------------------|---------|
| a. | ['ma.pu] ~ [ma.'pu] | 'land' |
| b. | ['piw.ke] ~ [piw.'ke] | 'heart' |

The vowel-final disyllables exemplified in (2) alternate the position of stress, such that it fits the quantity insensitive iambic analysis when final,

³ Following Hayes (1995): Moraic Trochee: (L L) or (H) and sometimes (L), where 'L' = a light syllable, 'H' = a heavy syllable, and underlining represents the position of stress. Quantity-insensitive iambs: (σ $\underline{\sigma}$), where σ = any syllable. This second foot type, however is explicitly banned in the Hayesian model (Hayes interprets Mapudungun as a defective quantity sensitive iambic system, where weight-by-position plays no role — 1995: 266–268).

and the quantity sensitive trochaic one when initial. This pattern is identified by virtually all present-day accounts, with the general consensus that stress falls on the penult more frequently than on the final. It is also reported that penultimate stress is judged by speakers as “more correct” than the alternative, and may thus be register-bound. Furthermore, the placement of stress seems not to be governed by the word’s position in the phrase or utterance, but fluctuates relatively free of conditions (Molineaux 2014, 2017). Finally, this fluctuation in nouns is not attested for adjectives, adverbs or pronouns, which have final stress irrespective of the final syllable’s weight (cf. [miʃ.'ki] ‘sweet’, [wu.'le] ‘tomorrow’, [ip.'tʃe] ‘I/me’).

2.2 Multi-suffix verbs in PDM

While speakers have no intuitions for the existence of more than one stress in monomorphemes, complex words are often deemed to have two stresses. However, subjects tend to be uninformative as to the hierarchical organisation of the stresses (Molineaux 2014, 2016a). In a number of accounts (Salas 2006: 74, Zúñiga 2006b: 64, Smeets 2008: 49), two windows for stress assignment are proposed for “longer words”, one at the right edge, and one at the left. As we see in the examples in (3), at the right, the pattern is basically, final if closed, otherwise penult. At the left, a window of two syllables is suggested, though there is little agreement as to the pattern it follows.

- (3) Stress-placement in PDM verbs (from Molineaux 2014, R=root; ω =word)⁴
- | | |
|--|--|
| <p>a. [[θew.'ma.]_R-ka.-'ki-j]_ω
make-CONT-HAB-IND.3S
's/he is usually making'</p> | <p>b. [[i.'ʃif.]_R-tu.-pu.-ke.'la-j.-m-i]_ω
throw-REST-TRLOC-HAB-NEG-IND-2-S
'You don't usually throw x back here'</p> |
| <p>c. [[l'ef.]_R-pu.-'le-j]_ω
run-TRLOC-PROG-IND.3
's/he is running here'</p> | <p>d. [[ʃi.'pa.]_R-ke.-'la-j.-m-i]_ω
exit-HABIT-NEG-IND-2-S
'You don't usually go out'</p> |

⁴ The following glossing conventions are used in this paper, mostly after Zúñiga (2006b) and Smeets (2008): APPL: applicative, BI: broken implicature (see Soto & Hasler 2010), CAUSE: causative, CIS: cislocative, CONT: continuative, D: dual, DES: desiderative, DET: determiner, EP: epenthetic, FP: focal person, FUT: future, HAB: habitual, IND: indicative, INV: inverse, IMP: imperative, NEG: negative, NMLS: nominaliser, PASS: passive, P: plural, PROG: progressive, POST: postposition, REST: restorative, SP: satellite person, S: singular, SUBJ: subjunctive, TEMP: temporal, TRLOC: translocative.

A quick look at the examples in (3) shows right-edge stress to fall consistently on the final pre-consonantal vowel, in the general weight-sensitive, trochaic pattern identified for nouns. In the case of the left-edge, the pattern would be difficult to ascertain, were it not for the indication of the verbal root in brackets. Consistently, it is the final syllable of the root that takes stress, irrespective of weight considerations. As verbal roots tend to be disyllabic, with occasional monosyllables (cf. 3c), it is unsurprising that Echeverría & Contreras (1965) describe a quantity-insensitive iambic system at the left edge, a pattern that also aligns with adjectives, adverbs and pronouns.

There are still a couple of important wrinkles in this description, however. Firstly, there is a small category of fairly productive valency-changing suffixes which tend to bear stress (cf. 4). Due to their core semantics, their immediate adjacency to the root, and their ability to induce root-allomorphy (cf. Molineaux 2014: 161-2), these suffixes may be treated, together with the verbal root, as an extended verbal stem. This, in turn, may be the broadest domain for the realisation of left-edge stress, which we now may more properly term stem stress.

- (4) Sample valency-changing (stem-extending) suffixes in PDM (R=root, S=stem, ω =word):
- a. [[tu.ku.]_R-'ɲe.]_S-la-'fu-j] _{ω} 'place-PASS-NEG-BI-IND.3S'
 - b. [[[la.ɲ]_R-'im.]_S-ke-'fi-j] _{ω} 'die-CAUSE-HAB-DIR.3SP-IND.3S'
 - c. [[[pe]_R-ɲ.ma.]_S-la-'fi-j] _{ω} 'see-APPL-NEG-DIR.3SP-IND.3S'

The second issue to account for in the verb-stress data is that of clash arising from the adjacency of stem and right-edge stress domains. Although occasionally clash is tolerated, the default pattern — as seen in the examples in (5) — seems to be the deletion of stress on simple stems (stem=root; b,d) and the preservation of that which falls on complex stems (stem= root+suffix; a,c) in clash contexts.

- (5) Stress realisation in PDM verbs where left- (stem) and right-edge stress clash is predicted, from Molineaux (2014):
- a. [[e.lu.ɲ.'ma.]_S-fi-j.-m-i] _{ω} give-APPL-3.SP-IND-2-S
'You give him/her/it x'
 - b. [[le.li.]_S-'fi-j.-m-i] _{ω} watch-3.SP-IND-2-S
'you watch him/her/it'
 - c. [[[la.ɲ]-'im.]_S-fi-j] _{ω} die-CAUSE-3.SP-IND.3S
's/he kills him/her/it'
 - d. [[le.li.]_S-'fi.-j] _{ω} watch-3.SP-IND.3S
's/he watches him/her/it'

Although there may be a number of ways of establishing the basic prosodic units and processes leading to stress positioning in PDM verbs (see, for instance, the proposals in Molineaux 2014), it is clear that there is a place for the moraic trochee in the system, as well as for morphological structure playing a fundamental role. As we shall see in the following section, these traits are not limited to the verbal system.

2.3 Nominal compounds in PDM

In contrast to the richness of Mapudungun verbal morphology, nouns show practically no inflectional or derivational affixes. Nevertheless, the concatenation of free nominal stems — compounding — is highly productive. A peculiarity of this word-building process in the language is that it displays both head-initial and head-final forms (cf. Baker & Fasola 2009: 598).

(6) Head-final and head-initial PDM nominal compounds (H=head, D=dependant) from Molineaux (2014):

- | | |
|--|--|
| a. [tʃa.'fo] _D -[ku.'ʃsan] _H | b. [tʃa.'ŋuʎ] _H -[ŋa.'muŋ] _D |
| 'cough-disease'(a cold) | 'finger-foot'(toe) |
| c. [ku.θi] _D -['fo.ro] _H | d. [fo.'ro] _H -[ʃsaʎ.wa] _D |
| 'mortar-bone'(spine) | 'bone-fish'(fishbone) |

Note that in the examples in (6a,b) the stress system seems to follow what we find in the verbal system: stress falls on the final closed syllable of the word (a right aligned moraic trochee), as well as on the final syllable of the first root-element, irrespective of weight. For cases where these patterns would predict stresses clash — (6c,d) —, the compounds reveal a new pattern in the data: the head of the compound preserves stress in clash, while the morphologically dependant stem lacks stress altogether.

2.4 The Obligatory Finite Inflection (OFI) and stress in PDM

Given that early descriptions of Mapudungun focus primarily on the verbal system and its morphological complexity, this is also where we find the most reliable body of data on stress placement, outside simplex words. As it is consistently described in most of the historical sources, we focus on what has been termed the “obligatory finite inflection” (OFI, Salas 1992) — the three rightmost slots in the language’s complex agglu-

tinating verbal morphology, marking mood, person, and number,⁵ all of which are obligatory for finite verbs.

ROOT	MOOD	PERSON	NUMBER
ʃipa	-l	-m	-u
'exit'	SUBJ	2	D

Table 2: Example OFI (mood, focal person and number marking) in contemporary Mapudungun

Considering the mostly agglutinating nature of the language, portmanteau morphemes are thought to be the exception (cf. Rivano 1989: 150). However, the first person singular indicative /-(i)n/ and the singular forms of the imperative, /-tʃi/, /-ɲe/, and /-pe/ (1st, 2nd and 3rd person, respectively) seem to be undecomposable. Excluding these morphemes, it is easy to assume that distinct meanings in the paradigms of verbs should be represented by separate morphemes at the underlying level — which is precisely what most accounts do. The language, therefore, appears to have little in the way of allomorphy,⁶ but does display some regular phonological alternations that may somewhat obscure the agglutinating pattern. The overall ‘one-morpheme, one meaning’ system for mood, focal person and number can be summarised as follows, according to Salas (1992), Zúñiga (2006b) and Molineaux (2014):

A number of alternations in the syllabic makeup of PDM verbs, which affect stress placement, are produced by (a) the alternation between syllabic and non-syllabic high-front sonorants ([i~j] marking the indicative, first person or singular), (b) the deletion of these same segments, and (c) the insertion of epenthetic [i] to break up consonantal clusters. A cursory statement of the key patterns at play in the inflectional system is given in (7),⁷ while tables 4 and 5, based on Salas (1991, 1992), Zúñiga (2006b), and Molineaux (2014), make the surface alternations plain.⁸

⁵ Mapudungun has an inverse person-marking system where verbal arguments refer to focal and peripheral persons. In intransitive verbs, the agent is the focal person. In transitive verbs, either argument might be the agent or the patient. In such cases, the default is for the focal person to be the agent. Where there is inverse marking, however, the peripheral person becomes the agent (cf. Salas 1976, 2006, Baker 2003).

⁶ Key exception to this are the portmanteau morpheme /n/~i/ ‘IND.1.S’ and non-portmanteau /l/~i/ ‘SUBJ’.

⁷ See Rivano (1990) and Molineaux (2014) for formal treatments of these patterns.

⁸ Two of the patterns that are not immediately straightforward in the tables are those of the final [e] in the subjunctive third person, and final [-li] in the subjunctive, first

	IND	SUBJ	IMP
Mood	/-i/	/-(i)l/	/-∅/
	1	2	3
Person	/-i/	/-m/	/-∅/
	S	D	P
Number	/-i/	/-u/	/-n/

Table 3: Mood, focal person and number markers in Mapudungun

- (7) Key phonological processes governing the OFI in PDM
- Glide formation: /i/ becomes [j] following a vowel, except where it would create a word-final final cluster. (e.g. /kon-i-i-u/ → [ko.ni.ju], but /tʃipa-∅-i-n/ → [tʃi.pa.iŋ]-*[tʃi.pajŋ])
 - High-front sonorant deletion: /j/ is deleted in tautosyllabic series with /i/. (e.g. /tʃi.pa.-i-i-n/ → [tʃi.pa.iŋ])
 - Epenthesis: [i] inserted to break up tautosyllabic consonantal series (e.g. /kon-∅-m-n/ → [kon.miŋ])
 - n-palatalisation: /n/ becomes [ɲ] following a high front vowel (e.g. /kon-∅-i-n/ → [ko.niɲ])

An important analytical difference must be made between [i] in the final syllable of all forms of the second person plural and [i] in the vowel-initial allomorphs of the subjunctive marker /-il/ and the indicative 1st singular marker /-in/ (see Table 5).⁹ In the first case, the vowel is never stressed, and in the second cases, it usually is. As epenthetic [i] is well attested elsewhere in Mapudungun, I assume that the unstressed forms are,

person singular. While Mapudungun tends not to distinguish number in the third person, it can be disambiguated, where necessary, by a postposed pronoun — [eɲu] for the dual, [eɲiŋ] for the plural. In the indicative, the reduced, fused forms of the pronoun are [ɲu] and [ɲiŋ], following final [i~j], which leads me to believe that, in the subjunctive plural forms, the pronouns' initial [e] was reanalysed as part of the OFI, thus extending to all persons. As for the subjunctive first singular (/l-i-i/) surfacing as [-li], rather than expected *[-lij] (compare ind.3 /i-i/ → [ij]), I can only suggest that the homorganic vowel-glide sequence was historically reanalysed as a single vowel in the less-frequent subjunctive, while being maintained in the more frequent indicative form.

⁹ The vowel-initial allomorph appears to be selected in inter-consonantal position, and in word-final position following a consonant (i.e., where /-l/ would create a consonant cluster).

		1 st	2 nd	3 rd
IND	S	[f̥ʂi.'pa-n]	[f̥ʂi.'pa-j.mi]	[f̥ʂi.'pa-j]
	D	[f̥ʂi.'pa.-ju]	[f̥ʂi.'pa-j.mu]	"
	P	[f̥ʂi.pa.-'iɲ]	[f̥ʂi.'pa-j.mɪn]	"
SUBJ	S	[f̥ʂi.'pa.-li]	[f̥ʂi.'pa-l.mi]	[f̥ʂi.'pa.-le]
	D	[f̥ʂi.'pa.-lju]	[f̥ʂi.'pa-l.mu]	"
	P	[f̥ʂi.pa.-'liɲ]	[f̥ʂi.'pa-l.mɪn]	"
IMP	S	[f̥ʂi.'pa.-t̪i]	[f̥ʂi.'pa.-ɲe]	[f̥ʂi.'pa.pe]
	D	[f̥ʂi.'pa.-ju]	[f̥ʂi.'pa.-mu]	"
	P	[f̥ʂi.pa.-'iɲ]	[f̥ʂi.'pa.-mɪn]	"

Table 4: PDM verbal paradigm for the vowel-final root [f̥ʂipa-] ‘exit’

		1 st	2 nd	3 rd
IND	S	[ko.'n-ɪn]	[ko.'n-i.mi]	[ko.'n-ij]
	D	[ko.'n-i.ju]	[ko.'n-i.mu]	"
	P	[ko.'niɲ]	[ko.'n-i.mɪn]	"
SUBJ	S	['kon-.li]	[ko.'n-il.mi]	['kon-.le]
	D	['kon-.lju]	[ko.'n-il.mu]	"
	P	[kon-.liɲ]	[ko.'n-il.mɪn]	"
IMP	S	['kon.-t̪i]	['kon.-ɲe]	['kon.-pe]
	D	['kon.-ju]	['kon.-mu]	"
	P	[kon.-iɲ]	['kon.-mɪn]	"

Table 5: PDM verbal paradigm for the consonant-final root [kon-] ‘enter’

indeed, epenthetic vowels added after stress assignment, while stressed [i] is part of the underlying allomorph of the relevant suffixes.¹⁰

Most importantly we note that, given the caveats above, minimal inflectional patterns in PDM follow the general stress pattern established for multi-suffix verbs. As a right-aligned trochee would either overlap or

¹⁰ In general, contemporary and historical grammars and texts use [i] and [ə] somewhat interchangeably, both for what appear to be epenthetic vowels and underlying ones. Although statements are found in the literature placing [ə] in unstressed positions, and [i] elsewhere, transcriptions are not consistent. Indeed, in a careful phonetic study, Sadowsky, Painequeo, Salamanca & Avelino (2013: 93) actually find the opposite distribution.

clash with stem-final stress in OFI-only verbs, only the trochaic pattern is consistently visible. Note that, while in vowel-final roots, most forms of the verb display an overlap between the two potential locations for stress, in consonant-final ones, stress is more often assigned to a vowel belonging to the inflectional material, rather than the root.

2.5 Summary for stress in PDM

As we have seen, then, the stress pattern for PDM nouns is predominantly a right aligned moraic trochee. In the case of adjectives, adverbs and pronouns, the pattern is stress-final. More interestingly, the stress system of compounds and verbs, though a right-aligned moraic trochee at the word-level, seems to establish a hierarchy of stress-placement that makes reference to several levels of morphological structure. Even though it has been mentioned that stress is perceptually ‘weak’, and that it has little interaction with the phonological system overall, we can also see (as claimed in Molineaux 2014, 2016a) that it plays an important role in highlighting — demarcating — the morphological structure of this highly agglutinating language.

Given stress on the first element of compounds, it is unsurprising that adjectives, which by and large precede a noun, have final stress. This position appears to be typical of stem demarcation processes, which may affect the adjective+noun phrase as it does a noun+noun compound.

Lack of agreement in previous work on the language, in my view, is unsurprising, as the ultimate system for stress assignment is not only layered, but also allows for a fair amount of variability. The pervasiveness of such features begs the question as to the stability of the system overall and the origins of its idiosyncrasies. In the following sections I attempt to probe this stability, placing it within a more general typology of prosodic change and evaluating the incidence of language internal and contact phenomena therein.

3 Evidence for the history of Mapudungun stress assignment: 1606–1903

In the following sections we will take a detailed look at the data for historical Mapudungun stress, and trace its path to the present-day language. I will divide the historical attestations into three stages, to which we add the contemporary data as a fourth stage (cf. Table 6). The presentation of the data in such documentation is not homogenous, either in its form, in its theoretical outlook, its depth of exemplification, or in its actual de-

scription of the language. However, there is no doubt that all the works deal with closely related varieties of a single language, and that it should be possible to trace a diachronic path from one stage to another.

Stage	Period	Sources
Stage I	Early 17 th century	Valdivia (1606),
Stage II	Mid 18 th century	Havestadt (1777), Febrés (1765)
Stage III	Late 19 th / Early 20 th century	Lenz (1893, 1895-1897), Augusta (1903, 1910, 1916)
Stage IV	Late 20 th / Early 21 st century	Salas (1976, 1992), Molineaux (2014, 2017)

Table 6: Documented synchronic stages for Mapudungun

3.1 Stage I: *Luis de Valdivia (1606) and the turn of the seventeenth century*

The earliest extant description of Mapudungun is Spanish-Jesuit Luis de Valdivia's *Art and Grammar* of the language, first published in Lima in 1606. The work was the result of Valdivia's almost 15 years in the Mapuche territories, learning and preaching in the language (see Olivares 2005, Toribio Medina 1894). Meant as a missionary learner's-guide, the grammar was written in the traditional, scholastic model of the day. Needless to say, this type of description is rather inadequate for a language so typologically dissimilar from Latin, its prototype. All in all, however, Valdivia did innovate a reasonable amount, creating a range of new categories to deal with his recalcitrant data (cf. Zwartjes 2000). Abstracting away from its theoretical framework, the grammar is very thorough and generally considered a fair description of the language, especially as regards phonology and verbal morphology (see Zwartjes 2000: 205-6, Salas 2003: 7, but also Lenz 1895-1897: 16), thus giving a reasonable body of data for this diachronic study.

3.1.1 Stress assignment, Valdivia (1606)

The stress assignment system for the language is given in the final section of Valdivia's grammar (1606: 74-5). Unfortunately, the rules are extremely parsimonious, no concrete examples are given, and there is no stress marking in the texts or examples elsewhere in his grammar or in the 'Sermons' published later (Valdivia 1621). Although we are told that

there are a number of exceptions, the stress system is summed up by three basic rules:¹¹

(8) Rules for stress assignment, Valdivia (1606: 74-5)

- *Rule 1* All nouns, prepositions, conjunctions, adjectives, adverbs, participles and interjections tend to be stressed on the penultimate syllable.
- *Rule 2* For verbs in the indicative, stress is on the final syllable for the first person; in verbs in the subjunctive, the first person is stressed on the penultimate syllable. For the other persons stress falls on the same syllable as the first person.
- *Rule 3* In the imperative, stress is on the penultimate syllable of the first singular dual and plural, as well as in the dual of the second and third person, but on the final syllable in the second and third person singular and plural. In transitions,¹² stress is on the *-e* or *-mo* that marks them.

If these rules are truly representative of the distribution of Mapudungun stress at the turn of the seventeenth century, they present an important departure from what we find in the contemporary data. We now take a look at the different word categories and attempt to reconstruct their actual patterns, accounting for their distribution.

3.1.2 Nominal and adjectival stress

The difference between present-day and turn-of-the-seventeenth-century stress is immediately evident in the case of the nominal and adjectival system. Recall that PDM was claimed to have penultimate mora stress in nouns, while adjectives (as well as adverbs and pronouns)

¹¹ Here, as in the other sources of early Mapudungun, I have provided close paraphrases — not direct translations — of the original Spanish, Latin or German, in order to smooth over some of the idiosyncrasies of the theoretical frameworks and style of the authors. Throughout the early grammars, I have tried not to make matters more difficult for the reader by presenting the transcription system of the authors in detail. Instead, I have tried to equate the elements being transcribed to the forms I use in the PDM data.

¹² Valdivia, as well as most early grammarians of Mapudungun use the term ‘transitions’ to refer to the inverse verbal morphology of the language (Adelaar 1997, Zwartjes 2000). These forms imply a reversal of the agency relations of transitive verbs, where the satellite person becomes the agent, rather than the focal person. See fn. 5.

had final stress. Here, nevertheless, we find only one system, which fits neither of these patterns: stress is on the penultimate syllable, regardless, apparently, of weight considerations.

(9) Early 17c stress in nouns, adjectives, adverbs and pronouns, after Valdivia (1606)¹³

a.	[ˈpu.kem]	‘winter’	b.	[ˈlaf.keŋ]	‘sea’
c.	[a.ˈtʃa.waɫ]	‘hen’	d.	[a.ˈtʃuɫ.peŋ]	‘floating ash’
e.	[ma.ˈwi.θa]	‘woodland’	f.	[pun.ˈpu.ja]	‘armpit’
g.	[pi.ˈviɫ.ka]	‘whistle’	h.	[ˈma.pu]	‘land’
i.	[ˈpiw.ke]	‘heart’	j.	[ˈmiʃ.ki]	‘sweet’
k.	[ˈwi.le]	‘tomorrow’	l.	[ˈiŋ.tʃe]	‘I/me’

If Rule 1 is accurate, at least from a surface perspective, the system appears to be trochaic, right-aligned and quantity insensitive (i.e. a syllabic trochee, in the sense of Hayes 1995). This, of course, is at odds with the moraic system outlined in Section 2.1 for PDM nouns, as well as with the alternations we find in the perception of stress in light-final disyllables (Molineaux 2017). The system also contrasts with the PDM tendency for adjectives, adverbs and pronouns to be stressed on the final syllable, regardless of weight.

3.1.3 Verbal stress

Rules 2 and 3 in (8) present a picture of verbal stress that is fundamentally determined by morphological structure, rather than by the phonology of the language. Stress appears to be a feature of the inflectional paradigms, rather than an algorithm that must be computed online for each form. As the first person singular of the indicative is [-n] and that of the subjunctive, [-li], stress will always surface on the vowel immediately preceding mood-marking (i.e. a final syllable closed by [-n] or a penultimate syllable, followed by [-li]). The vast majority of the imperative paradigm is also stressed on the vowel preceding mood-marking: here, the root-final vowel. The key exceptions are the portmanteau morphemes marking the second singular and third person ([-ŋe] and [-pe]), which take stress, even if they are the final syllable. Assuming Valdivia’s rules and with the rudiments of Mapudungun verbal structure outlined above, we may recon-

¹³ Example (d) is not attested in Valdivia’s text. It is given here for comparison with the PDM form in Example (1).

struct early seventeenth century verbal stress for vowel-final roots as in Table 7.

		1 st	2 nd	3 rd
IND	S	[tʃi.'pa-n]	[tʃi.'pa-j.mi]	[tʃi.'pa-j]
	D	[tʃi.'pa.-ju]	[tʃi.'pa.-j.mu]	"
	P	[tʃi.'pa.-iɲ]	[tʃi.'pa.-j.mn]	"
SUBJ	S	[tʃi.'pa.-li]	[tʃi.'pa.-l.mi]	[tʃi.'pa.-le]
	D	[tʃi.'pa.-lju]	[tʃi.'pa.-l.mu]	"
	P	[tʃi.'pa.-liɲ]	[tʃi.'pa.-l.mn]	"
IMP	S	[tʃi.'pa.-tʃi]	[tʃi.pa.-'ɲe]	[tʃi.pa.'pe]
	D	[tʃi.'pa.-ju]	[tʃi.'pa.-mu]	"
	P	[tʃi.'pa.-iɲ]	[tʃi.'pa.-mn]	"

Table 7: Verbal paradigm for vowel-final root [tʃipa-] 'exit', after Valdivia (1606).

Although Valdivia does not deal with the issue of consonant-final versus vowel-final roots, the data he provides in the *Vocabulary and Confessionary* that close his grammar, and his *Sermons* (Valdivia 1621), point to a series of verbs with epenthetic ⟨i⟩ breaking up consonantal clusters at the root/inflection boundary, as in (10).

- (10) Post-root, semantically empty ⟨i⟩ in Valdivia (1606, 1621)
- a. ⟨kim-i-n⟩ b. ⟨kim-i-l-m-n⟩
 know-EP-IND.1.S know-EP-SUBJ-2-P

Valdivia appears to be somewhat inconsistent in his use of the epenthetic form (cf. ⟨elu-duam-n⟩ 'give-DES-IND.1S' 1606: 14) making it an unlikely candidate for stress. I will therefore assume that, in the case of consonant-final roots (that show the ⟨i⟩ ~ ∅ alternation), said vowel (transcribed here as [i], following PDM) is disregarded for stress assignment purposes. Ultimately, this means that Rule 2 in (8) places stress on the final syllable of the verbal root, excepting the second singular and third person imperatives [-ɲe] and [-pe], as shown in Table 8.

Nevertheless, the rules seem to imply that the addition of tense or aspect suffixes changes the placement of stress, as in (11), thus requiring a new analysis.

		1 st	2 nd	3 rd
IND	S	['ko.n-ɪn]	['ko.n-i.mi]	['ko.n-ij]
	D	['ko.n-i.ju]	['ko.n-i.mu]	"
	P	['ko.n-ɪɲ]	['ko.n-i.mn]	"
SUBJ	S	['kon-li]	['ko.n-ɪl.mi]	['kon-le]
	D	['kon-lju]	['ko.n-ɪl.mu]	"
	P	['kon-liɲ]	['ko.n-ɪl.mn]	"
IMP	S	['kon-t̪i]	[kon-ɲe]	[kon-pe]
	D	['ko.n-ju]	['kon-mu]	"
	P	['ko.n-ɪɲ]	['kon-mn]	"

Table 8: Verbal paradigm for the consonant-final root [kon-] ‘enter’ in Valdivia (1606)

(11) Stress in further inflected verbs, following Valdivia (1606):

- a. [e.lu-’bu-n] b. [kim-du.’a.m-i-l-m-n] c. [kon-’la-n]
 give-BI-IND.1S know-DES-EP-SUBJ-2-P enter-NEG-IND.1S

We may then consider stress as a stem phenomenon, where the stem would include the root and the tense and aspect marking, excluding mood, person and number — the OFI. This idea is furthered by the fact that the forms with ‘transitions’ are stressed on the [-e] and [-mo] suffixes that mark the satellite person (SP) agent in inverse forms (see Rule 3 in 8), and which always precede the OFI.

(12) Stress in verbs with ‘transitions’, based on Valdivia (1606):

- a. [elu-’e-j-m-u] b. [elu-’mo-j-u]
 give-3SP-IND-2-D give-2D.SP-IND.1-D
 ‘He_{SP} gave you both_{FP}’ ‘You two_{SP} gave us both_{FP}’

Still, we have the problem of the final-stressed imperative forms, which are portmanteaus marking mood, person and number. It is evident that such forms ([-ɲe] and [-pe]) are synchronically undecomposable, since they do not mark person and number according to the predominantly agglutinating pattern outlined above (cf. Table 3). It is possible that these forms are different in that they represent periphrastic constructions that have not been fully grammaticalised as regards stress. If this is so, [-ɲe] can be related to the root [ɲe-] ‘to be’ and [-pe] can be related to the root [pe-] ‘to see’. If, phonologically, they represent different prosodic words, we may assume that they are stressed separately as well, while

[$\widehat{tj}i$] — presumably from the demonstrative [$\widehat{tj}i$] — would have never borne stress, as expected for a function word.

These exceptions aside, verbal stress in the early seventeenth century Mapudungun of the dialects described in Valdivia's grammar can be described as in (13):

(13) Verbal stress, after Valdivia (1606):

- Stress the final stem vowel.
- The stem corresponds to the entirety of the verb minus the obligatory finite inflection (OFI= mood, person and number).

In sum, early 17th century Mapudungun appears to assign stress to right-aligned trochees in nouns, just as PDM does. However, in contrast to PDM, this early system is quantity insensitive, and extends to other non-verbal categories. In verbs, the data from Valdivia suggests a stress pattern that is fundamentally morphological in nature, marking the final syllable preceding obligatory inflectional marking.

3.2 Stage II: *Bernhardt Havestadt (1777) and Andrés Febrés (1765): Mid-eighteenth century Mapudungun stress*

For a century and a half, Valdivia's grammar was the only widely available description of the Mapuche's language, and it continues to be an invaluable resource for its history. The mid-eighteenth century, however, saw the arrival of two Jesuits who would endeavour to update the work of their predecessor.

The first of these grammarians was Bernhardt Havestadt (1714-1778), a Westphalian, who arrived in the Mapuche territories in 1748, remaining for twenty-two years. His grammar, though apparently available in a Spanish-language manuscript in the mid-1750's, was published in Latin only in 1777 as *Chilidúgu: Sive Tractatus Linguæ Chilensis*.¹⁴ This work — part grammar, part compilation of texts, and part travel-log — spans three volumes and nearly one thousand pages. In its structure, it mirrors Valdivia's work, adhering even more vehemently to the scholastic approach.

¹⁴ The marks in the spelling *Chilidúgu* do not represent stress, rather the 'special ⟨u⟩' — which I transcribe as [i] elsewhere — and the 'Spanish ⟨ng⟩ sound' — which I transcribe as [ŋ]. Hence, ⟨Chilidúgu⟩ = [tʃili-θiŋu] 'Chile-speech'.

The second eighteenth-century grammar was that of a Catalan Jesuit, Andrés Febrés (1732-1790). Somewhat younger than Havestadt, he appears to have learnt the language and written his grammar less than five years after his arrival in Chile in 1759. It seems, however, that Febrés came into contact with Havestadt's *Chilidúgu* — in Spanish manuscript form — well before reaching the country (see Lenz 1895-1897: XLI-LI, and Havestadt 1777: 189). Febrés' grammar was, nevertheless, published before that of his German brother of the cloth, and is much more condensed, so was used more widely. Importantly, Febrés's grammar clearly outdoes that of Havestadt in its care in transcribing the sounds of the language, as is shown by abundant comment on pronunciation matters and exemplification.

3.2.1 Stress assignment data in Havestadt and Febrés's grammars

In terms of the presentation of verbal morphology, both eighteenth-century grammarians follow Valdivia quite closely, and hence, their analysis falls in with that set out in Table 3, above. As for the issue of stress assignment, Havestadt and Febrés' grammars differ in their presentation, but converge — for the most part — on the loci of stress. Although both grammars present stress in far more detail than Valdivia does, they are still very condensed, and we must do our best to tease out the details of their proposed systems.

3.2.2 Nominal and adjectival stress

Both Havestadt (1777: 2) and Febrés (1765: 6-8) give us a clear pattern for nouns and adjectives: stress the ultima if it ends in a consonant,¹⁵ otherwise, stress the penultimate syllable — a pattern we recognise from PDM nouns, in Table 1, above. This account is clearly at variance with that of the preceding grammar, as Valdivia depicts a quantity-insensitive system. Although the data is by no means exhaustive, it seems a reasonable assumption that in the period and dialects that Havestadt and Febrés cover, monomorphemic nominal and adjectival stress falls on a right-aligned moraic trochee, as in (14). The only exception to this is given by Febrés (p.7), who claims that nouns with a final consonant preceded by [i] are stressed on the penultimate syllable ([ˈne.miɪ] 'word', [ˈma.miɪ] 'wood', [ˈpe.liɪ] 'guest'). As I have already claimed for the early-

¹⁵ Febrés (1765: 6) actually says that default stress falls on a final syllable if it ends in a consonant or 'diphthong', i.e. ⟨au, eu, ay, ey⟩, etc. (probably [aw], [ew], [aj], [ej], etc.).

seventeenth-century data, [i] appears to be the default epenthetic vowel, which is likely only triggered following stress assignment, posing no major threat to the trochaic analysis.

- (14) Stress in nouns and adjectives (Havestadt 1777, Febrés 1765)
- | | | | |
|------------|--------------|------------|---------------|
| a. [e.ʎa] | b. [u.ʃ̄sar] | c. [tʃa.o] | d. [ma.m(i)ʎ] |
| ‘not much’ | ‘seed’ | ‘father’ | ‘wood’ |

Of course, while this analysis fits broadly the description for PDM nouns, the adjectival data remains at odds with the present-day data, where stress is invariably word-final. Although we are provided with no explicit data for adverbs and pronouns, I assume that these must follow the general rule stated by Febrés, thus contrasting with the state of affairs of PDM, where these word categories behave like adjectives.

3.2.3 Stress shifting in Febrés (1765)

Havestadt’s first assertion on Mapudungun stress is that it is often ‘ambiguous or according to taste’ (1777: 20). However, we have seen that — at least for PDM — this variability is highly circumscribed to vowel-final disyllabic nouns. A closer look at the first seemingly naturalistic speech recorded for the language shows this variation to be similarly restricted in the eighteenth century. Indeed, Febrés provides the reader with two transcribed dialogues, the second of which he marks for phrase-final prominences (1765: 146-156), which he claims are typical of formal speech.

When they speak in the tone that befits a speech, which they call *coyaghtun* ([kojauʎtun]), all the words at which they make a pause are pronounced long, e.g. *deuma pepavin gami mapú, marimari ca Llancahuenu, Dios pile, pentuayu ca mitá*, etc. ‘I have already come to see your land, oh Llancahuenu! If God is served, we shall meet again’; where they pronounce the three words *mapu, Llancahuenu, mita* long, not because they are, but because they raise their voices further on these, and make a pause (8).

In the note that precedes his extended example of one such speech, he tells us:

I warn here that all the words that have an accent mark on the final syllable and are followed by a star, denote that upon that final syllable and word they make a pause, raise their voice, pronouncing it as long and taking a breath for the next clause, which is the way to give a *coyaghtun* (145).

Upon closer inspection of the actual marking in the text (near 150 clauses), the vast majority of words marked for final stress are words where stress on the ultima is expected: monosyllables ([ˈpí-n] ‘call-IND.1S’),¹⁶ and words ending in a consonant ([kiˈθaw] ‘work’; [kupiˈfal] ‘poor person’, [iˈʌˈmen] ‘rich person’, [ʌvˈkeŋ] ‘sea’, [kime-ˈa-j] ‘good-FUT-IND.3’). The only cases where final stress is unexpected is in vowel-final disyllabic nouns ([paˈje] ‘priest, father’; [maˈpu] ‘land’), and the proper names of the two main speakers, [miˈʌ-leˈvu] ‘gold-river’ and [anka-teˈmu] ‘body-tree’.¹⁷ Although the cases of final stress in these proper names are interesting, they can hardly be said to reflect the language’s general pattern. The evidence seems to point, rather, to the fact that this alternation is mostly restricted to disyllabic nouns ending in a vowel.

The phenomenon of stress shifting in formal speech – if described correctly by Febrés – seems to be a consequence of intonational processes. It is not difficult to imagine that Febrés’ perception of stress comes from an extreme pitch contour at the clause-edge (possibly a H*) in such spoken-discourse formulae (indeed, Molineaux 2014 finds pitch maxima to be the strongest correlate of PDM stress). It seems interesting, however, to ask whether this L2 interpretation of final stress in these forms would have been perceived as such by native speakers, or whether they would have simply seen these phenomena as changes in the language’s intonation-contour (cf. Molineaux 2017: for PDM data). The fact that the pattern is found almost exclusively in disyllables will be key to our understanding of the later development of stress in the language (cf. Section 4, below)

3.2.4 Verbal stress

At a first glance, verbal stress is described in a very similar fashion to nouns: stress the final if closed, otherwise, stress the penultimate. Again, it is made plain that this excludes epenthetic vowels, which are never stressed, such as those in the first person singular indicative (e.g. [ˈkim-(i)n] ‘know-IND.1S’), and in the second and third person plural for all moods (e.g. [eˈlu-m(i)n] ‘give-IMP.2P’). As in the previous stage, the second and third person singular of the imperative are stressed on a final open syllable. Like in the seventeenth-century data, I assume these

¹⁶ Interestingly, postpositions such as [mew] are often stressed when final, as are particles such as [ve], which is described as interrogative or ornamental. Demonstratives and pronouns also appear in the clause-final position having stress on their only underlying vowel: cf. ⟨tva⟩ ~ [tiˈva] ‘this, thus’; ⟨eŋŋ⟩ ~ [ˈeŋiŋ] ‘they two’.

¹⁷ Specifically the *blepharocalyx cruckshanksii* or *temo* tree.

morphemes are somehow not fully grammaticalised, at least as regards the computation of stress.

A more unexpected pattern, however, is that of the first person plural of all moods, which bears stress on the penultimate syllable,¹⁸ that is, on the vowel immediately preceding a final closed syllable. We can summarise these assumed stress-patterns for vowel- and consonant-final verb-roots in tables (9) and (10), respectively.¹⁹

		1 st	2 nd	3 rd
IND	S	[tʃi.'pa-n]	[tʃi.'pa-j.mi]	[tʃi.'pa-j]
	D	[tʃi.'pa.-ju]	[tʃi.'pa.-j.mu]	"
	P	[tʃi.'pa.-iɲ]	[tʃi.'pa.-j.mn]	"
SUBJ	S	[tʃi.'pa.-li]	[tʃi.'pa.-l.mi]	[tʃi.'pa.-le]
	D	[tʃi.'pa.-lju]	[tʃi.'pa.-l.mu]	"
	P	[tʃi.'pa.-liɲ]	[tʃi.'pa.-l.mɪn]	"
IMP	S	[tʃi.'pa.-tʃi]	[tʃi.pa.-'ɲe]	[tʃi.pa.'pe]
	D	[tʃi.'pa.-ju]	[tʃi.'pa.-mu]	"
	P	[tʃi.'pa.-iɲ]	[tʃi.'pa.-mɪn]	"

Table 9: Verbal paradigm for vowel-final root [tʃipa-] 'exit', after Havestadt 1777 and Febrés 1765 (forms contradicting the 'general rule' shaded).

The case of consonant-final roots, in particular in the indicative, is radically different from what we find in the early seventeenth century. If we consider that, in many such forms, the penultimate syllable peak is occupied by the indicative marker — in this case the syllabic form of the high front sonorant (i.e. [i], where in vowel-final forms it surfaces as [j])²⁰ — then Havestadt's assertion, that the second person singular and

¹⁸ Havestadt and Febrés share this percept for the first person plural of the subjunctive, but only data from Febrés is available for the imperative. In the case of the indicative, the two Jesuits disagree, with Havestadt stressing the final syllable and Febrés, the penult. Here I follow Febrés, whose data is more complete.

¹⁹ Havestadt, in claiming that 'all first persons of the indicative' bore final stress, seems to claim that the final open syllable of the indicative first person dual [tʃi.pa.-'ju]. This is most likely an overgeneralisation of the rule. Especially looking at the data from Valdivia and Febrés' grammars, final stress in this case would be extremely odd, since it would fall on a final open syllable as well as a clearly decomposable number-marker ([u] 'D', see Table 3). I assume, therefore, that the dual — which would have been the least familiar to a speaker of German and Spanish — was slightly overlooked as regards stress.

²⁰ Havestadt tells us explicitly that the [j]~[i] alternation for the indicative marker depends on whether it is preceded by a vowel, in which case it changes to ⟨y⟩ (1777: 26);

		1 st	2 nd	3 rd
IND	S	[<i>'ko.n-ɪ̃n</i>]	[<i>ko.'n-i.mi</i>]	[<i>'ko.n-ij</i>]
	D	[<i>ko.'n-i.ju</i>]	[<i>ko.'n-i.mu</i>]	"
	P	[<i>'ko.n-ij̃n</i>]	[<i>ko.'n-i.mɪ̃n</i>]	"
SUBJ	S	[<i>'kon-.li</i>]	[<i>'ko.n-ɪ̃l.mi</i>]	[<i>'kon-.le</i>]
	D	[<i>'kon-.lju</i>]	[<i>'ko.n-ɪ̃l.mu</i>]	"
	P	[<i>'kon-.lij̃n</i>]	[<i>'ko.n-ɪ̃l.mɪ̃n</i>]	"
IMP	S	[<i>'kon-.tʃi</i>]	[<i>kon-.'ɲe</i>]	[<i>kon-.'pe</i>]
	D	[<i>ko.'n-i.ju</i>]	[<i>'kon-.mu</i>]	"
	P	[<i>'ko.n-ij̃n</i>]	[<i>'kon-.mɪ̃n</i>]	"

Table 10: Verbal paradigm for the consonant-final root [kon-] ‘enter’, after Havestadt 1777 and Febrés 1765 (forms contradicting the ‘general rule’ shaded)

the second and third dual and plural are stressed penultimately, leads to the indicative marker — not the last pre-OFI syllable (cf. 13) — being stressed.²¹

Besides first person plural forms, penultimate-mora stress also fails to fall on the non-finite markers [-el] and [-ɪ̃m], in Febrés’ data. Furthermore, inverse marker [-e] is stressed by Febrés despite being followed by a closed syllable (as in the 17th century, cf. Table 12). In all these cases, some synchronic alternation seems to be afoot, sometimes stressing the penultimate mora, and sometimes the last pre-OFI syllable, as can be seen in Table 11.

	‘give-IND-1P’	‘give-TEMP’	‘give-NOMS’	‘give-INV-IND.3-3SP’
Havestadt	[e.lu-('i-ɲ)]	[e.lu-(j.ɪ̃m)]	[e.lu-('el)]	—
Febrés	[e'lu-(i-ɲ)]	[e.'lu-(j.ɪ̃m)]	[e.'lu-(el)]	[e.lu-'e-(j-ew)]

Table 11: Stem-final vs. penultimate mora stress in Havestadt and Febrés (right-aligned moraic trochee in parenthesis)

however, in his transcriptions he never gives, for instance, ⟨yñ⟩ when following a vowel, so the rules of glide formation seem to be more of the type: ‘create a vowel where it avoids tautosyllabic consonant clusters’, as proposed for PDM in (7a).

²¹ In the 2nd person plural, Havestadt (1777: 5) assumes that, although unwritten, there is a very brief vowel between the final consonants (⟨ù⟩, in his script, [i] here).

We note then, that in all these forms, where stress does not follow the general rule, it seems to revert to what we find in the previous stage: stress on the last vowel before the OFI. The only exceptions are imperative [-ŋe] and [-pe].

It is my claim, then, that the stem-final syllable does have some degree of stress, which is normally demoted in favour of stress on the penultimate mora of the word. This would imply that, in building the verb's morphological structure, stress assignment rules are applied twice, once to the stem and once to the word.²²

3.2.5 Summary of mid-eighteenth century stress assignment

Havestadt's claim that many words are simply "ambiguous or according to taste" as regards stress (1777: 20), appears to be symptomatic of a system in flux, though an appropriate linguistic generalisation was needed to restrict and explain the variation. The phrasal and pragmatic phenomena described by Febrés may be partially responsible for Havestadt's observations, but the inconsistencies between the two grammarians point to other factors that are unstable within the system.

The picture I present for stress in this period is in many ways similar to what we find in the present day account. The most important similarity is the practically exceptionless footing of a right-aligned moraic trochee at the word level. This is particularly true for the nominal system, excepting the cases with variable stress in PDM. The second similarity is the tendency to stress the stem-final vowel in verbs. One of the major differences, however, is the fact that what appears to be the stem domain in the eighteenth century (and in the early seventeenth as well — all verbal morphology excluding the OFI) is significantly different to what the data yielded for the stem-domain in the twenty-first century (root plus core valency-changing suffixes, mostly, cf. Section 2.2).

Interestingly, considering the possible structures of mood, focal person and number suffixes, there are only two possible distributions for the verb's two stresses: conflation or clash. This less than ideal distribution of stresses, I venture, most likely led speakers, over time, to avoid clash by re-conceptualising the domains of the stem and word-morphology. We will ultimately see this reassessment of the stem-domain and the role of demarcative stress in the final historical works on the language, in Section

²² For a more detailed, formal analysis of this data see Molineaux (2014: 260–4).

3.3 as well as in my own, twenty-first century data, which I will return to in Section 4.

3.3 Stage III: Rudolf Lenz (1896) and Félix de Augusta (1903): Mapudungun stress at the turn of the twentieth century

Towards the end of the nineteenth century, the work of Rudolf Lenz, a German-born linguist and philologist, opened up the field of Mapuche Studies to university academics. Based in Santiago from 1890 until his death, in 1938, Lenz focused first on the peculiarities of Chilean Spanish, which he claimed was “basically Spanish with Araucanian sounds” (1893: 208). He soon turned his interest to Mapudungun itself, travelling repeatedly to Mapuche territories and making detailed notation of stories, poems, speeches and dialogues. His main works on Mapudungun — written between 1895 and 1897 — were compiled in *Estudios Araucanos*. For the first time in Mapudungun studies, the work did not have a pedagogical objective (as in the missionary grammars), but rather attempted a careful, scientific description.

In parallel, Felix de Augusta, part of a new contingent of Bavarian Capuchins, took on the task of renewing the missionary materials for working with the Mapuche, now forcibly relocated to reservations. His *Gramática Araucana* (1903) is the result of Augusta’s first eight years of work in Chile’s Araucanía Region. It is perhaps the most manifestly ‘pedagogical’ of the missionary works, structured as a series of brief grammar points followed by examples and exercises, as was the model of the day for learner grammars. Although the *Gramática* is Augusta’s most explicit work on the language’s structure, it should be taken as part of a trilogy — alongside his collection of texts, *Lecturas Araucanas* (1910), and superb bilingual dictionary (1916) — which provide a broader practical description of the language (Salas 1985, Molineaux 2016b).

3.3.1 Stress assignment data in the work of Lenz and Augusta

Lenz’s views on the phonetics and phonology of the language are sprinkled quite generously across his work. The most extensive account is given in the prologue to his collected articles on Mapudungun (Lenz 1895-1897), where, with regards to stress, he states that it “has little strength and stability, changing its place according to laws of balance that are scarcely fixed” (XXIV). However, in a footnote elsewhere in the volume, he agrees with Febrés in claiming that “words are stressed on the

penultimate syllable; only when ending in a consonant do they become acute” (388 fn.I).

Augusta’s account of stress is stated early on in his first work on Mapudungun, giving a ‘general rule’, followed by a series of partial or superficial exceptions. As in the case of Lenz (as well as Havestadt and Febrés) he places stress on “the last syllable when it is closed or has a diphthong [i.e. a vowel plus a glide] and the penultimate elsewhere” (1903:2-3). Although, overwhelmingly, stress is not marked in Lenz or Augusta’s transcriptions, where it is specified, this general pattern is most often upheld.

3.3.2 Nominal and adjectival stress

In a 1893 article, preceding his *Estudios*, Lenz is more precise than anywhere else regarding Mapudungun stress:

“Stress varies in accordance with lexical combinations; in general, words ending in a consonant are stressed on the last full syllable (those which do not include [ə]), while simplex, polysyllabic words ending in a vowel, are stressed on the penultimate syllable. (202)”

It is interesting, however, that in his collection of texts, stress is sometimes marked on a final syllable with the epenthetic vowel [i] (15:d,e), which he elsewhere considers interchangeable with schwa.

(15) Sample nominal stress in the Lenz’s *Estudios* (1895-1897)

a. [ki.'ʎe.ɲu] b. ['loŋ.ko] c. [ku.'ʎin] d. [vo.'tim] e. [ɲa.'miɲ]

‘tear’ ‘chief’ ‘cattle’ ‘son’ ‘foot’

Augusta’s assessment of nominal stress is very similar to that of Lenz, as it derives from his ‘general rule’ (penultimate mora stress), with two added exceptions: one stating that ‘disyllables that have a schwa in the first syllable are stressed on the last syllable regardless of the general rule’, and the other, that “disyllables that have a schwa in the final syllable have two stresses (a spondee)” (1903:4). Examples are: [pə.'li] ‘soul’, [pə.'ʎi] ‘fly_N’ and ['fo.'təm] ‘son’; ['ma.'məʎ] ‘wood’. If indeed the dialect that Augusta describes has this distribution, we could explain the final stressed syllable forms with [ə] in the first syllable, as well as the cases of ‘spondee’ stresses, by assuming that right-edge stress is applied cyclically to the noun: this would occur once before epenthesis, and once after, as suggested in Table 12. Be this as it may, taken together with the data from Lenz, Febrés and PDM, it seems clear that the interaction between stress and

nominal epenthesis is not altogether settled, and, indeed, the historical epenthetic vowel might be in the process of entering the lexical representation of at least some of the dialects and words of 18c Mapudungun.

	Underlying	Stress	Epenthesis	Stress	Surface	Gloss
a.	/pli/	'pli	pə.'li	-	[pə.'li]	'soul'
b.	/fotm/	'fotm	'fo.təm	'fó.'təm	['fo.'təm]	'son'

Table 12: Stress and epenthesis in nouns, based on Augusta (1903)

Interestingly, although neither Lenz nor Augusta explicitly mention stress in other word categories than nouns and verbs, in both authors' collections of texts (especially Lenz's), stress is often marked on the final open syllable of disyllabic adjectives, adverbs, pronouns and demonstratives (cf. Lenz: [mu.'na] 'few', [wi.'le] 'tomorrow', [ki.'je] 'one/DET' and [tu.'fa] 'this', Augusta: [we.'θa] 'bad', [fi.'ta] 'old'). I assume, then, that this is the normal position of stress in such words, since we find no instances where their stress is marked initially.

3.3.3 Stress-shifting

The major exception to the nominal pattern are the — by now familiar — disyllables ending in a vowel. In the prologue to his *Estudios* Lenz exemplifies the 'scarcely fixed' nature of stress in words such as *ruka* 'house', giving the forms in (16a) and (16b). Upon closer inspection, in texts corresponding to all language varieties, we see that it is the disyllables with a final open syllable that appear with stress in both positions, as is plain in examples (16c) vs. (16d).

(16) Varying stress (underlined) in Mapudungun, based on Lenz (1895-1897):

- a. [tə.'fa.-mu mə.l-i ni 'ru.ka] (p.XXIV)
 DET-POST be-IND.3S my house
 'Here is my house'
- b. [ni ru.'ka mo kə.'pa-n] (p.XXIV)
 my house from come-IND-1S
 'I come from my house'

- c. [wu.tʃa.-'la-j tʃi 'loŋ.ko] (p.18)
 stand-NEG-IND.3S the chief
 'The chief did not stand up'
- d. [mi.le.-fu ka.θi.ke, loŋ.'ko] (p.18)
 be-BI leader chief
 'they were leaders, chiefs'

We note that, although the lack of stability is claimed for the language overall, the alternate position of stress on a final open syllable is restricted to two-syllable words, in particular, nouns. Clearly the forms that do not follow the general rule seem most common clause-finally, or preceding the postposition [mo]/[mew] (a claim explicitly made by Augusta 1903: 4), but this behaviour is not consistent for such a position, nor exclusive to it.²³

As for Augusta, his actual transcripts do not diverge from the rules given in the grammar and the introduction to the *Lecturas*, except in the case of the adjectives. Nowhere in the transcriptions — and in contrast to Lenz's contemporary texts — do we find stress marked on the final open syllable of a noun in isolation. This, in my view, seems symptomatic of Augusta's representation of a lexical pattern, rather than the surface, post-lexical one, which Lenz would have had access to.²⁴ The key difference here is that Augusta is likely to have been one of the most proficient of the L2 speakers of Mapudungun to write a grammar of the language, while Lenz — a very competent phonetician — would have lacked the long-term exposure necessary to tease apart the lexical and post-lexical patterns of prominence.

²³ Note, for instance the transcription ['ma.pu mo] in Lenz's texts (p.34), and the position of stress in phrase-final ['ma.pu] and ['loŋ.ko] in (16a) and (16c), respectively. Although rare, there are a few examples of disyllables transcribed with stress on a final vowel, even when not phrase final, as in [pi.tʃi 'ma.pu ru.'ka mi.le.-ka.-j-a-j] 'bit earth house be-CONT-FUT-IND.3 (there won't be much distance to the house)' (p.97). It is possible, of course, that the speaker placed an intonational break following the word [ru.ka], which brought with it the change in perceived stress.

²⁴ Augusta tells us that "aside from the prosodic stresses, we also find declamatory or emphatic stresses which allow a certain syllable to be reinforced outside the rules of stress assignment" (1910 p. XI). No specific conditions for this reinforcement are given, nevertheless.

3.3.4 Verbal stress

While Lenz gives no explicit guidance regarding verbs, in Augusta's work stress follows the general rule in the first person singular of all moods, with other conjugations following this form's stress (see Table 13). Only in the subjunctive does Augusta claim an exception, with the first person plural not following the singular's pattern, but rather following the general rule to stress a final closed syllable.

The resulting system, in Table 13, is one where the overwhelming majority of OFI-paradigm forms, in vowel-final roots, are stressed on the penultimate mora. The exception to this pattern — as in the data for the 18th century — are the first person plural of the indicative and the imperative, which have their stress on the root-final syllable. However, the subjunctive form no longer has exceptional, pre-OFI stress, and the second and third person singular of the imperative have come under the general rule.

		1 st	2 nd	3 rd
IND	S	[fʃi.'pa-n]	[fʃi.'pa-j.mi]	[fʃi.'pa-j]
	D	[fʃi.'pa.-ju]	[fʃi.'pa.-j.mu]	"
	P	[fʃi.'pa.-iɲ]	[fʃi.'pa.-j.mn]	"
SUBJ	S	[fʃi.'pa.-li]	[fʃi.'pa.-l.mi]	[fʃi.'pa.-le]
	D	[fʃi.'pa.-lju]	[fʃi.'pa.-l.mu]	"
	P	[fʃi.pa.-'liɲ]	[fʃi.'pa.-l.mɪn]	"
IMP	S	[fʃi.'pa.-tʃi]	[fʃi.'pa.-ɲe]	[fʃi.'pa.pe]
	D	[fʃi.'pa.-ju]	[fʃi.'pa.-mu]	"
	P	[fʃi.'pa.-iɲ]	[fʃi.'pa.-mɪn]	"

Table 13: Verbal paradigm for vowel-final root [fʃipa-] 'exit', after Lenz 1895-1897 and Augusta 1903. Exceptions to penultimate-mora stress greyed out.

For roots ending in a consonant, Augusta claims the existence of an epenthetic vowel, which in the first person singular of the indicative is often stressed ([e.'l-ən] 'put-IND.1.S'). This is the case if the root is monosyllabic (i.e. [el-], 'put'; [wəl-] 'give'). Otherwise, in polysyllabic roots, stress is assigned to the preceding vowel ([ku'fʃan-ən] 'sicken-IND.1S').²⁵

²⁵ Augusta also claims that, in consonant-final roots, the third person singular of the indicative receives stress on the vowel preceding the inflection, given the example of [ku'fʃan-ij] 'sicken-IND.3.S'. This example is problematic, seeing as how it is a denominal

		1 st	2 nd	3 rd
IND	S	[ko.'n-ín]*	[ko.'n-i.mi]	[ko.'n-ij]
	D	[ko.'n-i.ju]	[ko.'n-i.mu]	"
	P	[ko.'n-ij]	[ko.'n-i.mín]	"
SUBJ	S	['kon-.li]	['ko.n-íl.mi]	['kon-.le]
	D	['kon-.lju]	['ko.n-íl.mu]	"
	P	[kon-.líp]	['ko.n-íl.mín]	"
IMP	S	['kon-.tjì]	['kon-.ɲe]	['kon-.pe]
	D	[ko.'n-i.ju]	['kon-.mu]	"
	P	[ko.'n-ij]	['kon-.mín]	"

Table 14: Verbal paradigm for the consonant-final root [kon-] ‘enter’, after Lenz 1895-1897 and Augusta 1903. * = but also: [ku.ʔsa.n-ín] ‘disease-IND.1s’

As we see in Table 14, the position of stress for consonant-final roots is fully consistent with the right-aligned moraic trochee of nouns. Still, the picture for the epenthetic vowel in verbs seems murky at best. Although nowhere in Augusta’s texts is stress marked on these epenthetic vowels,²⁶ we do find cases where Augusta does not transcribe the epenthetic vowel itself after a monosyllabic root (cf. ⟨kim-n⟩ ‘know-IND.1s’ p. 204). Furthermore, in Lenz’s work, although we do find cases of stressed epenthetic vowels after monosyllabic roots, such as, precisely, ⟨ki.m-én⟩ ‘know-IND.1s’ (1895-1897: 38), there are also disyllabic roots that follow this pattern, such as ⟨ja.we.l-én⟩ ‘ride-IND.1s’ (104).

Just as in nouns with epenthesis, it appears we are dealing with a process that is no longer fully post-lexical, since the epenthetic vowel is sometimes susceptible to stress marking. The interaction with the stem-level stress is crucial to the realisation of stress in such cases. I will return to the issue, however, in the general analysis of the period.

verb, and may attract additional stress to the root-final syllable. Also, in his own texts, Augusta marks stress on the final syllable of such cases: eg. [ʎo.'w-i-j] ‘receive-IND-3s’ (1910:37).

²⁶ The marking of stress on schwa and ⟨ù⟩ ([i] in Augusta’s texts) presented important difficulties for early 20th century typesetting, as Augusta complains in his introduction to the *Lecturas* (1910: XI).

3.3.5 Left-edge stress?

For the first time, in the late nineteenth century, we get enough data to examine the issue of an apparent second stress for compounds and verbs. As in contemporary accounts, this stress appears to be realised on the final syllable of the first morphological element (the verbal root or first noun in a compound). However, in verbs we are only explicitly told about this second stress where there is more than one root (i.e. verbs with nominal incorporation or serial verbs) or if there is suffixation beyond the OFI, as in Table 15.²⁷ The implication, of course, is that minimally inflected forms do not have an independent stress on the stem. In most vowel-final stems this is irrelevant, since stem and word stresses are predicted to be conflated, but in particular in the consonant-final ones, there is room for both stresses. Unfortunately, Augusta gives no exemplification of these cases.

ROOT+OFI	ROOT+OFI	ROOT+SUFFIX+OFI	ROOT+ROOT+OFI
[[e.'lu] _R -j.-m-i]	[[ko.'n] _R -i.-m-i]	[[j'e.] _R -pa.-'la-j.-m-i]	[[[ʃa.'na.] _R -na.'u-j-i]
'give-IND-2-S'	'enter-IND-2-S'	'carry-CIS-NEG-IND-2-S'	'strike-down-IND.3S'

Table 15: Stress in minimally inflected verbs (vowel and consonant-final), further suffixed verbs, and serial verb constructions (R=root).

In Lenz's work, additional stresses in longer verbs are occasionally transcribed. In practically all cases, these stresses are verbal and surface on the root-final syllable (cf. 17).

- (17) Sample stem stress in (Lenz 1895-1897, R=root)
- a. [[u.'jem.]_R-tu.-'vi.-ŋe] b. [[ki.m]_R-a.-'vu-j] c. [[a.'[sun.]_R-ki.'le-n]
- 'light-REST-3SP-IMP.2S' 'know-FUT-BI-IND.3' 'fatigue-PROG-IND.1S'

Augusta's *Gramática* states that compounds have their stress where it would be expected for the first root, although it often moves to its final syllable. Indeed, in the examples he provides us with in his *Gramática*, as well as in the transcriptions in his texts (1910), stress is consistently on the final syllable of the first root (cf. 18).

²⁷ Augusta tells us that "Verbs with interposed particles [i.e. pre-OFI suffixes] also have two stresses, the primary one being on the verbal root and the secondary, where the given rules require it" (1903: 4)

- (18) Stress on the first root of a compound, according to Augusta:
 a. [ku.'ʃe.-pə.ʎi] b. [fo.'θu.-tʃaʎ.wa] c. [ka.'ʎe.-ka.ʎe]
 'old.lady-soul' 'spine-fish' 'shrub-shrub'

Of course, final stress in the first element of longer words is a feature we find both in the earliest stage of the language and in the contemporary account, presented for PDM as a case of stem-final stress. Clearly, here the definition of *stem* differs from the earliest stages of the language, and even from that at the immediately preceding attested stage (cf. 3.2.4, above). It remains to be seen whether the stem form we find in Lenz and Augusta is compatible with the account given for PDM.

3.3.6 Summary turn of the twentieth century stress

According to Lenz and Augusta, there are two major stress positions for Mapudungun of the period, one on the penultimate mora of the word, and in longer words, another on the final syllable of the leftmost element. There is also some visible alternation in the case of vowel-final disyllables (especially, in Lenz's *Estudios*, for the case of nouns).

Some non-trivial interaction between stress and epenthesis shows up as well, with Lenz and Augusta showing variability in the stressing of final-syllable, interconsonantal [i]~[ə]. In the light of the PDM data, where this vowel receives stress, it seems that Lenz and Augusta's data represent an intermediate stage between a purely post-lexical process of epenthesis, and a vowel-full underlying representation. Indeed, in Lenz's texts from northern and eastern varieties of Mapudungun, we find that stressing the epenthetic is exceptionless, perhaps indicating that here lexicalisation of the process is complete. Tables 16 and 17 give tentative derivations for the three stages in lexicalisation of the epenthetic vowel. Febrés represents the oldest stage, where epenthesis follows stress assignment. Augusta represents the intermediate stage, where nouns are stressed both on the underlying vowel and the epenthetic (the 'spondee' pattern) and verbs vary in the assignment of stress on the (former) epenthetic vowel. Finally, the northern and eastern dialects in Lenz represent the most advanced stage, where the vowel appears to be lexicalised, and hence stressed, as it is in PDM.

In the case of the disyllables, there is also some alternation for vowel-final forms, which seems, at this historical stage to be restricted to phrase-

	Febrés (1765) (North/Center)	Augusta (1903) (Center)	Lenz (1897) (North/East)
Underlying	/ɲamɲ/	/ɲamɲ/	/ɲamɪɲ/
Cycle 1:STRESS	'ɲamɲ	'ɲamɲ	ɲa.'mɪɲ
EPENTH	—	'ɲa.mɪɲ	—
Cycle 2:STRESS	—	'ɲa.'mɪɲ	—
Post-Lex:EPENTH	'ɲa.mɪɲ	—	—
Surface:	[ɲa.mɪɲ]	[ɲa.'mɪɲ]	[ɲa.'mɪɲ]

Table 16: Dialectal (and historical) differences in the position of stress in disyllabic nouns with final syllable interconsonantal [i]~[ə] (Example: [ɲamɪɲ] 'foot')

	18th Century (North/Center)		Augusta (1903) (Center)	Lenz (1897) (North/East)		
UNDERLYING	/kim-n/	/el-n/	/kim-n/	/el-in/	/kim-in/	/el-in/
STRESS	'kimn	'eln	'kimn	e.'lɪn	ki.'mɪn	e.'lɪn
EPENTHESIS	'ki.mɪn	'e.lɪn	'ki.mɪn	—	—	—
Surface	['ki.mɪn]	['e.lɪn]	['ki.mɪn]	[e.'lɪn]	[ki.'mɪn]	[e.'lɪn]

Table 17: Dialectal (and historical) differences in the position of stress in consonant-final roots with a [ə]~[i] vowel preceding [-n] '-IND.1S' marking (Examples: [kim-in] 'know-IND.1S'; [el-in] 'place-IND.1S')

final position or to the position preceding the postposition *mo/mew*.²⁸ In that it is only a tendency, rather than a categorical shift of stress position, and that it refers to phrasal edges and the concatenation of specific words or functional elements, final open syllable stress bears the hallmarks of a phrasal rule.

A key aspect of the verbal stress system, as presented explicitly by Augusta and exemplified often by Lenz, regards the interaction of stem and word-level stress. It appears that where the final syllable of the verbal root and mood-marking are not adjacent (i.e. where there are suffixes beyond the OFI), there are two stresses, one on the final syllable of the root, and the other on the penultimate mora of the word (cf. Table 15 and example 17).

²⁸ For the functions of the postposition see Harmelink (1987).

It is Augusta's claim that the first element in such constructions — the root, or underived stem — bears main stress, while the rightmost stress is secondary. Transcriptions of stress in Lenz's texts, however, show this to be somewhat unstable. Here, the majority of verbal forms have only the rightmost, penultimate-mora stress transcribed, while stem-final stress is only occasionally marked.

In other words, although the two stresses are important to the system, their relative prominence appears to be only marginally relevant. As in the contemporary account, we find here that the culminativity of stress does not seem to be enforced particularly strongly in words with complex morphological structure. What does seem important, however, is to mark the edge of the leftmost constituent, which emphasises demarcation over rhythm and culminativity — a feature we also see in nominal compounds (cf. 18, above). The existence of morphological-boundary-related contours in the stress patterns appears to be more important than the relative height of the peaks.

Finally, accounting for invariant final stress on adjectives, adverbs and pronouns requires some adjustment to the general penultimate-mora stress-assignment system. Interestingly, this pattern appears similar to that of the first stem-element in compounds and verbs. Since I have remained agnostic as to exactly what mechanism brings about stem-final stress, I do the same for these peripheral word categories. I do claim, however, that they must be stressed at the same level as the stems. In a way, the fact that these are all dependent word categories — they do not tend to stand alone, but modify or complement verbs or nouns — may allow us to say that they are not stressed as full prosodic words.

(19) Summary of Mapudungun stress at the turn of the century:

- Nouns:
 - Stressed on a right-aligned moraic trochee.
 - Epenthesis: varies by dialect/stage of the language.
 - [ə]~[i] breaks up clusters.
 - Always post-lexical in the penultimate syllable or earlier.
 - In a final syllable it may be post-lexical (Augusta), or part of the UR and stressable (Lenz).
 - Exceptions:
 - Stress on word-final vowels may occur in disyllables at the end of the utterance.

- Verbs:
 - Word-stress:
 - Falls on the penultimate mora of the stem.
 - The first person plural of the indicative and imperative are stressed on the last pre-OFI syllable, despite the final syllable being closed.
 - The (erstwhile) epenthetic vowel in the -IND.3S marker *-n/-in* is regularly stressed in Lenz's texts and occasionally in Augusta's.
 - Stem-stress:
 - Falls on the final syllable of the root, where not adjacent to the OFI.

4 Preservation and change in Mapudungun stress 1606 – today

As will be clear thus far, the most striking features of stress-related change in the first three centuries of the historical period of the Mapuche language are the system's overall transition from syllabic to moraic trochees (Section 4.1), the redefinition of the domain of the stem (Section 4.2), the lexicalisation of epenthesis in specific morphological and prosodic contexts (Section 4.3), and the development of final-syllable stress in some word-categories (Section 4.4). In what follows, I will examine the stages of each one of these changes, evaluate them with regards to the general situation of the language at the time (Section 4.5), and contrast them with what has actually been preserved despite the changes (Section 4.6). More general conclusions regarding the data for the history of Mapudungun morphology and stress interactions follow (Section 5).

4.1 Changes in weight sensitivity

The earliest observation we have for Mapudungun (Stage I: Valdivia 1606: 74) claims that stress — in all word categories but verbs — falls on the penultimate syllable. Approximately one hundred and fifty years later (Stage II: Febrés 1765, Havestadt 1777), this pattern appears to be restricted only to vowel-final nouns, while consonant-final ones have shifted their stress to the final syllable. Explicit claims at later stages in the language find this pattern to persist (Stage III: Lenz 1895-1897, Augusta 1903, Stage IV: PDM), although there is a tendency to stress a disyllable's

final vowel in certain morpho-syntactic positions (Stages II and III) or in particular registers (Stage IV).

Stage I	Stage II	Stage III	Stage IV	Gloss
('ru.ka)	('ru.ka)	('ru.ka)~ (ru.'ka)	('ru.ka)~ (ru.'ka)	'house'
('pu.kem)	pu.('kem)	pu.('kem)	pu.('kem)	'winter'
ma.('wi.θa)	ma.('wi.θa)	ma.('wi.θa)	ma.('wi.θa)	'woodland'
a.('tʃa.waʌ)	a.tʃa.('waʌ)	a.tʃa.('waʌ)	a.tʃa.('waʌ)	'hen'

Table 18: Changes in nominal stress in di- and tri-syllables: vowel and consonant final (feet in parenthesis — key changes in grey)

We assume that the blanket claim for penultimate stress at Stage I applies not only to nouns but to all other non-verbal word categories. By Stage II, the weight-sensitive pattern seems to apply to these word-categories as well, though we have some initial evidence for stress shifting to the final of two syllables in particular syntactic contexts and registers (see Section 4.4, below). By the turn of the 20th century most disyllabic adjectives, adverbs and pronouns were stress-final, a pattern that continues into PDM (Stage IV).

Stage I	Stage II	Stage III	Stage IV	Gloss
('ko.ɲoʌ)	ko.('ɲoʌ)	ko.'ɲoʌ	ko.'ɲoʌ	'purple'
'we.θa	'we.θa	we.'θa	we.'θa	'bad'

Table 19: Changes in adjectival stress: vowel and consonant final forms (applicable also to adverbs, pronouns and determiners — key changes in grey)

Table 20 looks at the development quantity sensitivity in verbs. Stage I data seem to show a fundamentally morphologically-driven stress assignment system, which places stress on the final vowel before the OFI. However, in the vast majority of the verbal paradigms this position is effectively the vowel of the penultimate syllable. I suggest, therefore, that where the two are not coextensive (e.g. [konimi]), there must be a word-level rule promoting stem stress over the penult.

Our analysis of Stage II showed verbal stress to follow the same overall pattern of Stage I in terms of stressing the stem-final vowel and the head of a right-aligned trochee, the only differences being that the trochee, as in nouns, was considered to be weight sensitive and to take pri-

ority over stem stress. Effectively, this means that the trochee is more clearly surface-true than in Stage I.

In Stage III, verbs are also stressed on a right-aligned moraic trochee and on the final syllable of the stem. At this point, however, the stem appears to be restricted mostly to the verbal root. Where the two stress rules do not target the same syllable, it is Augusta's contention that the stem takes priority over the root, however, this occurs only where the stem is not immediately adjacent to the OFI (1903: 4).

In the data for Stage VI we find a very similar pattern to that of Stage III, the only major difference being that the stem is defined as the root followed by a limited number of mostly valency-changing suffixes (cf. Section 2.2). In this case, the penultimate mora tends to be promoted in the context of clash with the stem-final syllable (which is usually destressed), except when the stem is derived, in which case it takes main stress.

Stage I	Stage II	Stage III	Stage IV	Gloss
('ko.n-ij)	,ko.('n-ij)	ko.('n-ij)	,ko.('n-ij)	'enter-IND.3-S'
'ko.(,n-i.mi)	,ko.('n-i.mi)	ko.('n-i.mi)	,ko.('n-i.mi)	'enter-IND.2-S'
e.(lu.-'fi-n)	e.lu.(-'fi-n)	e.lu.(-,fi-n)	e.,lu.(-'fi-n)	'give-IND.1-S'

Table 20: Changes in right-edge verbal stress (feet in parenthesis, OFI underlined, secondary stress marks are proposed 'demoted' stresses — key changes in grey)

If our data is relatively accurate, the change from syllabic to moraic trochees occurs early in the recorded history of the language, between Stages I and II. For the learner, evidence of final closed syllables being stressed would have most obviously come from the verbal system, in particular from the first person indicative and a number of other forms where the OFI is preceded by a vowel (cf. Table 21). Interestingly, in the remainder of the forms of the paradigm there is a very strong tendency for the final syllable to be open and for stress to fall on the penultimate. As a result, the percept would have been that the stem-final stress — which was main stress as well — was usually also on the penultimate mora, thus paving the way for the reanalysis of the footing as moraic trochees.

Final Closed	e.'lu-n	'-ind.1s'	e.'lu-l-m-n	'-subj-2-p'	e.'lu-j	'-ind.3s
Penult Vowel-final	e.'lu-j.-m-i	'-ind-2-s'	e.'lu-l.-j-u	'-subj-1-s	e.'lu-tfi	'-imp.1s'

Table 21: Stage I stem-stress on a final closed syllable and on a penultimate syllable in a vowel-final verb (example: [elu-] 'give')

4.2 Changes in the stem domain

Stage I displays an almost purely morphological rule for verb stress: prominence falls on the final vowel of the first person singular indicative — invariably the syllable preceding the OFI — which is then reproduced throughout the paradigm with minimal exceptions (cf. Valdivia 1606: 75 and Table 22). Stage II presents a very similar pattern of stem-final stress, though in competition with penultimate-mora stress. By Stage III, however, we find that primary stress is on the root-final syllable (cf. Table 22c,d), except in the cases where the root is followed exclusively by an OFI, in which case the word-level right-aligned moraic trochee is stressed (cf. Table 22b). The Stage IV data shows a similar pattern, where roots may be extended to stems by the addition of a very limited set of suffixes (Table 22d).

	Stage I	Stage II	Stage III	Stage IV	Gloss
a.	e.(<u>lu</u> -j)	e.(<u>lu</u> -j)	e.(<u>lu</u> -j)	e.(<u>lu</u> -j)	'give-IND.3S'
b.	ko.(<u>n-i</u> .mi)	<u>ko</u> .('n-i.mi)	<u>ko</u> .('n-i.mi)	<u>ko</u> .('n-i.mi)	'enter-IND-2-S'
c.	e.lu.-('la-j)	e.lu.(-'la-j)	e.,lu.(-'la-j)	e.,lu.(-'la-j)	'give-NEG-IND.3S'
d.	e.lu.-ɲe.-('la-j)	e.lu.ɲe.(-'la-j)	e.'lu.ɲe.(-'la-j)	e.lu.'ɲe.(-'la-j)	'give-PASS-NEG-IND.3S'

Table 22: Changes in stem stress in verbs (feet in parenthesis, OFI underlined, secondary stress marks denote 'demotion' of stress — key changes in grey)

Importantly, by Stage II the purely morphological pattern of stem-final stress has been phonologised to become penultimate-mora stress. This means that stress in Stage II no longer signals the morphological structure of verbs as clearly. Indeed, when penultimate-mora stress and pre-OFI-syllable stress are not conflated, the latter stress is demoted due to immediate adjacency to the main stress (see Table 22b).

As a result, it is proposed that the marking of the last pre-OFI syllable soon became redundant (between stages II and III), and additional stress retracted to the next prominent morphological position: the root-final syllable, which is what we find for Stage III (see Table 22b,c). This change would have had the important functional role of helping to parse longer verbs, by signalling the edge of the root. It is unclear whether the suffixes that I have identified as stem-extending in Stage IV were also the locus of stress at Stage III (except for passive [-ɲe], which does not bear stress). Nevertheless, by PDM the stem domain (or extended-root domain) came to include these suffixes with core root-semantics, which in turn appear to override penultimate-mora stress in clash positions (see Section 2.2 and Table 22 d).

It seems, therefore, that at every stage of the language there are two types of stress at play, one which is fundamentally morphologically driven and the other which is fundamentally phonologically driven. Their interaction is complex and the predominance of one over the other is not always clear. This said, Mapudungun seems to persistently accommodate stress marking to its morphological signalling function.

4.3 Lexicalisation of epenthesis

While throughout attested Mapudungun the locus for epenthesis seems relatively straightforward — breaking up series of onset or coda consonants —, from Stage III onward, there is evidence, in some contexts, for erstwhile epenthetic vowels becoming part of the lexical representation. Crucially, this would allow the inserted vowel ([i]~[ə]) to be stressed.

In Stages I and II, epenthesis seems to be purely post-lexical, as the inserted vowels are not relevant to the computation of stress. By Stage III, however, both nominal and verbal epenthesis seem to interact with stress in some contexts. Augusta claims, to this effect, that sometimes nominal stress occurs both on a syllable-final epenthetic and on a preceding vowel (the ‘spondee’ pattern of Section 3.3.2), and that verbal epenthetic vowels preceding the suffix [-n] ‘IND.1S’ are also variably stressed (cf. Section 3.3.4). However, in Lenz’s data for northern and eastern dialects it seems that, for both contexts, stress falls on the epenthetic. This latter pattern is what the PDM data present.

	STAGE I	STAGE II	STAGE III (Augusta)	Stage III (Lenz)	STAGE IV	Gloss
a.	[ˈɲam(ɨ)ɲ]	[ˈɲam(ɨ)ɲ]	[ˈɲaˈmɨɲ]	[ɲaˈmɨɲ]	[ɲaˈmɨɲ]	‘foot’
b.	[ˈpɬi]	[p(ɨ)ˈɬi]	[p(ɨ)ˈɬi]	[p(ɨ)ˈɬi]	[p(ɨ)ˈɬi]	‘soul’
c.	[ˈkon-(ɨ)n]	[ˈko.n-ɨn]	[ˈkoˈn-ɨn]	[koˈn-ɨn]	[koˈn-ɨn]	‘enter-IND.1S’

Table 23: Epenthesis (in parenthesis) vs. underlying [ɨ] and its relation to stress in the history of Mapudungun

One of the major insights we can draw from the nominal epenthesis data is the tendency to break-up word-initial clusters seems much weaker than that to break up word-final clusters. Indeed, the stress data shows epenthesis creating a first syllable in disyllables, never interacts with stress (see Table 23b), and is probably more of a post-lexical phenomenon. This contrasts with the state of affairs in final-cluster epenthesis, which eventually becomes part of the representation of the word, taking on stress (as in Table 23a).

An interesting conclusion that seems to emerge from the verbal data is that epenthesis is lexicalised more easily when the morpheme it becomes part of underlyingly has more of a fusional structure — as the case of [-in]/[-n] ‘-IND.1S’ in Table 23c — that is, when it cannot be decomposed into its constituent parts. This can be contrasted with the epenthetic in [-m-in] ‘3-s’, which is never stressed, even in PDM. This seems rather common sense, as in the case of portmanteau morphemes there is no necessary correspondence of one morph to one meaning, hence freeing up the morpheme from corresponding to the other elements of the paradigm. In other words, portmanteau morphemes appear to more readily develop allomorphy.

4.4 The rise of final-syllable stress

With the exception of some vowel-final nouns as well as the right-edge of verbs, PDM shows a clear pattern of final stress. Not only does this apply to adjectives, adverbs and pronouns, but also to the domain of the verb stem, and the first element of compounds. Diachronically, the issue of stress on the final syllable of verb-stems (cf. Table 24a-b) seems rather uncontroversial, as this is the stated position of main stress — always with some caveats — in the first three stages of the language. Although there has clearly been a shift in the position of this stress, it has never been to the first syllable of the root, except in the case of monosyllables. For the case of compounds (cf. Table 24c-f), we only have data beginning in Stage III. In Augusta’s work, however, there are only disyllabic stems as first elements, all of which are stressed on the final syllable, regardless of weight. In the Stage IV data there are also trisyllabic stems as first elements. Here the pattern is different, as it follows that of trisyllables in isolation: final syllables are stressed if closed, otherwise, the penultimate is stressed.²⁹

For disyllabic nouns, although word-initial stress would have been the rule at Stage I, by Stage II the switch to moraic trochees left only monosyllables and vowel-final disyllables as stress-initial. In formal speeches, this proportion would have been further reduced by phrase-final disyllables, which would have had final stress regardless of this syllable’s structure. In Stage III, Lenz’s data appears to show the same pattern. Finally, by

²⁹ We leave aside the issue of headedness and the level of stress of each element in comparison to the other.

	STAGE I	STAGE II	STAGE III	STAGE IV	Gloss
a.	[ko.,n _s -i.-m-u]	[,ko.'n _s -i.-m-u]	[,ko.'n _s -i.-m-u]	[,ko.'n _s -i.-m-u]	'enter-IND-2-D'
b.	[u.'ma,ʷ _s -i.-m-u]	[u,ma.'ʷ _s -i.-m-u]	[u.'ma,ʷ _s -i.-m-u]	[u,ma.'ʷ _s -i.-m-u]	'sleep-IND-2-D'
c.			[fa.'θu.-tʃaʎ.wa]	[fa.'θu.-tʃaʎ.wa]	'spine-fish'
d.			[tʃa.'ŋiʎ-na.'min]	[tʃa.'ŋiʎ-na.'min]	'finger-foot'
e.				[ma.'wi.θa.-tʃe]	'woods-person'
f.				[a.tʃa.'waʎ.-ru.ka]	'hen-house'

Table 24: Stem final stress in verbs (right edge of stem=s) and first PRWD-stress in compounds (secondary stress marks denote 'demoted' stresses)

Stage IV, the alternation has become much more widespread, leaving the cases of disyllables with initial stress as much more of a rarity.

For adjectives, adverbs, determiners and pronouns we have no explicit data for the early stages. In Febrés (1765: 8), the formal speech data never places one of these word categories in phrase-final position, so there is no evidence for stress shifting at Stage II. However, by Stage III the marking of final stress on disyllables within these word-categories is practically exceptionless (when stress is marked at all). This pattern seems well established in Stage IV as well, where penultimate stress is very rare. In other words, here the final-stress pattern seems to have moved forward more quickly and to have ultimately become more pervasive than in nouns, which still show a fair amount of alternation today (see Table 19).

As a result of the processes outlined in this section, by Stage IV, stems and words appear to dependably be stressed on a first syllable only if they are monosyllabic. The fact that trisyllables in the initial position of compounds are not invariably stress-final, following the moraic trochee pattern (see Table 24e), points to the issue no longer being just of preference for the final syllable but rather for actively avoiding the initial one.³⁰

Although the data for final stress in the first element in compounds does not stretch back far enough, it is possible to see the stress-final pattern in verb-stems as far back as we have records of the language. In this sense it is not unlikely that the pattern of stems (and possibly for the first element in compounds) may have spread to other monomorphemic forms in context. The utterance-final rise in formal speech may have been the first possible context for this spreading, which moved relatively quickly across to all non-verbal disyllables. Such a pattern is likely to have

³⁰ In Molineaux 2014: 176–181 I suggest this may be interpreted as an instance initial syllable extrametricality.

been facilitated by the polysynthetic nature of Mapudungun, whereby the difference between word and morpheme boundaries are less absolute.

4.5 The context of change

Adalberto Salas, writing two decades ago, tells us that “the effects of systematic, continuous contact with Spanish are displayed at all levels of today’s Mapuche language” (1992:28-9). Evidently, this includes lexical borrowings at a massive scale, alongside a non-trivial amount of function words, as well as morphosyntactic adaptations including the development of an article system, the reduction of nominal incorporation and the reduction in use of the inverse agreement system (Zúñiga 2006b,a).

Many of the content words relevant to the changes in the Mapuche lifestyle during the conquest (agriculture, sheep-herding, war, and governance) were borrowed early and most likely with little direct contact with Spanish speakers among the general populace. As a result, it is highly doubtful that such words would have been incorporated into Mapudungun following the Spanish stress patterns. It is clear that for segmental patterns, the borrowings of this period tended to transpose the Spanish inventory onto the Mapudungun one, adding no non-native patterns (cf. Hasler & Soto 2012). Although the early grammars give us no evidence for the stress patterns, I assume borrowings would have been adapted to the native system, as is the case, for the most part, even today.

As a result, I assume that the change in the basic foot pattern between Stage I and Stage II cannot simply be attributed to contact conditions, but must be the result of language internal factors such as those suggested in Section 4.1. Even though the moraic-trochee pattern is precisely that of unmarked words in Spanish (cf. Harris 1996), it seems doubtful that these patterns would have kicked off the change, even if they may have helped reinforce it later on.

An interesting possibility is that the preservation of stress-initial disyllabic nouns, as well as the percept of ‘correctness’ for these forms, may be bolstered by Spanish bilingualism at Stage IV. In other words, although we would expect the tendency we see in the peripheral word categories — stressing final vowels in disyllables — to spread to nouns in all syntactic positions, this does not seem to be occurring at the same rate. In the context of practically universal Spanish bilingualism, this seems less surprising, as speakers would have abundant data from new borrowings and from a parallel phonological module to assume that the penultimate mora continues to be the correct position for stress, and to apply a post lexical rule to these at the right edge of the phrase.

4.6 Preservation vs. change

Although here I have focused predominantly on reconstructing the major stress-related changes that have taken place in the 400 years of documented Mapudungun, at least as important as these are the elements that have avoided change in the same period. To this effect there are three persistent traits of the prosodic system that must be highlighted.

4.6.1 End-rule right

Throughout the language's attested history, the right edge of a prosodic domain seems to be the locus of alignment for feet (or syllables, in the cases where I have stipulated morphologically determined stress). This applies both to verbs, and to simplex and complex nouns. Clearly, the question of whether it is the absolute final syllable that is stressed or the head of a right-aligned trochee (syllabic at Stage I, moraic later) is one that causes important noise in the data, especially for disyllabic nouns. However, the global assessment of each one of the different cross-sections obtained for the language shows the general pattern to be one of right-alignment. In this sense, my account differs from the most influential contemporary one: Echeverría & Contreras (1965), which has been taken to show that feet align to the left edge of words.

4.6.2 Left-headed feet

Another fundamental difference we find with the standard interpretation of Mapudungun stress, as presented in Echeverría & Contreras (1965), relates to the headedness of feet. Throughout the four stages I report on here, it appears that the basic foot-structure of the language is trochaic. The exceptions to this rule are context and register-bound in nouns, and circumscribed to peripheral word categories elsewhere. In verbs, although occasionally the right-aligned trochee may be demoted in favour of stem-stress, a final open syllable is never stressed.

As in the case of end-rule right, the influence of the incoming language presents no conflict, the default stress pattern being clearly trochaic as well (in this case moraic). Furthermore, especially in the case of the spreading of final-vowel stress in disyllabic nouns at Stage IV, it may be the case that widespread bilingualism actually prevents the shift, reinforcing the penultimate mora as the locus of stress.

4.6.3 Stress as stem-edge demarcation

Another persistent prosodic feature I present here is that of sub-lexical domains aligning stress to the right edge. Although Spanish, the incoming language, does show features of stress following sub-lexical morphological domains (cf. Roca 2005 for non-verbs and Oltra-Massuet & Arregi 2005 for verbs, among others), this marking does not show the same type of interaction with an independent word-level stress assignment system, as in Mapudungun. In the Amerindian language, stress appears to consistently mark a stem-final syllable (or foot in Stage IV). Where the confluence of penultimate mora stress and stem-final stress (defined as the PRWD minus OFI suffixes) becomes practically exceptionless (at Stage II) the domain of the stem stress is re-defined (apparently as the root-morpheme alone) in order not to be conflated with the word-edge stress and to continue to highlight the morphological structure of the word.

The fact that attested Mapudungun has tended to preserve the boundary marking within complex nouns and verbs gives further grounding to the contemporary claims for demarcative stress. Ultimately, this feature also reinforces the diachronic pattern by which stress is subordinate to morphological structure, rather than the opposite (cf. Molineaux 2014).

5 Summary and conclusions: *Polysynthesis and domain pertinacity*

This paper has examined the known evidence for the phonological system of Mapudungun up to the early twentieth century, and ventured a plausible set of rules for stress assignment at four distinct stages. It is, of course, difficult to ascertain whether the differences between the sets of data are an artefact of the methods for data-gathering and the perception of the researchers involved, or whether they are actual historical differences. Unless there are contradictions in the data from the same period, I have taken the grammarians' reports at face value.

Considering the historical data, as well as the sources for PDM, I assessed the commonalities and differences between the four outlined stages, attempting a diachronic view of the relation of stress and morphological structure.

The major changes identified in the language occur early in the recorded history, when relations between Spaniards and the natives were less fluid, and are therefore unlikely to be contact-induced. Two of these changes were the development of weight-sensitivity and the re-definition of the domain of the stem. Both of these processes appear to be related to the disambiguation of the partial conflation of stem and word-level stress

assignment. The third change — lexicalisation and stressing of epenthetic vowels — seems slightly later, as it is first attested at Stage III. Here, the process seems to be most robust where the morphological structure of the words is less transparent.

Finally, the shift of stress from the first to the second syllable of vowel-final disyllables in non-verbs appears to be a phrase-final phenomenon, and is attested starting at Stage II. By Stage IV, however, the pattern seems to have become predominant in words in phrase-internal contexts. Here, I have suggested that Spanish foot structure may well have contributed to the preservation of the stress-initial pattern in nouns.

The demarcative function of stress in Mapudungun, and its pertinacity (cf. Dresher & Lahiri 2003, Lahiri 2015) across the four stages of the language, is one of the more interesting findings in both the synchronic and diachronic data presented in the preceding chapters. If we, furthermore, take into account the polysynthetic nature of the language, the motivations for this type of phenomenon become more transparent. If the ideal polysynthetic language has single words as full sentences — as is no doubt possible for Mapudungun —, word-stress may have more features of the phrasal type and less of the word-type. As a result, it seems that Mapudungun places a greater value on demarcation (which is typically a phenomenon related to the phrasal level), than on culminativity (which tends to apply within the PRWD).

The issue of lack of clear culminativity is present in the PDM literature overall, where we find alternation between the different grammars as regards the preponderance of stem vs. word level stress. This is perhaps clearest in Smeets's claim that there may be two main stresses in longer words (Smeets 2008: 64). The fact that the data at Stage IV finds the same lack of clear culminativity at the morphosyntactic word level, points to a deep-seated tendency — most likely related to the language's morphological type — for sacrificing culminativity and rhythmic structure in order to highlight the morphological structure of words. From a diachronic perspective, this is particularly interesting since Sala's claim that "a high degree of resistance to change may be seen as an overall, prominent feature of the Mapuche language" (1991: 166). While this seems to hold for segmental and morphological change, prosodic structures seems ever-ready

to change in patterns that preserve and highlight morphological structure.

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Associated material

The key historical Mapudungun texts surveyed in this paper can be accessed at <https://benmolineaux.github.io/>

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