

The dental-alveolar contrast in Mapudungun: Loss, preservation and extension

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Abstract

Dialects of the South American language Mapudungun are claimed to display a dental-alveolar contrast across four manners of consonant articulation: stops, nasals, laterals and fricatives. Such a full, symmetrical system of distinctions among coronals is typologically unique and, as such, is predicted to be unstable. This paper's survey of contemporary data, however, shows that, despite lexical contrast being marginal and dentals being morphologically restricted, the distinction is highly salient to native speakers of the more vital dialects. A careful examination of the pattern's historical roots and diachronic stability, furthermore, allow us to reconstruct it throughout the 400-year textual record. Indeed, the early descriptions and transcriptions shown that, instead of contracting, the contrast expanded, by borrowing the alveolar fricative /s/ from Quechuan and Spanish. The historical and articulatory data shows that while /t̪ n̪ l̪ θ/ are laminal, /t n l/ are apical. Incoming /s/, however, does not follow the pattern, being laminal and prompting a reorganisation of featural contrasts among fricatives. As a result of erosion of native fluency under Spanish contact, loss of dental-alveolar contrast has become commonplace, although there is much variation across speaker, dialect and manner of articulation. Crucially, dialects which had only voiced fricatives until the borrowing of /s/ seem to have added voicing as a new contrastive feature, helping to preserve the coronal contrast among fricatives, even where vitality is reduced.

keywords: Mapudungun, dental consonants, coronals, language contact, contrast

1 Introduction

Mapudungun (ARN, unclassified/isolate) is the endangered, ancestral tongue of the Mapuche people of the Southern Cone of the Americas.¹ Before European invasion (c.1530s), speaker numbers are estimated at around one million (Bengoa

¹Other names/spellings for the language include Mapuche, Mapuzungun, Mapuchedungun and Araucanian (the last now dispreferred).

2000: 21). Today, optimistic counts stand at about 250,000 (Eberhard et al. 2020, Zúñiga and Olate 2017). Despite these rough, large figures, proficiency varies widely and transmission has seen sustained decline (Gundermann et al. 2009), with Spanish-dominant bilingualism the norm, while native education programs remain incipient and insufficient (cf. Loncon 2017).

Our empirical focus is the typologically unique four-manner (stop, nasal, lateral, fricative) dental-alveolar contrast described in the literature on Mapudungun. In Section 2, I examine the standard account, its typological status, and lexical and morphological distribution. I then survey the 400-year written record (Section 3), in order to assess the stability of the pattern. Particular focus is placed on fricatives, since the /θ-/s/-contrast appears to be an innovation. Section 4 surveys the contemporary dialectal data, showing different patterns of maintenance and decay. A discussion and formalisation of the changes in the contrastive system *vis-a-vis* contact ensues in Section 5, with a particular focus on the features of fricatives. Section 6 concludes the paper.

2 Dental-alveolar contrast in Mapudungun

2.1 The standard account

Much of contemporary scholarship on Mapudungun focuses on central varieties, spoken in the western Andean slopes, central valley and coastal areas of Chile’s Araucanía and Los Ríos regions (see Figure 4). It is on the basis of these dialects that the language is traditionally claimed to display a phonemically contrastive, symmetrical series of (inter)dental and alveolar segments (cf. Echeverría 1964, Echeverría and Contreras 1965, Salas 1976, 1992a, Lagos 1981, 1984, Zúñiga 2006), such as can be observed in Table 1. While minimal pairs contrasting the

Table 1: Central Mapudungun consonant inventory, based on Sadowsky et al. 2013

	Labial	Dental	Alveolar	Post-alveolar	Retroflex	Palatal	Velar
Stop/affricate	p	t̪	t	tʃ	tʂ		k
Fricative	f	θ	s	ʃ	ʂ		
Nasal	m	n̪	n			ɲ	ŋ
Lateral		l̪	l			ʎ	
Approximant	w					j	ɥ

two places of articulation do occur for stops, nasals and laterals (see Table 2), these are somewhat rare, as are dental segments more generally (see Section 2.3). For fricatives, only near-minimal pairs may be found, since the alveolar sibilant (/s/) is mostly restricted to borrowings. In their study of the *Lafkenche* (coastal/central) variety of Isla Huapi (Figure 4), Painequeo et al. (2018) show that most speakers

Table 2: (Near-)Minimal dental-alveolar pairs by manner of articulation (from Painequeo et al. 2018 and Augusta 1916)

Stops	Nasals	Laterals	Fricatives
[t̪ən] ‘head louse’	[m̪ə.n̪a] ‘cousin’	[ki.l̪a] ‘bamboo’	[θ̪a.kel] ‘pact/agreement’
[tən] ‘high sound’	[m̪ə.na] ‘much’	[ki.la] ‘three’	[sa.ku] ‘sack’(< Spa.‘saco’)

— especially older ones — consistently contrast dental and alveolar stops, nasals and laterals in both production and perception. Particularly, they find speakers tend to reject dental-consonant target words produced with an alveolar segment (e.g. *[tapəl] for [t̪apəl] ‘leaf’), claiming they sound ‘foreign’. Indeed, despite the marginality of lexical contrasts, speakers have strong intuitions about the distinction. This is reflected in community-led orthographic conventions, where native speakers insist on representing the dentals graphemically (see Salas 1992b: 502–3 and Zúñiga 2001).

Acoustic evidence for the robustness of the contrast in *Lafkenche* is given by Fasola et al. (2015) and Figueroa et al. (2019), who observe that, at the onset of adjacent vowels, dentals cause a greater depression in F2 than alveolars.² In the same dialect, Sadowsky et al. (2013) use static palatography to capture a more nuanced articulatory picture: The dental series shows apical protrusion throughout, while /t̪, n̪, l̪/ also display broad laminal contact on the upper incisors, consistent with laminal interdental articulations.³ The alveolars /t, n, l/, show narrow — likely apical — contact on the alveolar ridge. Finally, while /s/ displays some overlap with other fricative categories,⁴ it is usually realised as [s̪] with a laminal-alveolar articulation. The resulting pattern, in Table 3, is less symmetrical than what we get from viewing the passive articulator alone. The general upshot, however, is that — at least for the more vital *Lafkenche* dialect — Mapudungun does present a discernible phonetic and phonological contrast between the two coronals.

²These two studies focus only on non-fricatives. In Figueroa et al. (2019), the findings are statistically significant only for stops and laterals, a fact that is attributed to the smaller number of tokens available for the dental nasal.

³Unless making a specifically phonetic point, I simply use the term *dental*, since this captures the phonological contrast (but see Mena and Salamanca 2018). Typological surveys, furthermore, do not tend to make distinctions among dentals, since interdental-postdental contrasts are unattested (Ladefoged and Maddieson 1996: 20). The term also avoids the fraught matter of IPA representations of interdentals.

⁴A full analysis of Mapudungun fricatives and affricates, unfortunately, exceeds the scope of this paper.

Table 3: Active and passive articulators for Mapudungun anterior coronals

	APICAL	LAMINAL
AVEOLAR	/t,n,l/	/s/
INTERDENTAL		/t̪, n̪, l̪, θ/

2.2 Typological rarity

Most languages of the world tend to have only one main coronal place of articulation — most frequently alveolar⁵ —, the contrast between dentals and alveolars being fairly rare and usually supported by a laminal-apical contrast (see Butcher 2006). Indeed, at the time of consultation, among the 2100 languages in the *Phoible* database (Moran and McCloy 2019), only 8.9% of languages contrast dentals and alveolars among stops, 7.8% among nasals, 4.1% among laterals and 2.9% among fricatives. The implication is that dental-alveolar contrast is somehow dispreferred, or, in diachronic terms, difficult to develop and/or maintain. With this in mind, Mapudungun — the only language in *Phoible* with four major manner distinctions for the contrast — is an excellent case study for probing the possibilities of its synchronic and diachronic robustness.

2.3 Lexical and morphological distribution

Despite phonological contrasts, there is a definite imbalance between the two coronal series, such that lexical incidence for the dental stops, nasals and laterals is far smaller than for the alveolars. In the case of fricatives, however, the opposite pattern obtains, as seen in Figure 1. Just as striking is the fact that, comparing the overall consonant frequencies in Mapudungun to the occurrence of the same consonants across the languages in *Phoible*, we find that the dental and alveolar fricatives are outliers (see Figure 2). In other words, they violate the strong typological tendency for correspondence between language-internal phoneme frequency and phoneme attestations across the languages of the world (see Gordon 2016: 71-82 for an overview). A further distributional fact about our target segments is that dentals occur only in the root morphemes of the language, while the alveolars — excepting /s/ — are found across the board, in inflectional and derivational elements as well. This pattern suggests that dentals (and /s/) belong to open-class categories only and may have either been recently innovated in roots or lost in suffixes due to their greater markedness (see Bybee 2005).

⁵Overall, /t, n, l, s/, are found in 68%, 78%, 68% and 67% of inventories in the *Phoible*, respectively. /t̪, n̪, l̪, θ/ appear in 23%, 18%, 7% and 4%.

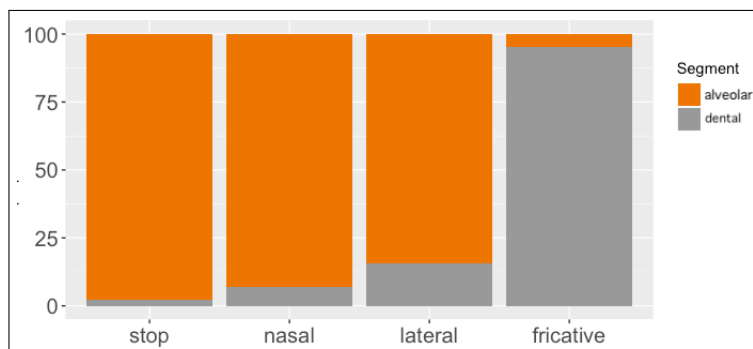


Figure 1: Proportion of lexical items with alveolar vs. dental segments, based on the 5,125 dictionary entries in Augusta (1916)

3 Historical evidence for dental-alveolar contrast

As one of the ‘general languages’ used by colonists for evangelisation and diplomacy across the Americas, Mapudungun has a relatively substantial early textual history. Using data from the *Corpus of Historical Mapudungun* (CHM - Molineaux and Karaiskos 2021), I will show that European missionaries, explorers, and linguists were able to observe the dental-alveolar contrasts throughout the 400-year record and were often at pains to provide suitable descriptions. That being said, early sources vary in their quality, interpretability and regional coverage. This is further complicated by early writing rarely being conducted by native speakers, so there are different phonologies, as well as spelling systems at play in each source.

3.1 The 16th century evidence: Luys de Valdivia (1606, 1621)

Father Luys de Valdivia was part of the first group of Spanish Jesuits to work with the Mapuche in the Mission of Chile. His *Art and Grammar* of Mapudungun, published in 1606, is the earliest printed, surviving grammar and vocabulary of the language. In describing the language’s pronunciation, we find the following claim (Figure 3):⁶

... these three letters *l*, *n*, *t*, aside from the pronunciation they have in our Spanish syllables [la, na, ta] have another pronunciation in this language which should be known in order to avoid mistakes, since the meaning of many words depends on this pronunciation, which is thus: that nearing the tip of the tongue to the teeth, they pronounce [la, le, li, etc.] and [na, ne, ni, etc.], which is different from our first pronunciation...

⁶Here and elsewhere in the paper, translations are my own.

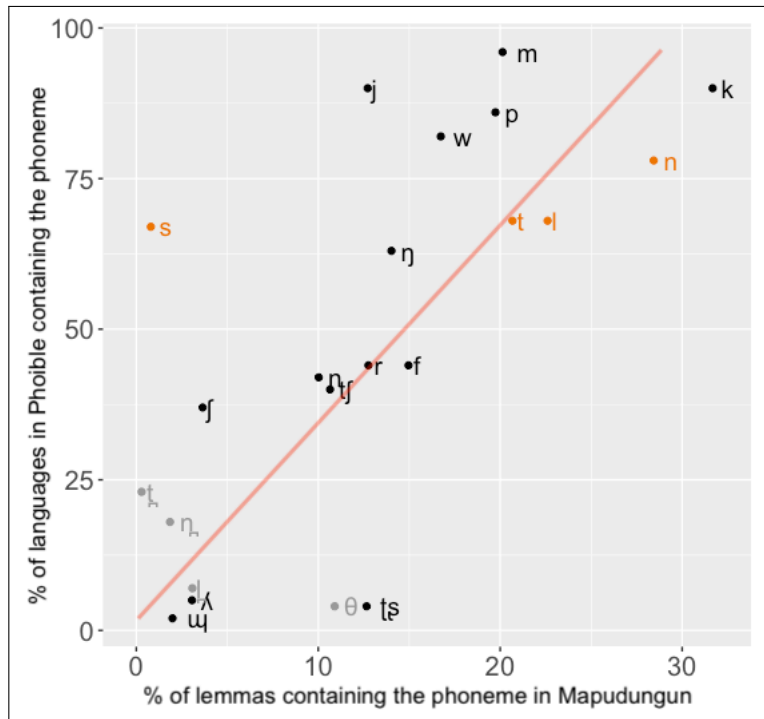


Figure 2: Lexical incidence of Mapudungun phonemes (in Augusta 1916) vs. their attestation in languages of the world (the 2,100 languages in *Phoible*)

Given that Spanish coronal nasals and laterals were alveolar at the time (cf. Penny 2002: Section 2), there is good reason to believe that the given contrast is between “our Spanish” alveolars (<l,n>)⁷ and the “different” dentals (<ɺ,n>). For stops, however, the situation is less straightforward. Indeed, “our” coronal stops in 17th-century Spanish were probably dental (cf. Penny 2002: Section 2), while Valdivia tells us that Mapuche speakers have a “different” <ɺ> for which “they shift the tip of the tongue towards the high palate”(8r).⁸ Since the words spelled with <ɺ> in Valdivia’s vocabulary match the present-day retroflex affricate (/t͡ʂ/) set, we suggest that the contrast was between alveolar and retroflex stops (affrication probably followed shortly). The lexical set which today corresponds to the dental stops, however, shows no graphemic contrast with alveolars, both being spelled <t> (cf. Table 4).

Coronal fricatives are not explicitly treated in Valdivia (1606), however, the lexical set which today contains a dental fricative is consistently spelled with <d>, as in *dihuen* ‘companion’ (cf. Table 5). This is roughly in line with the intervocalic, fricative allophone of 17th-century Spanish voiced dental stops (cf. <d> = [ð] in *ca[ð]a* ‘each’ and [d̪] in [*d̪*]ios, ‘god’, Harris-Northall 1990). The

⁷Throughout, I use angled brackets to represent graphemes (not IPA equivalents).

⁸“arriman la punta de la lengua al pladar alto”

¶ Lo tercero se ha de notar que estas tres letras siguientes l. n. t. de mas de la pronunciacion que tienen en nuestra Española en estas syllabas (la, na, ta) que también se usa en esta lengua; hazen otra pronunciacion con ellas, que es neccssario saberla para evitar la equiuocacion q̄ ay en muchos vocablos, cuya significaciō depende desta pronunciaciō, la qual es desta manera, que arrimando la punta de la lengua a los dientes pronuncia (la, le, li, &c.) y (na, ne, ni, &c.) lo qual no tiene la primera pronunciacion nuestra

Figure 3: Dentals, according to Valdivia (1606: 8r)

Table 4: Words with <l, n, t> vs. <ł, ñ, t̄> spellings in Valdivia (1606)

Grapheme	Entry in Valdivia's <i>Vocabulary</i>	Phoneme	Present-day reflex
<l>	(ł) <i>lamuen</i> 'sister'	/l/	/lamwen/
<ł>	(ł) <i>łan</i> 'death'	/ł/	/łan/
<n>	(n) <i>non</i> 'win'	/n/	/non/
<ñ>	(ñ) <i>ñoyn</i> 'eat too much'	/ñ/	/ñojn/
<t>	(t) <i>tica</i> 'adobe'	/t/	/tika/
<t̄>	(t̄) <i>t̄ecan</i> 'walk'	/t̄/	/t̄ʂekan/
<t̄>	(t̄) <i>t̄ue</i> 'earth'	/t̄/?	/t̄ue/

implication, is that the dental fricative was voiced, as were all fricatives in Valdivia's dialect, given the spellings in Table 5. As we shall see in Section 5.2, this is an important isogloss in Mapudungun today, where fricatives tend to be voiced in the northern varieties and voiceless in the central and southern ones (see Figures 4 and 5). Stops, on the other hand, are always voiceless, so voiced stops borrowed from Spanish are voiceless in Mapudungun (cf. *toninco* < *domingo* 'Sunday', Herckmans 1643). This supports the idea that Valdivia's <d> is not a stop, but a voiced dental fricative. The picture for the alveolar fricatives is less

Table 5: Voiced fricatives in 17c Mapudungun

Grapheme	IPA	Spelling	Gloss	Present Day
<d>	ð	dùgu	'word/thing'	θiŋu
<v>	v/β	voru	'bone/tooth'	fozo
<r>	ʒ	raù	'clay'	ʒau

clear. Spellings in the lexical sets for /s/ include <ç>, <z> or <s>, but these

are rare and appear almost exclusively in words of Spanish or Quechuan (QWE) origin.⁹ The Spanish words — mostly related to Christian doctrine (Table 6) — suggest no phonological incorporation, preserving their original spellings. Quechuan words are likely older, originating in the languages of the Incan Empire, which expanded into central Chile in the 1470s. These borrowings display phonological and morphological integration, however, they seem to preserve the alveolar fricative, otherwise absent from the Mapudungun inventory. A full list of the <ç/z/s> Quechuan borrowings is given in Table 6 (Cusco Quechua [QUZ] reference forms from Middendorf 1890 cf. Moulian et al. 2015 and Sánchez 2020).¹⁰

Table 6: Words with <ç>, <z> or <s> spellings in Valdivia (1606, 1621)

Grapheme	Spelling	Gloss	Source	Spelling	Gloss
<ç>	<i>esperança</i>	‘hope’	Spanish	<i>esperança</i>	‘hope’
<ç>	<i>çuyçuyhue</i>	‘sieve (n.)’	Quechuan	<i>suisuy</i>	‘sieve (v.)’
<ç>	<i>çacin</i>	‘fast (v.)’	Quechuan	<i>sasiy</i>	‘fast (v.)’
<z>	<i>caliz</i>	‘cup’	Spanish	<i>cáliz</i>	‘cup’
<z>	<i>mizquilcan</i>	‘sweeten’	Quechuan	<i>misk’i</i>	‘sweet’
<z>	<i>ezñacan</i>	‘curse’	Quechuan	<i>ñakay</i>	‘damn’
<z>	<i>pizcoytu</i>	‘tops (game)’	Quechuan	<i>p’iskoinu</i>	‘tops (game)’
<z>	<i>pozco</i>	‘yeast’	Quechuan	<i>p’osko</i>	‘sour/bitter’
<s>	<i>Dios</i>	‘god’	Spanish	<i>Dios</i>	‘God’
<s>	<i>ñampas clelu</i>	‘hollow thing’	Quechuan	<i>ñan-pas</i>	‘road-other’

Although from Granada, Valdivia was educated in Salamanca in the late 16c, so would likely have been exposed to Castilian dialects where <ç/z> represented denti-alveolar [ʃ] and <s> represented apico-alveolar /s/ (cf. Sanz-Sánchez 2019). These are likely the target values for the Spanish non-incorporated words. In the Quechuan borrowings, the tendency is for <ç/z> spellings, which indicates that Valdivia probably perceived them to be distinct from Spanish apico-alveolar [ʃ]. In all likelihood, <ç/z> spellings represented a laminal articulation of the sibilant ([ʃ]). This, however, was probably still not fully integrated into Mapudungun phonology, and ultimately did not merge with the native dental.¹¹ Eventually, integrated Spanish borrowings with a sibilant would have joined this category too,

⁹The only exception is *Yzùm*, given as ‘birds’, which looks very much like a variation on *üñüm*, the native word for ‘bird’.

¹⁰*ñampas clelu*, given as “hueca cosa” is least clear. It ends in Mapudungun /kile-lu/ ‘PROGRESSIVE + NON-FINITE’ and, combined with the provided Quechuan source, possibly reflects the meaning ‘that which is being on another road/elsewhere’ (i.e. empty/hollow).

¹¹The only apparent exception to this pattern is the word <pozco> ‘yeast’ in Table 6, which alternates with <puclu> in Valdivia’s *Vocabulary*.

since the dominant New-World Spanish (*seseo*) varieties would have also had a laminal-alveolar [ʃ].

3.2 The 18th century evidence

From the next century, two Jesuit grammars survive: one by Andrés Febrés (1765), a Catalan, and one by Bernhard Havestadt (1777), a German. In both cases, descriptions of the sound system are cursory. Febrés mentions, however, that “in some words, they pronounce *l* and *n* nearing the tip of the tongue to the teeth” (5),¹² but he decides not to transcribe this, as he considers the difference almost imperceptible and lexically rare. Havestadt fails to mention dentals altogether, providing no special marking. This is surprising, given that both missionaries were stationed in northern dialects areas (Angol and Nacimiento, respectively), which we would otherwise expect to be similar to those described by Valdivia. Given Febrés’ comments, it is likely that, due to its low functional load, the place distinction of non-fricative dentals and alveolars was ignored in favour of the more Spanish-like phones [l, n, ɫ]. The only exception to this pattern is the occasional use of <ld> in words with /l/ reflexes (e.g. *pelde* for [peɫe] ‘mud’) which probably represents the lateral with the dental articulation of Spanish coronal stops. Both Febrés and Havestadt use <d> to represent the a voiced dental fricative (/ð/), as did their predecessor. This is in line with other fricatives, such as <v>, which Febrés claims to sound as in Spanish or Catalan ([β/b/v]) for northern Mapuche. Further to the south, however, he tells us it is pronounced “a bit stronger, much like *F*, in the way that Germans pronounce it in the Latin words *parvulus* or *vita*”(5),¹³ which is to say: voiceless. The grammars include lexical lists that use the grapheme <s>. The familiar Quechuan words, such as *misqui* ‘sweet’ crop up,¹⁴ but now there is a wider set of integrated Spanish borrowings, such as <awas> ‘faba/broad bean’ from *habas* ‘faba/broad beans’ or <mansun> ‘ox’ from *manso* ‘tame’ probably taken from *seseo* varieties of Spanish (with one anterior sibilant) and representing [ʃ]. Despite this integration,¹⁵ it seems that /s/ does not join the voiced pattern of the other fricatives, which are voiced. An independent source for the dialectal details of the dental-alveolar contrast can be found in Thomas Falkner’s *A description of Patagonia* (1774). The Mancunian surgeon-turned-Jesuit gives a brief overview of central Mapudungun. Words that elsewhere have a <d> are spelled with either an <s> or a <z>. He appears to use Spanish, rather than English

¹²“en algunas palabras pronuncian la *n* y la *l*, arrimando la punta de la lengua à los dientes”

¹³“un poco más fuerte, que se parece à la *F*, al modo que la pronuncian los Alemanes en estas voces latinas, *parvulus*, *vita*”

¹⁴Some variation is registered by Febrés for these borrowing, alternating between <z,s,j>. These likely represent variation between [ʃ] [ʃ] and [j].

¹⁵Note the phonological changes [β] > [w], [o] > [u], the de-morphologisation of plural <s> and the metonymic shift from the quality of an animal to the animal itself.

grapho-phonemic correspondences,¹⁶ so <z> is likely a voiceless sound representing either Castilian /θ/ or New World /s/. All fricatives, crucially, appear to be voiceless in this area, as evidenced in Table 7.

Table 7: Fricatives in northern (N) and central (C) 18c Mapudungun sources

Febrés (N)	Havestadt (N)	Falkner (C)	Contemp. (C)	Gloss
ad	ad	az	/aθ/	‘face’
dùgu	dngu	sengu	/θiŋu/	‘word, idea, thing’
mansun	mansun	(Dios)	/mansun/	‘ox’
avùln	avuln	afeln	/afelin/	‘be averse/destroy’
cura	cura	cusa	/kuʒa/	‘stone’

3.3 The 19th century and beyond

In the late 19th century, German-born linguist Rudolf Lenz compiled the first scientifically-oriented collection of Mapuche stories and dialectal samples (Lenz 1897). Prompted by his main consultant, Calvún (Segundo Jara), he was also first to recognise the full set of dental-alveolar contrasts (including [t]-[t̪]). He recalls how Calvún would patiently turn to him when pronouncing the key sounds: “to show me the tip of his tongue as it protruded between his teeth”(1897: 130),¹⁷ which he eventually understood to be systematic. Lenz also identifies the dental fricative (p.68), using <d> for realisations with voicing, and <z> for voiceless ones (i.e. “the Castilian <z> of some northern dialects of Spain” p.7). As for <s>, he uses the symbol only in words of Spanish or Quechuan descent, representing /s/ (p.69). The last of the major missionary grammars was published in 1903 by another German, the Franciscan Félix de Augusta. As in Valdivia (1606), three dental-alveolar contrasts are proposed: nasals, laterals and fricatives. Only when he composed his *Dictionary* (1916) did Augusta decide to use the grapheme <t> to represent dental stops. Again, the decision was prompted by an explicit recommendation by one of his main consultants: Domingo Segundo Huenuñamco of Panguipulli (p.XIV). The grapheme <d>, Augusta claims, sounds like Spanish *d* or English *th* (1910: X), which by now would have contrasted with alveolar <s>, pronounced ‘as in Spanish’ (i.e. /s/). Ultimately, then, we find that both Lenz and Augusta, albeit later in their studies of the language, observe the distribution of dentals and alveolars as in the standard system of Table 1. This is true for both the northern and central dialects they describe, although the dental fricative is voiced in the north.

¹⁶For example, the use of <hu> for /w/ (cf. p.144 <huenuy> = /wenuj/ ‘friend’)

¹⁷“para mostrarme la punta de la lengua que se asomaba entre sus dientes”

4 Dentals vs. alveolars in contemporary dialects

In what follows, I give a brief overview of the available data for dialects of Mapudungun today, summarised in Figure 4.

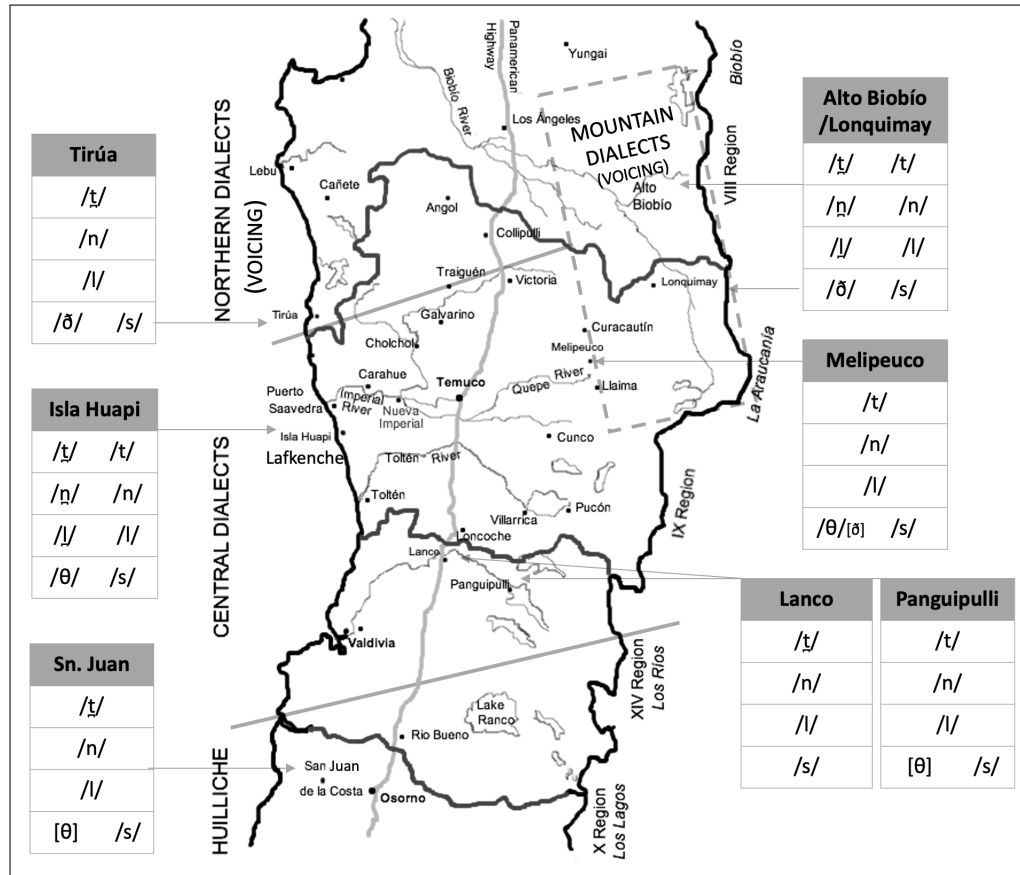


Figure 4: Dentals and alveolars across Mapudungun dialects (major areas follow Croese 1980)

4.1 Voiceless fricative dialects: Central and South

The fully contrastive system in Section 2.1 corresponds to the Isla Huapi dialect, a central, coastal variety (Lafkenche). Here, community members were carefully selected for their proficiency, being L1 Mapudungun bilinguals who still used the language regularly. This yielded clear phonological and phonetic differences between the voiceless dental and alveolar categories across manners of articulation.¹⁸ Looking further afield, we find a less clear-cut pattern. Indeed, describing

¹⁸A similar, fully contrastive, voiceless system is claimed for the area around Victoria, though the source is outdated (Lagos 1984).

the dialect of Melipeuco, in the Andean foothills, Salamanca et al. (2009) find that laterals and nasals are in free variation across dental and alveolar realisations, the latter dominating even in the dental lexical sets. Stops, however, are exclusively alveolar.¹⁹ Among fricatives, alveolar /s/ and dental /θ/ contrast, with the latter alternating freely between voiceless [θ] and voiced [ð] in line with other fricatives ([f]~[v]; [ɟ]~[z]). This shows the area to be near the voicing/voiceless fricative isogloss. For the south-central dialects of Lanco and Panguipulli, Alvarez-Santullano (2016) reports speakers merging nasals and laterals on the alveolar, while the stops merge on the dental in Lanco and alveolar in Panguipulli, though alternations are rampant. Fricatives are consistently voiceless and, for the single Lanco consultant, /θ/ and /s/ have merged on the alveolar, while for the Panguipulli speaker the same process is nearing completion. The southernmost dialect, known as *Huilliche*, is described by (Sadovsky et al. 2015) for San Juan de la Costa. As in Lanco dialect, stops have merged on the dental, while nasals and laterals do so on the alveolar.²⁰ For fricatives, which are voiceless (cf. [f-ϕ-x], [θ-s-h], [ɟ]), the dental set is often realised as alveolar, but not vice-versa. As a result, a merger towards /s/ is nearing completion.

4.2 Voiced fricative dialects: Northern and Mountain

The coastal variety of Tirúa is shown by (Salamanca and Quintrileo 2009) to have mostly lost the target contrast for non-fricatives (though some variation remains). Fricatives are predominantly voiced ([v-β], [ð], [z]), except for /s/, which contrasts with /ð/.²¹ For the Alto Biobío mountain varieties (*Pehuenche*), the phonemic status of dentals is debated. Sánchez (1989: 293) rejects their contrastiveness while Salamanca (1997) finds contrast among stops, nasals and laterals. Salamanca et al. (2017) revisit the issue, with a larger dataset including palatogram, audio and video evidence, concluding that competent speakers consistently use dentals in the relevant lexical sets. However, among young, mobile speakers, different degrees of free variation between dentals and alveolars are evident. As with the Tirúa dialect, fricatives are consistently voiced, excepting /s/, which contrasts with /ð/. This same pattern is found in the other described *Pehuenche* area, Lonquimay (Sánchez and Salamanca 2015).

¹⁹This is an interesting finding, as loss of contrast tends to go towards the dominant Spanish pattern elsewhere (see the SCM data in Section 4.3). The only other exception seems to be Panguipulli, where unconditioned alternation seems to favour the alveolar.

²⁰The erstwhile lateral dental is sometimes realised as the [ɫ] series, also acceptable in Spanish.

²¹A further northern coastal variety — Los Álamos — is described by Saldivia and Salamanca (2020) with identical outcomes, though with some receding evidence for contrast amongst stops.

4.3 The *Sounds Comparisons* evidence

The wealth of phonetic and phonological studies on our target contrast is surprising for a South American language. However, the methodologies and transparency of data vary widely, making comparisons difficult. Here, the *Sounds Comparisons* project for Mapudungun (SCM, Sadowsky et al. 2019) gives some perspective, providing more homogeneously-gathered, accessible data in the form of audio and IPA-transcribed speaker samples for 224 lexical items across 38 locations in Chile and Argentina. A quick look at the distribution of dentals vs. alveolars in key words for stops (*füt'a* ‘husband’ vs. *pütokon* ‘drink water’), nasals (*wen'üy* ‘friend’ vs. *tranan* ‘mash’) and laterals (*l'an* ‘die’ vs. *lamngen* ‘sister’) shows a striking pattern where only the *Lafkenche* items display the contrast, while elsewhere only the sounds that match the Spanish phoneme are evidenced. The reasons behind the discrepancies between the localised studies and the SCM are not altogether clear, but are likely to be attributable to the selectiveness of consultant sampling in the former. For the fricatives (see Figure 5), however, the contrast seems much more robust across the SCM data, even if occasional overlap of categories occurs, particularly in southern and eastern dialects. Reassuringly, the fricative voicing isogloss is clearly observable.

5 Changes in the dental-alveolar contrast:

5.1 Contact and the development of new contrast

Throughout our 400-year survey, we have seen that the dental-alveolar contrast consistently rears its head in the more careful descriptions and transcriptions. This is certainly the case for / η /–/n/ and / λ /–/l/, highlighted already by Valdivia (1606). Contrast in stops is not explicitly observed until almost three centuries later, by Lenz (1897), yet it is unlikely to have emerged in that lapse, as we find some evidence — at least residual — for equivalent lexical sets across most contemporary dialect areas. The difficulty in perceiving this contrast is probably the result of the lexically rarer variant, / t^h /, being expected for L1 Spanish descriptions. Indeed, the first observations of the contrastive nature of /t/–/ t^h / are only made when native speaker judgements are taken seriously (see Section 3.3).

By analysing the graphemic repertoires of early missionaries we reconstructed the antecedent of present-day / θ / as / δ /; a phoneme we assume to be native to the language (albeit circumscribed to root-morphology, cf. Section 2.3). /s/, we further ascertained, emerged as a result of contact, first with Quechuan and then with Spanish. While the early recorded borrowings are few, the typological frequency of /s/ across the languages of the World (67% of [Phoible](#) inventories) suggests its relative unmarkedness, and hence its ease of adoption. Placing /s/ in the otherwise symmetrical dental-alveolar system, furthermore, should have been

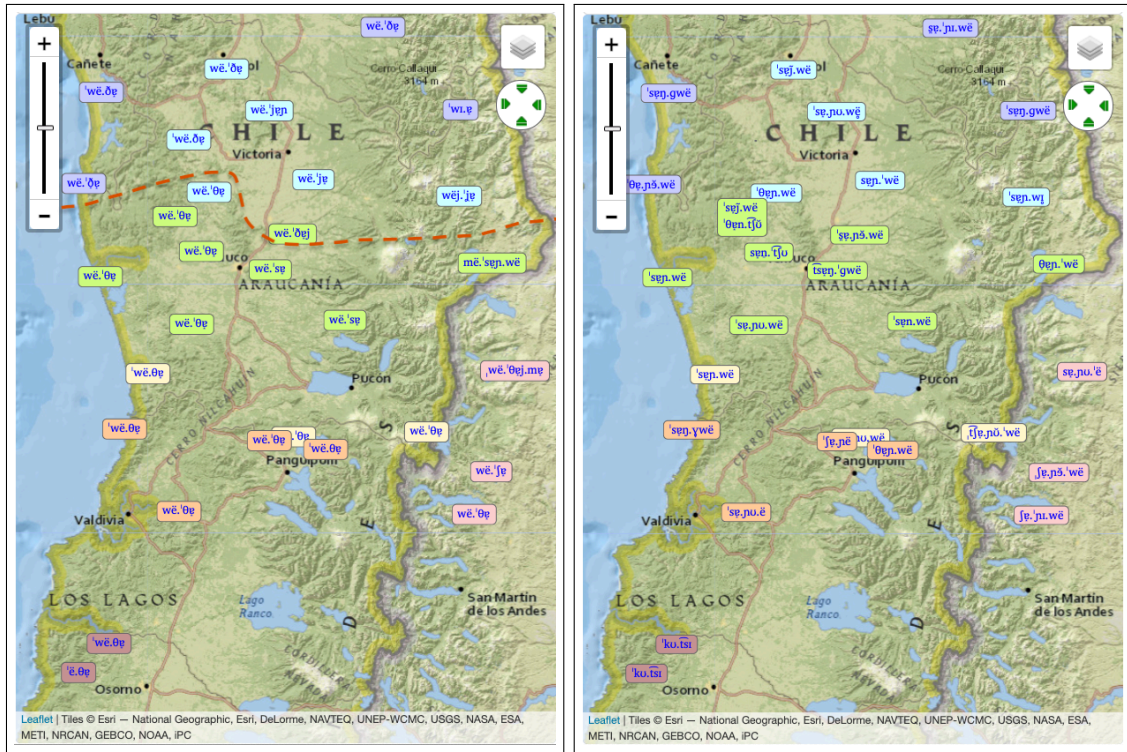


Figure 5: Pronunciations of *weda* ‘bad’ (left - fricative voicing isogloss superimposed) and *sañwe* ‘pig’ (right, from Spanish *saín* ‘animal fat’ + the instrumental suffix *-we*), in the *Sounds Comparisons: Mapudungun* database.

a fairly economical change (Clements 2003). The key featural distinction between dentals and alveolars among stops, nasals and laterals, however, seem to fail to produce the right contrast for the dentals. Indeed, dental-alveolar contrasts have long been argued to be fundamentally characterised by laminal ([+DISTRIBUTED]) vs. apical ([–DISTRIBUTED]) features (Chomsky and Halle 1968, Clements 2009, Rice 2011), a pattern that does not obtain among present-day Mapungun fricatives, which are both laminal (cf. Table 3). The phonetic details of Spanish sibilant adaptations into Mapudungun also underscore this pattern. Indeed, while most of these borrowings show historical <s> spellings and contemporary [ʃ] pronunciations (cf. Table 7), some early Spanish <s> loans are spelled with <ch> and are still often pronounced [tʃ] (cf. Febrés 1765: <chiñur> ‘Spaniard’ < *señor*). This reflects the early heterogeneity of Spanish dialects coming into contact with the Native American languages. The first group of borrowings are likely to originate in southern Peninsular *seseo* varieties with a single sibilant phoneme (laminal [ʃ] = <s>), while the latter probably come from *distinción* dialects such as Castilian, which distinguish [ʃ] and [ç] (<ç/z> and <s>). Crucially, apical-alveolar [ç] was likely perceptually and featurally closer to the Mapudungun

voiceless post-alveolar affricate /tʃ/ = <ch>, than to the voiced dental fricative /ð/ = <d> (cf. Hasler and Soto 2012: 98) or, indeed, to the incoming laminal [ʃ]. The population, power and lexical dynamics that led to borrowings coming from one dialect or another are unclear (see Sanz-Sánchez 2019 for a pan-American view). However, the pattern gives further evidence that <s> was never apical in Mapudungun, but must have eventually contrasted with /θ/ via a different feature than the other dental-alveolar pairs. A well-established candidate for this role is [\pm strident] (cf. Kim et al. 2015), as given in Table 8.

Table 8: Proposed features for key Mapudungun coronals

	DISTRIBUTED	STRIDENT	ANTERIOR
/t n l/	–	–	+
/ṭ ṇ ḷ θ/	+	–	+
/s/	+	+	+
/tʃ/	–	+	–

While there were other strident phones in pre-contact Mapudungun, the feature [STRIDENT] was not key to any phonemic contrasts. If we take features to be specified in a language only if they are contrastive (as in Modified Contrastive Specification: Dresher 2009, Hall 2011), the feature [+STRIDENT] in /tʃ/ is redundant because Mapudungun has no other affricates with the specification [-DISTRIBUTED, -ANTERIOR]. However, the adoption of /s/ meant that [STRIDENT] must have become specified in the contrastive system of Mapudungun. This innovation is particularly interesting in that it involves a far less economical change to the language’s contrastive system than adapting Spanish /s/ to fit the apical series.

5.2 Fricative voicing: diatopy and diachrony

Compared to the languages of Africa and Eurasia, the Americas — and the Southern Cone in particular — make little use of voicing contrasts (cf. [WALS](#) data in Maddieson 2013). Historically, Mapudungun lacks obstruent voicing altogether, with the quirky distributional fact that fricatives in northern dialects are, by default, voiced, while in central and south dialects they are voiceless. Here, I have observed that the isogloss separating these varieties must precede the written record. In the northern, voiced-fricative dialects, however, the eventual phonemization of /s/ would have created a less predictable voicing pattern. This new contrast, I will argue next, is likely to have played a role in the preservation of both members of the dental-alveolar fricative pair, despite ongoing language marginalisation and loss of vitality.

5.3 Loss of contrast

Mapudungun is in the process of losing the dental-alveolar contrast. Yet this development is not uniform across dialects, speakers and manners of articulation. Polar extremes are seen in the Isla Huapi variety, where competent speakers seem to preserve a robust four-manner contrast, and in the Huilliche variety, where the few remaining speakers have almost completely merged the dental-alveolar pairs across all four manners, always in favour of the sound matching the Spanish phoneme. These two poles also mirror the loss of fluency and reduced transmission in said communities. Detailed comparative data for the vitality of Mapudungun dialects is limited, yet we can ascertain that Central *Lafkenche* varieties are at once remote and vital, with cultural and oral literature traditions very much alive (Painequeo et al. 2018). Huilliche, on the other hand, is spoken by a very small number of elders and has long been identified as moribund (Alvarez-Santullano 1992, Sadowsky et al. 2015).²² Among central dialects, Melipeuco, Panguipulli and Lanco varieties show loss of the dental-alveolar contrast in stops, nasals and laterals. While Melipeuco speakers preserve the fricative contrast, Panguipulli speakers appear to be in the process of merging them (on /s/), a process that is complete in Lanco. The reports in the relevant descriptions highlight changes to the communities' linguistic makeup as a result of increased contact with major urban settlements (Melipeuco, near Temuco) and greater mobility (the Panamerican highway cross-sects Lanco). Mountain dialects are recognisably well preserved, due to their remoteness (Gundermann et al. 2011). Here, dental-alveolar contrast is maintained throughout (Salamanca et al. 2017). In northern coastal varieties (Tirúa, Los Álamos), however, vitality is lower and interaction with non-indigenous society, more intense (Gundermann et al. 2011). Unsurprisingly, robust contrast persists only among fricatives (Salamanca and Quintrileo 2009, Saldivia and Salamanca 2020).

Beyond the clear correspondence between vitality and contrast, we see greater degrees of contrast-maintenance among fricatives. This sub-category is not only distinct in being the most recently developed dental-alveolar pair, it is also set apart by articulatory detail (Section 2.1), frequency patterns (Section 2.3), and featural specifications (Section 5.1). A closer look at diatopy, however, suggests that contrast-preservation is also related to the fricative voicing patterns: Where fricatives are voiceless and other dental-alveolar contrasts are lost, the tendency is for contrast-loss among fricatives too (see Lanco, Panguipulli and San Juan). Where fricatives are historically voiced (north/mountain), we see that it is possible for these to preserve the dental-alveolar contrast, despite its loss among stops,

²²The main argument in this latter paper is, precisely, that Huilliche should not be seen as a separate language from other Mapudungun dialects — as has been claimed elsewhere (Eberhard et al. 2020: HUH) — but rather that its more substantial phonic differences are the result of advanced attrition.

nasals and laterals. We see this to be the case in Tirúa and, to the extent that fricatives alternate voicing in Melipeuco, we see it there too.²³

The available data, therefore, suggest that among the northern, fricative-voicing varieties, the dental-alveolar contrast is supported by a voicing contrast. That is, the salience of the voicing contrast amongst increasingly Spanish-dominant speakers is likely to facilitate the maintenance of the dental contrast in fricatives. From a featural perspective (in Modified Contrastive Specification), we may formalise the change as follows: In voiceless dialects, [\pm DISTRIBUTED] is being removed from the bottom of the feature hierarchy (6a-b), closely followed by [\pm STRIDENT] (6b-c). In voicing dialects [\pm VOICE] — heretofore a redundant, enhancement feature — has become specified for fricatives, maintaining the key contrast (7a-c).

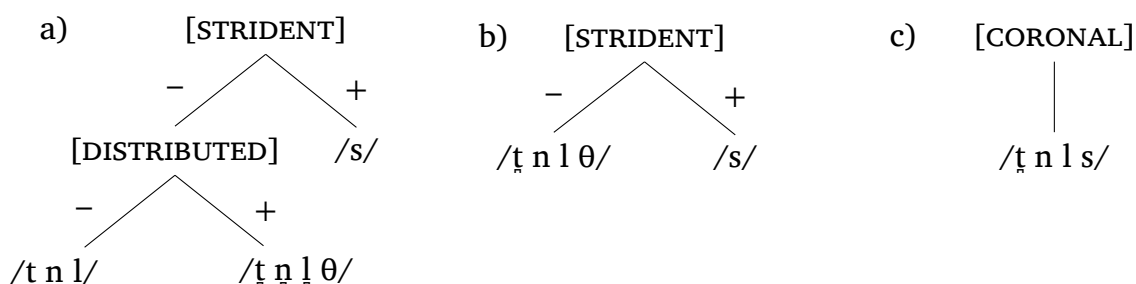


Figure 6: Proposed stages of feature-specification loss in voiceless fricative dialects of Mapudungun

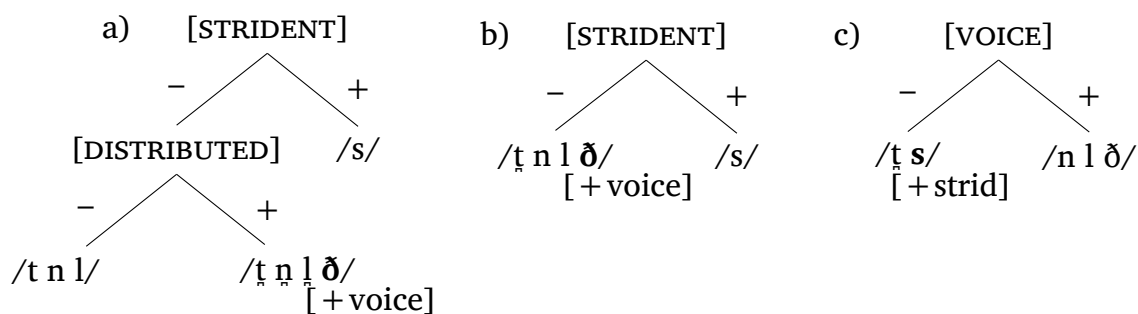


Figure 7: Proposed stages of feature-specification re-ranking in voiced fricative dialects of Mapudungun

²³The account of Alto Biobío given by Sánchez (1989) also follows this trend.

6 Conclusions

The Mapudungun data presented here points to the fact that, while typologically fairly rare, the dental-alveolar contrast can be maintained and even expanded over time in contexts of linguistic vitality, even with no significant areal support and substantial imbalance in frequency. In cases of loss of linguistic vitality, nonetheless, the contrast tends to quickly disappear unless additional features can be relied upon for its maintenance. Under the asymmetric contact conditions of Mapudungun *vis-a-vis* Spanish, many dialects have followed this path to contrast loss. Upon closer inspection, however, not all dental-alveolar contrasts are equivalent. Indeed, the fricative pair differs from the stops, nasals and laterals not only by virtue of being newly-developed, but also in lacking a laminal-apical distinction. From a typological perspective, this is interesting, given that other languages that extensively exploit the laminal-dental vs. apical-alveolar contrast, either lack fricatives altogether (e.g. Australian languages cf. Fletcher and Butcher 2014) or do not exploit the contrast amongst them (e.g. Dravidian languages cf. Arsenault 2012). I have shown that, despite the theoretical possibility of joining a well-established laminal-apical contrastive system, the /s/ phoneme fails to do so. As a result, there is no evidence for the integration of fricatives into such an ‘economical’ system. Whether this is the result of pressures emerging from the contact conditions, or from structural constraints alone, remains impossible to determine. The new phoneme, /s/, has brought with it, furthermore, a new voicing contrast in the northernmost dialects, which enhances the dental-alveolar opposition, further dispensing with the laminal-apical contrast. At bottom, the integration of this new, unmarked segment is a contact-induced change, but one with Trojan-horse-like consequences for the language’s overarching system of contrasts. Finally, I hope to have shown that detailed examination of the historical record, as well as close dialectal comparisons (which take native speaker intuitions seriously) are key tools for allowing us to turn back the sands of time and view what Indigenous American languages have gained and lost.

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