PHONOLOGICAL TYPOLOGY
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Contrastive feature hierarchies as a new lens on typology

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Introduction

My paper addresses a question raised in the workshop proposal:

Phonological typology vs. phonetic typology
(same / different?)

I will propose a way of looking at phonological typology that is clearly different from phonetic typology.

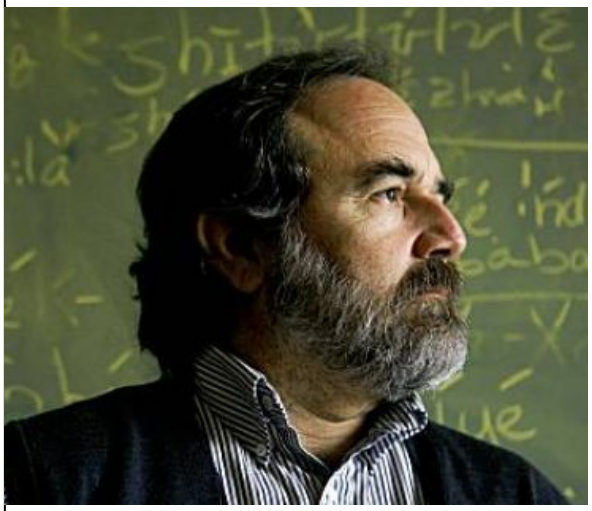
In particular, I will propose that contrastive feature hierarchies offer a new lens on typology, while also shedding light on synchronic and diachronic phonological patterns.

Introduction

The talk is organized as follows:

- General remarks on typology and phonological contrast
- Contrastive feature hierarchies
- Contrast and activity: Classical Manchu example
- Synchronic typology: Labial harmony and the relative ordering of [labial] and [coronal]
- Diachronic typology: Algonquian vowel systems
- Areal typology: Ob-Ugric vowel systems
- Conclusions

Phonological typology



Following Hyman (2007), the kind of typology I will be concerned with is 'an underlying one, based on phonological analysis, not on surface inventories'.

Hyman cites Vajda's (2001) view of phonological typology: '[. . .] it is possible to classify languages according to the phonemes they contain [. . .]. Typology is the study of structural features across languages. Phonological typology involves comparing languages according to the number or type of sounds they contain.' [emphasis added by BED]

Phonological typology

I will build on this view by advancing a specific notion of the terms 'phonemes', 'structural features', and 'number or type of sounds'.

In the same paper, Hyman (2007) cites Sapir's (1925: 43) 'intrinsically typological' idea that 'two languages, A and B, may have identical sounds but utterly distinct phonetic [read: phonological] patterns'.

Sapir also constructs two languages C and D that illustrate the converse situation: phonetically their sounds are quite different, but their 'pattern alignments' are isomorphic:

Different phonetics, similar pattern alignments

	h		w	j	l	m	n
p		t	k	q			
b		d	g	ɢ			
f		s	x	χ			

Language C

Sapir arranges the phonemes this way.

	h		v	ʒ	r	m	ŋ
p^h		t^h	k^h	q^h			
β		ð	ɣ	ʁ			
f		ʃ	ç	ħ			

Language D

He justifies the positions of /v/ and /ʒ/ by their phonological behaviour.

Sapir (1925)

"And yet it is most important to emphasize the fact, strange but indubitable, that a pattern alignment does not need to correspond exactly to the more obvious phonetic one."

Edward Sapir, Sound patterns in language, *Language* 1: 37–51, 1925.

Different phonetics, similar pattern alignments

	h		w	j	l	m	n
p		t	k		q		
b		d	g		ɢ		
f		s	x		χ		

	h		v	ʒ	r	m	ŋ
p^h		t^h	k^h		q^h		
β		ð	ɣ		ʁ		
f		ʃ	ç		ħ		

Language C

The isomorphic alignments can be understood as indicating that corresponding phonemes have the same *contrastive* values.

Language D

Contrastive specifications

The chart below represents one possible way of suggesting what the contrastive specifications might be.

		labial	coronal	dorsal	post-dorsal
obstruent	voiceless stop	p/p^h	t/t^h	k/k^h	q/q^h
	voiceless spirant	f/f	s/ʃ	x/ç	χ/ħ
	voiced	b/β	d/ð	g/ɣ	ɢ/ʁ
sonorant	nasal	m/m	n/ŋ		
	liquid		l/r		
	glide	w/v	j/ʒ	h/h	

Contrastive specifications

In each cell, the first sound is from C, the second from D. The differences between them do not involve contrastive features.

		labial	coronal	dorsal	post-dorsal
obstruent	voiceless stop	p/p^h	t/t^h	k/k^h	q/q^h
	voiceless spirant	f/f	s/ʃ	x/ç	χ/ħ
	voiced	b/β	d/ð	g/ɣ	ɢ/ʁ
sonorant	nasal	m/m	n/ŋ		
	liquid		l/r		
	glide	w/v	j/ʒ	h/h	

Contrastive specifications

Some phonemes appear to be in the wrong place, suggesting that their underlying specifications are like their counterparts.

		labial	coronal	dorsal	post-dorsal
obstruent	voiceless stop	p/p^h	t/t^h	k/k^h	q/q^h
	voiceless spirant	f/f	s/ʃ	x/ç	χ/ħ
	voiced	b/β	d/ð	g/ɣ	ɢ/ʁ
sonorant	nasal	m/m	n/ŋ		
	liquid		l/r		
	glide	w/v	j/ʒ	h/h	

Contrastive specifications

Some phonemes appear to be in the wrong place, suggesting that their underlying specifications are like their counterparts.

These types of examples in particular have been much discussed in connection with how abstract Sapir's theory of phonology was.

Less attention has been paid to the other examples, which don't appeal to abstractness, but which show the importance of establishing the contrastive properties of segments.

sonorant	nasal	m/m	n/ŋ	
	liquid		l/r	
	glide	w/v	j/ʒ	h/h

Contrastive specifications

For example, the obstruents in red are contrastively voiced and redundantly stops or spirants.

		labial	coronal	dorsal	post-dorsal
obstruent	voiceless stop	p/p^h	t/t^h	k/k^h	q/q^h
	voiceless spirant	f/f	s/ʃ	x/ç	χ/ħ
	voiced	b/β	d/ð	g/ɣ	ɢ/ʁ
sonorant	nasal	m/m	n/ŋ		
	liquid		l/r		
	glide	w/v	j/ʒ	h/h	

Contrastive specifications

No abstractness is at issue here, but we have to distinguish between contrastive and non-contrastive properties.

		labial	coronal	dorsal	post-dorsal
obstruent	voiceless stop	p/p^h	t/t^h	k/k^h	q/q^h
	voiceless spirant	f/f	s/ʃ	x/ç	χ/ħ
	voiced	b/β	d/ð	g/ɣ	ɢ/ʁ
sonorant	nasal	m/m	n/ŋ		
	liquid		l/r		
	glide	w/v	j/ʒ	h/h	

Contrast and synchronic analysis

Thus, for Sapir the pattern alignment of a phoneme amounts to its contrastive status, which is not determined by its phonetics, but is a function of its phonetic and phonological behaviour.

Thus, a synchronic analysis of the phonology should, among other things, give an account of the contrastive features of each phoneme.

Contrast and diachronic analysis

Prague School phonologists have argued that the contrastive properties of phonemes also play an important role in phonological change.

The insight that phonological change may involve a reorganization of the phonemes of a language goes back to Jakobson (1931):

Contrast and phonological change

'Once a phonological change has taken place, the following questions must be asked:

What exactly has been modified within the phonological system?

…has the structure of individual oppositions [contrasts] been transformed? Or in other words, has the place of a specific opposition been changed…?'

Roman Jakobson, Principles of historical phonology, first published in German in *TCLP*, IV (Copenhagen, 1931).

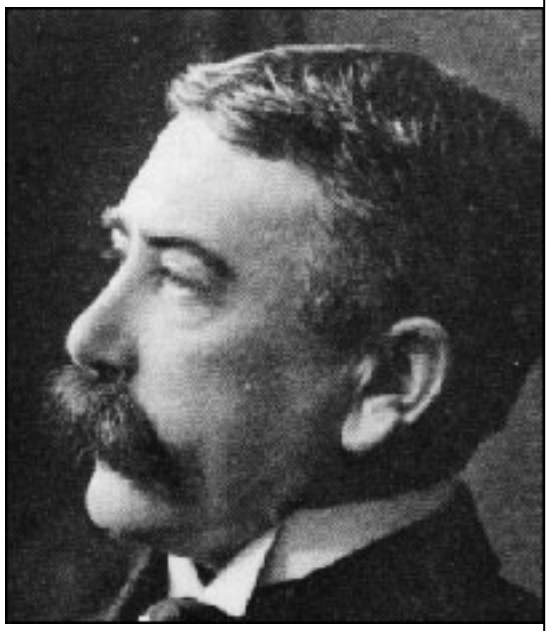
Problems of contrast-only theories

It should be noted that phonological theories that put the emphasis on contrast have not been unproblematic.

In pre-generative structuralist theories, synchronic grammars were composed of contrasting elements locked into systems of oppositions.

Problems of contrast-only theories

If one takes too literally Saussure's (1972 [1916]: 166) dictum that

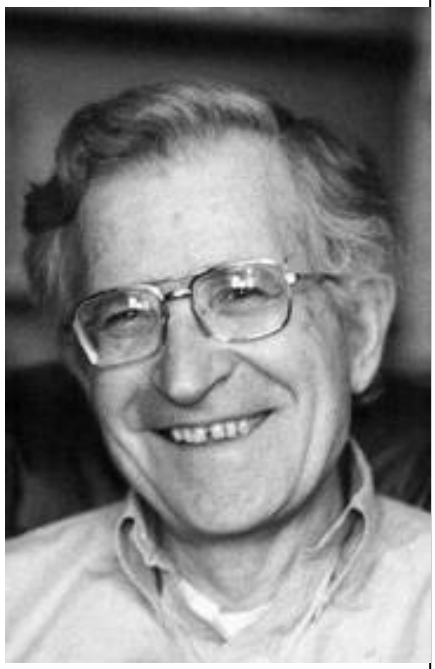


'dans la langue il n'y a que des différences . . . sans termes positifs'

then grammars become incommensurable, and one has no way to relate successive stages of a language, or even closely related dialects (Moulton 1960).

Rule systems

Generative grammar (Chomsky & Halle 1968) solves this problem by construing phonology as a system of rules that mediate between underlying (lexical) and surface (phonetic) forms.



Now, grammar change takes the form of the addition, loss, reordering, or restructuring of rules.

Rule systems versus only contrast

Kiparsky (1965) demonstrated that a series of changes in Armenian dialects can be understood in terms of the spreading of three rules; furthermore, his analysis

'highlights the pointlessness of a structural dialectology that...distinguishes dialects according to points of structural difference [i.e. the number of contrasting phonemes] rather than according to the innovations through which they diverged'.

Contrast in rule-based phonology

The above show the inadequacy of a phonology that deals only in structural points of contrast ('differences'), without also including substantive properties ('positive terms'), including features and a system of rules or constraints.

I think that generative grammar went overboard, however, in jettisoning the structuralist notion of language-particular contrast.

I will argue that contrast plays a crucial role in synchronic and diachronic phonology, and hence in phonological typology.

A theory of contrast



To implement contrast in an explicit theory, I borrow an idea from Jakobson and his collaborators (Jakobson, Fant & Halle 1952, Jakobson & Halle 1956), that was called 'branching trees' in the literature of the 1950s and 1960s:

The contrastive hierarchy

Contrastive features are assigned by language-particular feature hierarchies.

I call it the Successive Division Algorithm (Dresher 1998, 2003, 2009):

Assign contrastive features by successively dividing the inventory until every phoneme has been distinguished.

As a first approximation I assume further that phonology computes only contrastive features, in keeping with the Contrastivist Hypothesis:

A theory of contrast

The Contrastivist Hypothesis (Hall 2007)

The phonological component of a language L operates only on those features which are necessary to distinguish the phonemes of L from one another.

That is, only contrastive features can be phonologically active.
If this hypothesis is correct, it follows as a corollary that

Corollary to the Contrastivist Hypothesis

If a feature is phonologically active, then it must be contrastive.

A theory of contrast

This corollary suggests a working heuristic: assume that active features are contrastive, and find, if possible, a feature ordering that fits the observed patterns of activity.

I believe that this heuristic represents the practice of many descriptive phonologists, minus the requirement that all active features are necessarily contrastive.

That is, phonologists typically limit their analyses to those features that are relevant to the workings of the language, and these active features also serve as the contrastive features, as far as possible.

Markedness

One final assumption is that features are binary, and that every feature has a marked and unmarked value.

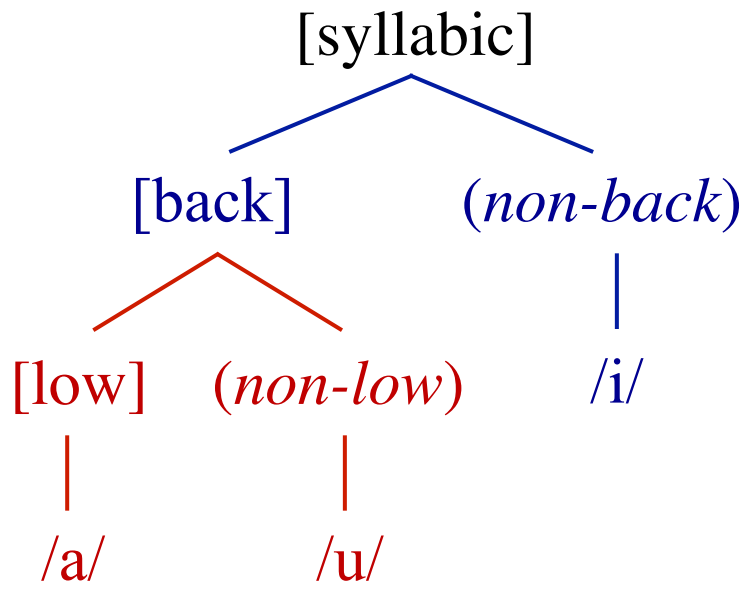
I assume that markedness is language particular (Rice 2003; 2007) and accounts for asymmetries between the two values of a feature, where these exist.

I will designate the marked value of a feature F as [F], and the unmarked value as (*non-F*).

How the contrastive hierarchy works

For the hypothetical inventory /i, a, u/, here are two possible contrastive hierarchies and the feature specifications that they produce:

[back] > [low]



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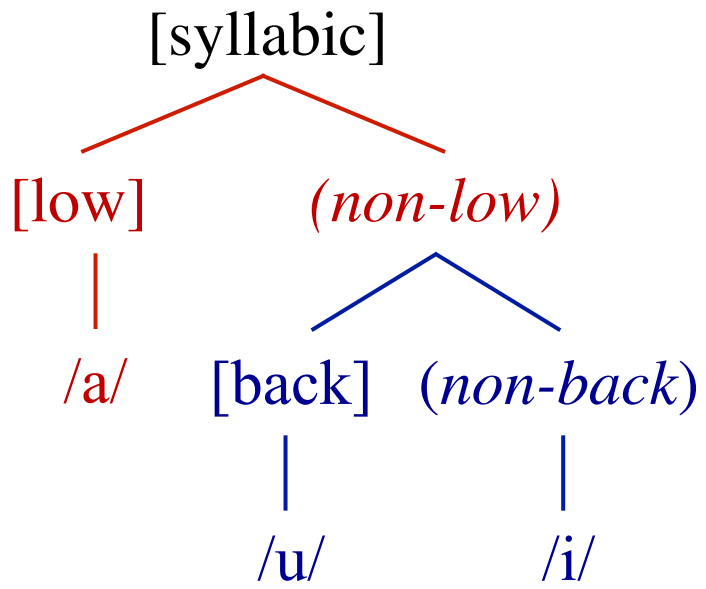

What does the hierarchy do? Synchrony

1. The hierarchy constrains phonological activity:
Only contrastive features can be phonologically active.

Which phonemes can trigger backing?

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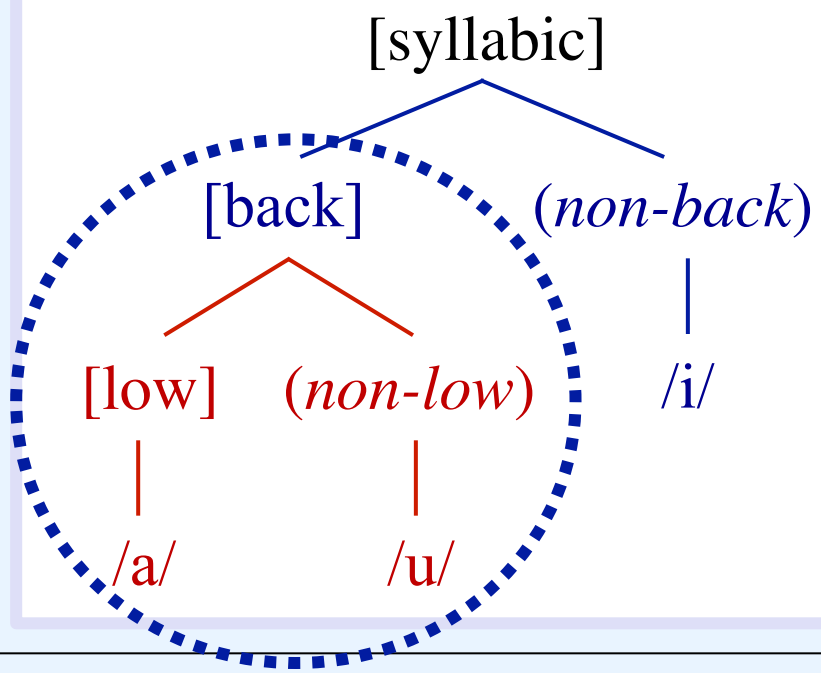

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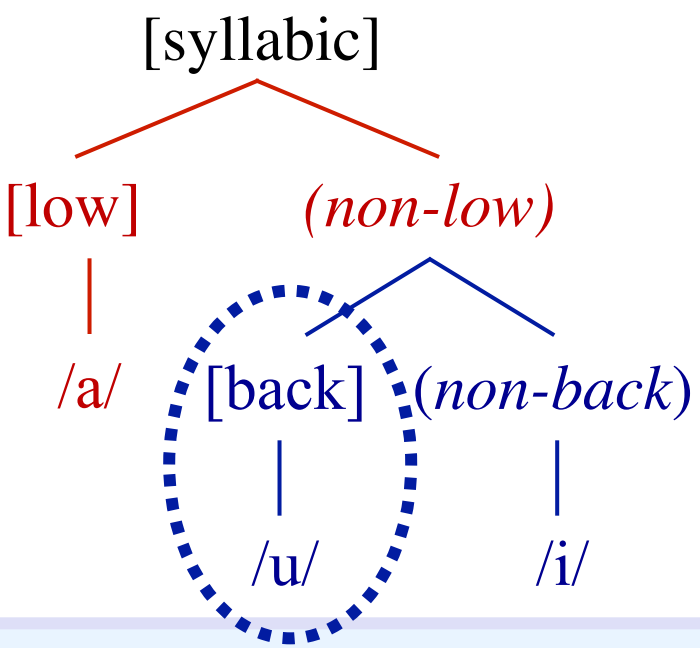

What does the hierarchy do? Diachrony

2. The hierarchy constrains neutralization and merger:
Mergers affect phonemes that are contrastive sisters.

Which phoneme can* /u/ *merge with?

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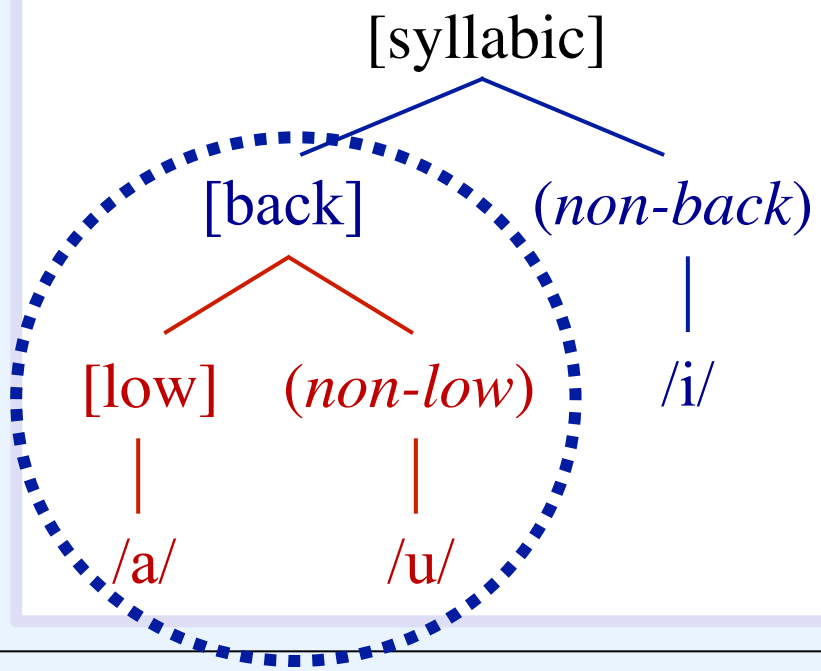
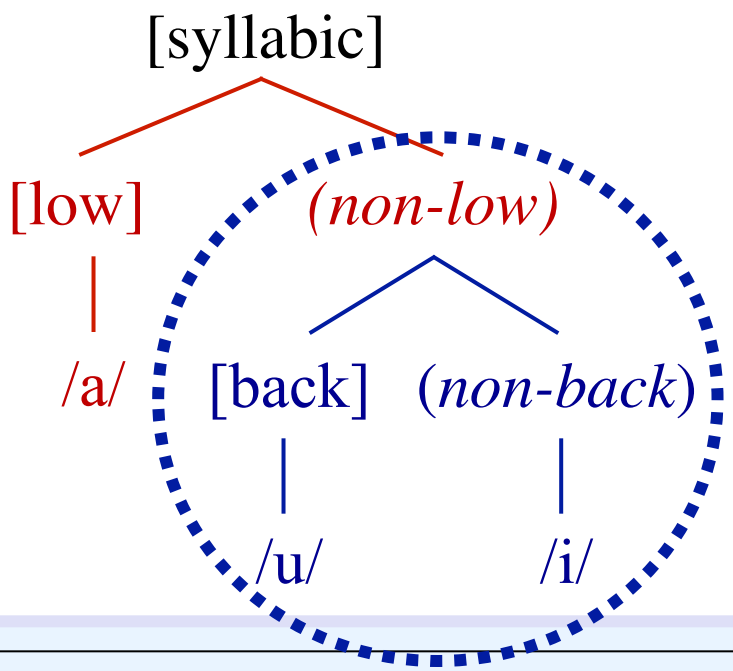


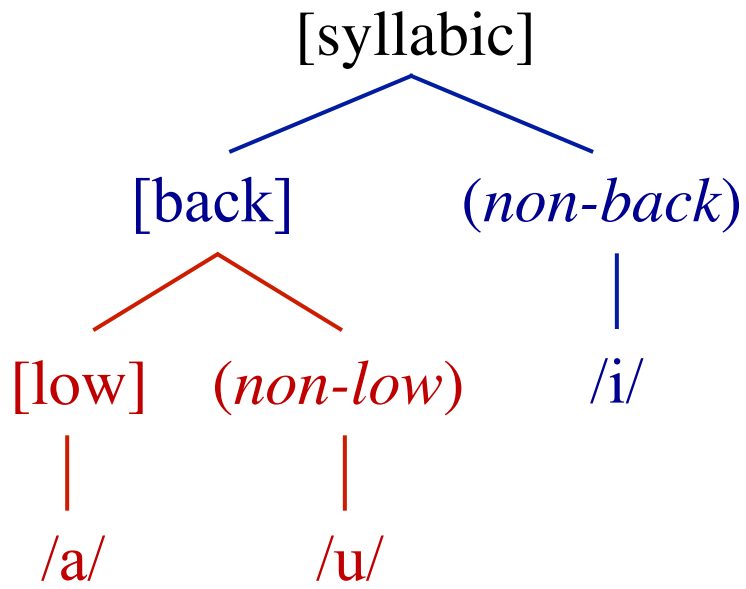
[low] > [back]



Where can we find typological generalizations?

The typological generalizations I will be discussing can thus not be found by looking at inventories alone (say, /i, a, u/), or at individual phonemes (say, /a/), or phones ([a]), without also considering the relevant contrastive feature hierarchy.

[back] > [low]



Notice also that a consequence of this hierarchical method for assigning contrastive features is that a contrastive specification need not be unpredictable.

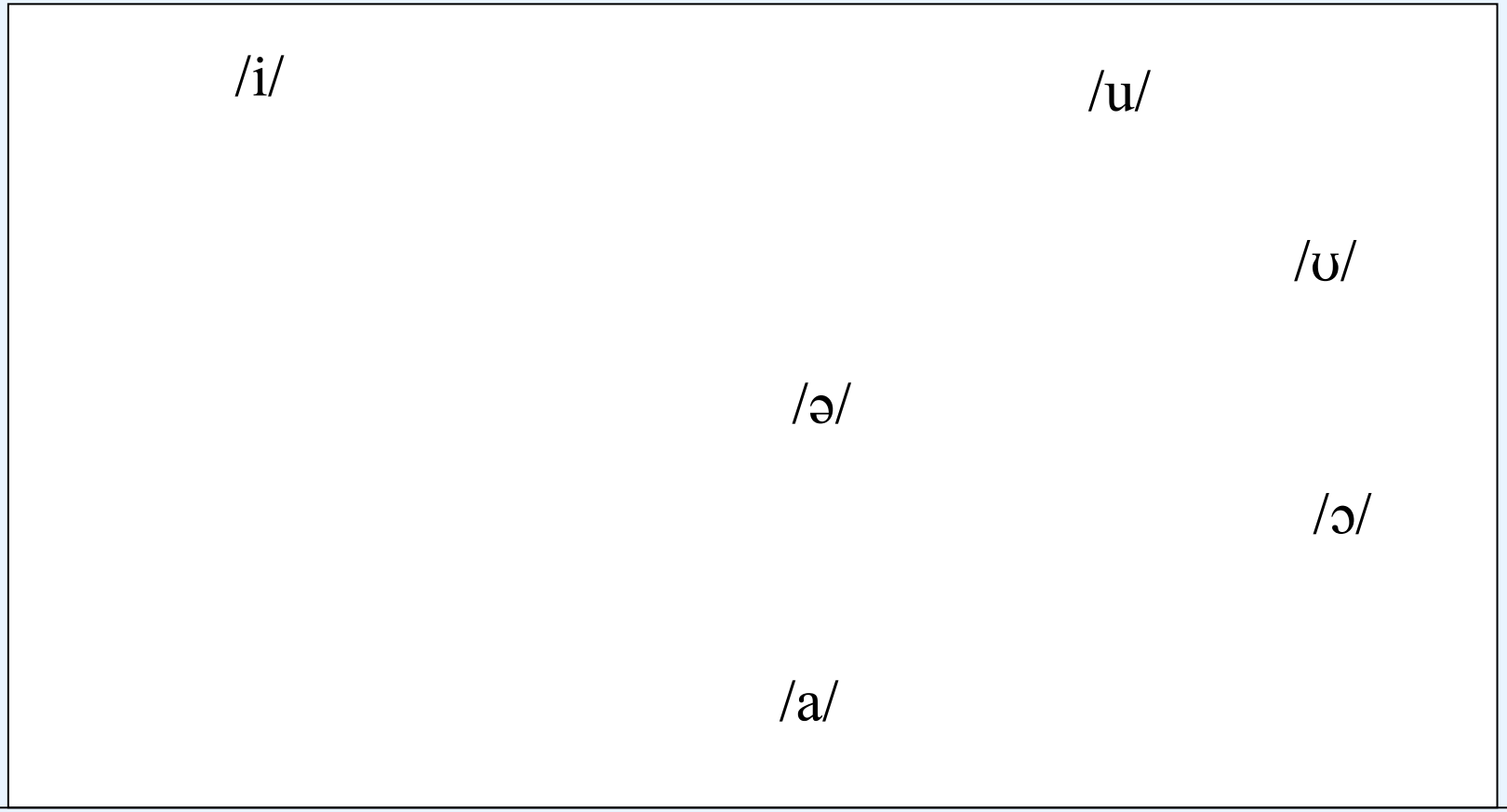
Here, /a/ is the only [low] vowel, so its [back] feature is predictable; but it is still contrastive, for it distinguishes between /a, u/ and /i/.

Example of contrast and activity:

The Classical Manchu vowel system

Classical Manchu vowel system (Zhang 1996)

Classical Manchu has 6 vowel phonemes



Activity in Classical Manchu

The three most notable kinds of phonological activity involving vowels are:

- ATR harmony
- Labial (rounding) harmony
- Palatalization

ATR harmony

The vowels /ə/ and /u/ trigger ATR harmony within a word: /ə/ alternates with /a/ and /u/ alternates with /ʊ/

/ə/ alternates with /a/

[ATR]	xəxə	'woman'	xəxə-ŋgə	'female'
(*non-ATR*)	aGa	'rain'	aGa-ŋGa	'of rain'

/u/ alternates with /ʊ/

[ATR]	xərə-	'ladle out'	xərə-ku	'ladle'
(*non-ATR*)	paqt'a-	'contain'	paqt'a-qʊ	'internal organs'

ATR harmony

An apparent exception is caused by the fact that /ʊ/ changes to [u] everywhere except after dorsal (velar ~ uvular) consonants:

Underlying /u/: ATR harmony

[ATR]	s**u**sə	‘coarse’	s**u**sə-t**ə**-	‘make coarsely’
[ATR]	xət’**u**	‘stocky’	xət’**u**-k**ə**n	‘somewhat stocky’

Underlying /ʊ/: non-ATR vowels

(*non-ATR*)	t**u**lpa	‘careless’	t**u**lpa-t**a**-	‘act carelessly’
(*non-ATR*)	tat’ʂ**u**n	‘sharp’	tat’ʂ**u**-q**a**n	‘somewhat sharp’

ATR harmony

The vowel /i/ is neutral:

/ə/ ~ /a/ suffix

[ATR]	pəki	‘firm’	pəki-lə	‘make firm’
(*non-ATR*)	paqtʂ’in	‘opponent’	paqtʂ’i-la-	‘oppose’

/u/ ~ /ʊ/ suffix

[ATR]	sitərə-	‘hobble’	sitərə-sxun	‘hobbled/lame’
(*non-ATR*)	panjin	‘appearance’	panji-sχʊn	‘having money’

/i/ suffix

[ATR]	əmt’ə	‘one each’	əmt’ə-li	‘alone; sole’
(*non-ATR*)	taχa-	‘follow’	taχa-li	‘the second’

ATR harmony

When /i/ is in a position to trigger harmony, it occurs only with non-ATR vowels:

/ə/ ~ /a/ suffix

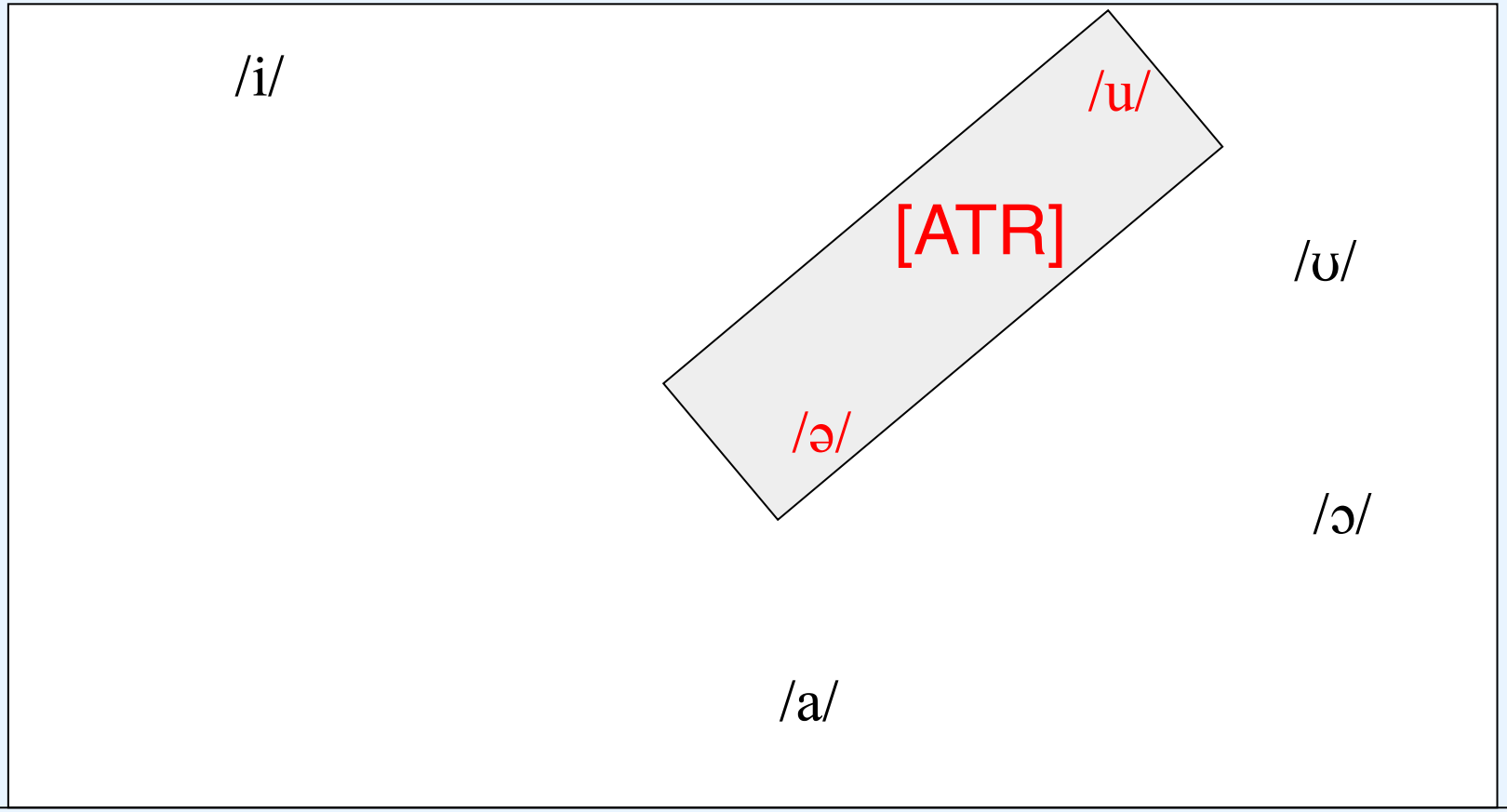
(*non-ATR*)	**i**l**i**-	'stand'	**i**l**i**-χ**a**	'stood'
(*non-ATR*)	f**i**l**i**	'solid'	f**i**l**i**-q**a**n	'somewhat solid'

/u/ ~ /ʊ/ suffix

(*non-ATR*)	tʂ'**i**l**i**-	'to choke'	tʂ'**i**l**i**-q**ʊ**	'choking'
(*non-ATR*)	s**i**f**i**-	'stick in the hair'	s**i**f**i**-q**ʊ**	'hairpin'

ATR harmony

The evidence from activity, therefore, is that /ə/ and /u/ have an active [ATR] feature, which, by hypothesis, must be contrastive; but the same is not the case with /i/.



Labial (rounding) harmony

Two successive /ɔ/ vowels cause
a suffix /a/ to become /ɔ/:

Two successive /ɔ/ vowels trigger labial harmony

ɔ…ɔ	pɔtʂ'ɔ	'colour'	pɔtʂ'ɔ-ŋɢɔ	'coloured'
Compare	aɢa	'rain'	aɢa-ŋɢa	'of rain'

A single /ɔ/, short or long, does not suffice

Single ɔ	tɔ-	'alight (birds)'	tɔ-na-	'alight in swarm'
Single ɔɔ	tɔɔ-	'cross (river)'	tɔɔ-na-	'go to cross'

Labial (rounding) harmony

Note that /u/ and /ʊ/ do not trigger labial harmony:

/u/

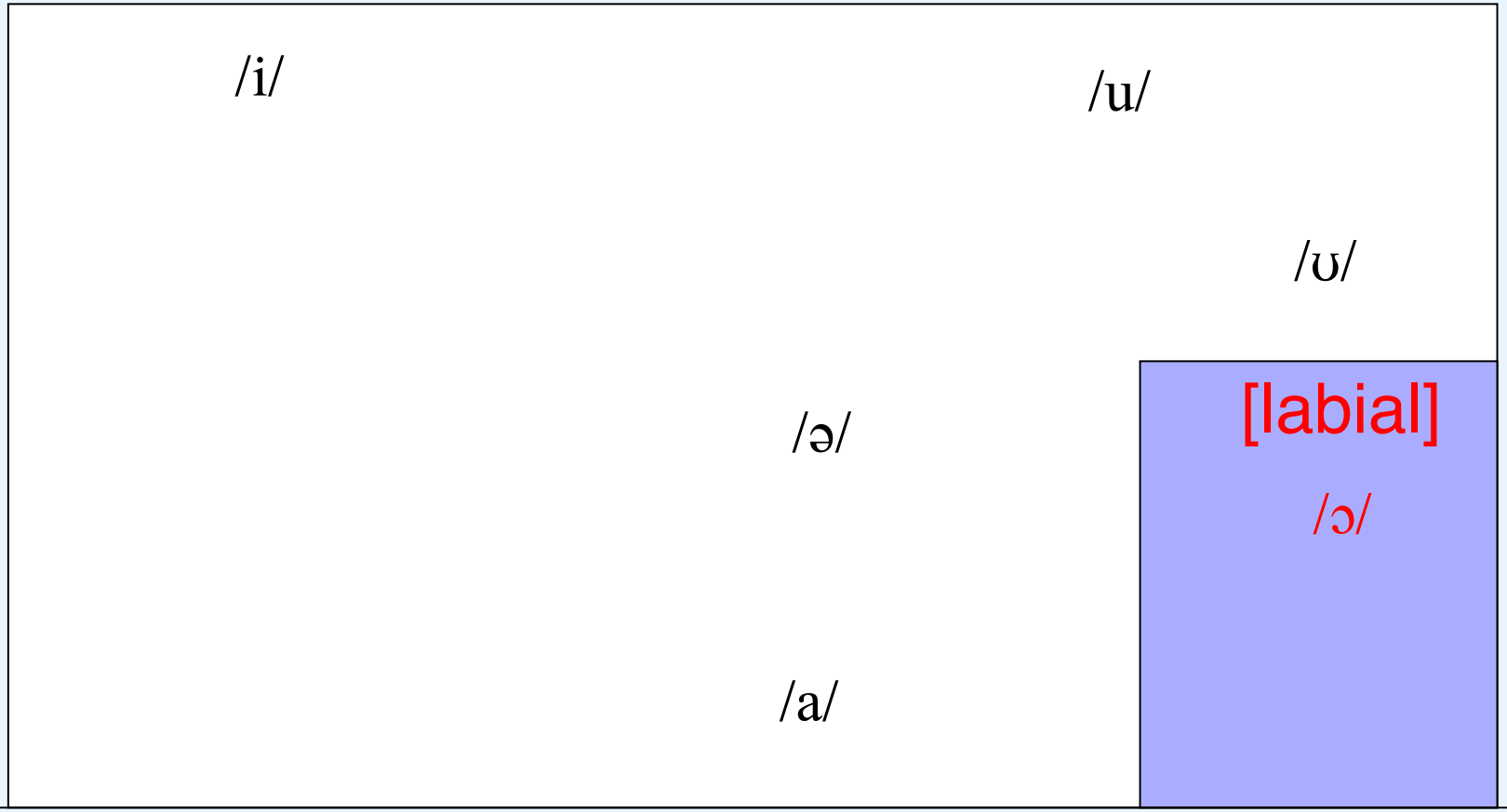
g**u**l**u**	‘plain’	gulu-k**ə**n	‘somewhat plain’
k**u**m**u**n	‘music’	k**u**m**u**-ŋg**ə**	‘noisy’

/ʊ/ (/ʊ/ becomes [u]except after a back consonant)

χ**ʊ**t**u**n	‘fast’	χ**ʊ**t**u**-q**a**n	‘somewhat fast’
t**u**rs**u**n	‘form’	t**u**rs**u**-ŋɢ**a**	‘having form’

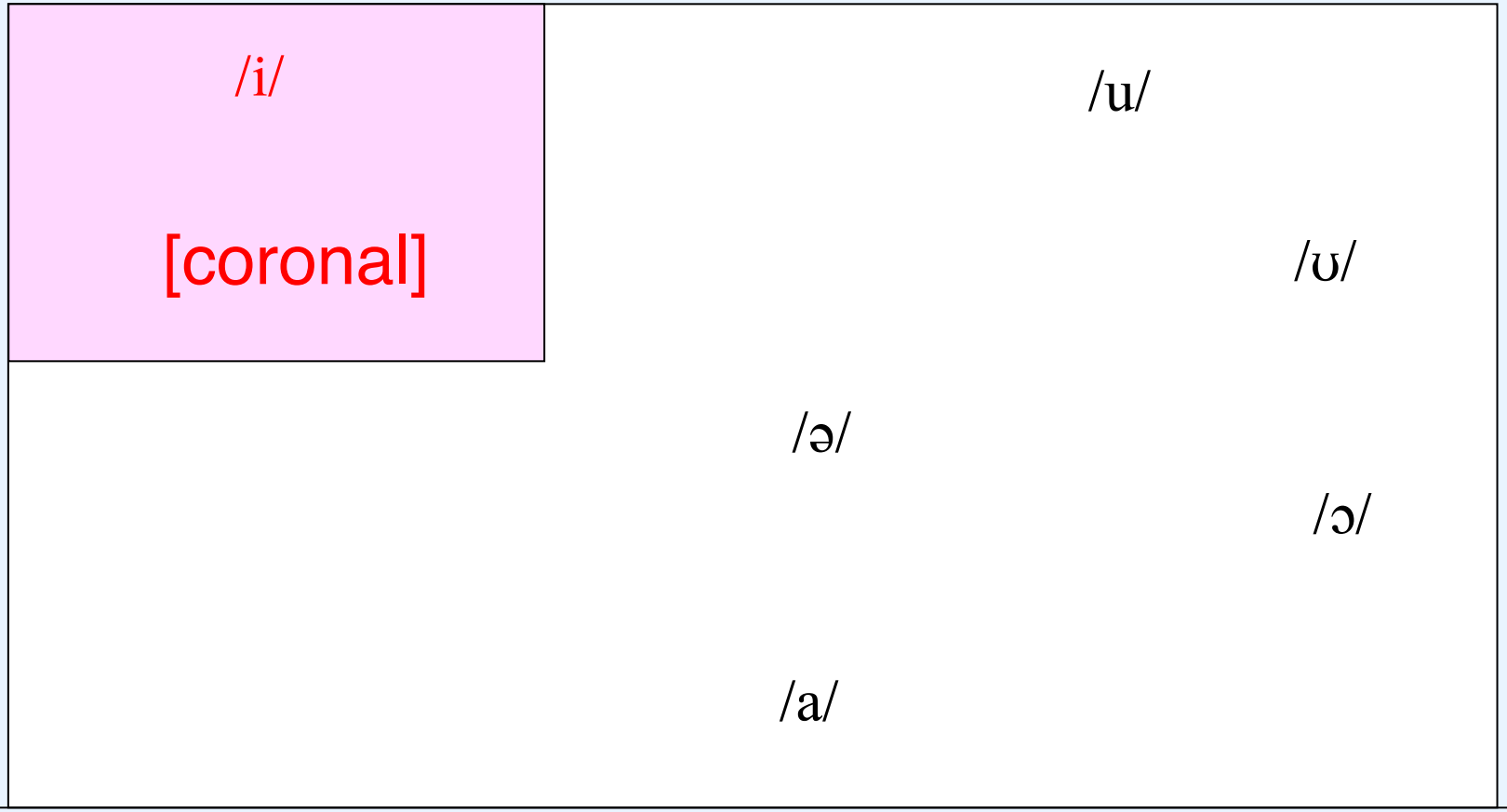
Labial (rounding) harmony

The evidence from activity here, then, is that /ɔ/ must have an active, therefore contrastive, [labial] feature; but the same is not the case with /u/ and /ʊ/.



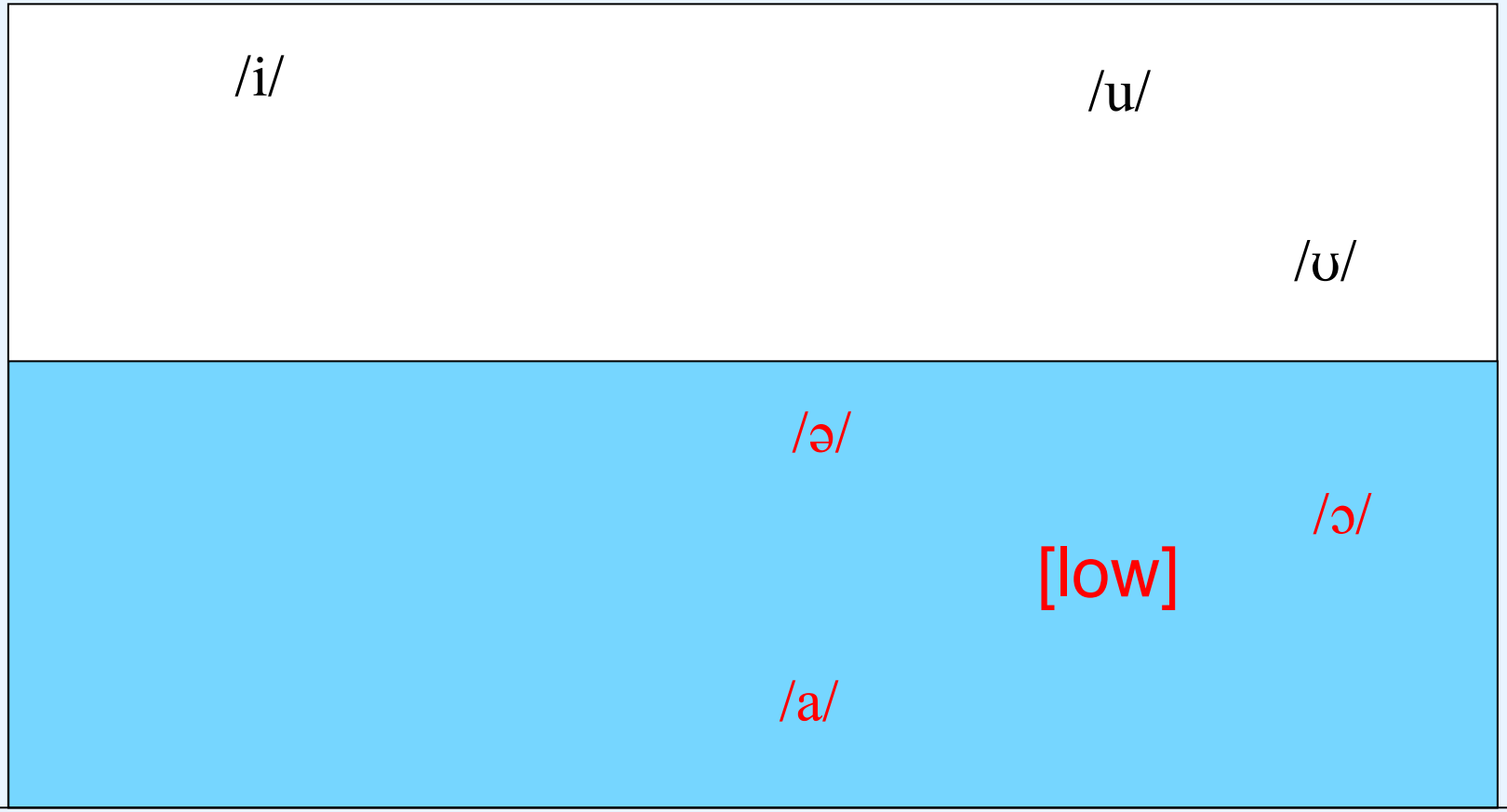
Palatalization

The vowel /i/ uniquely causes palatalization of a preceding consonant, which suggests it alone has a contrastive triggering feature we call [coronal].



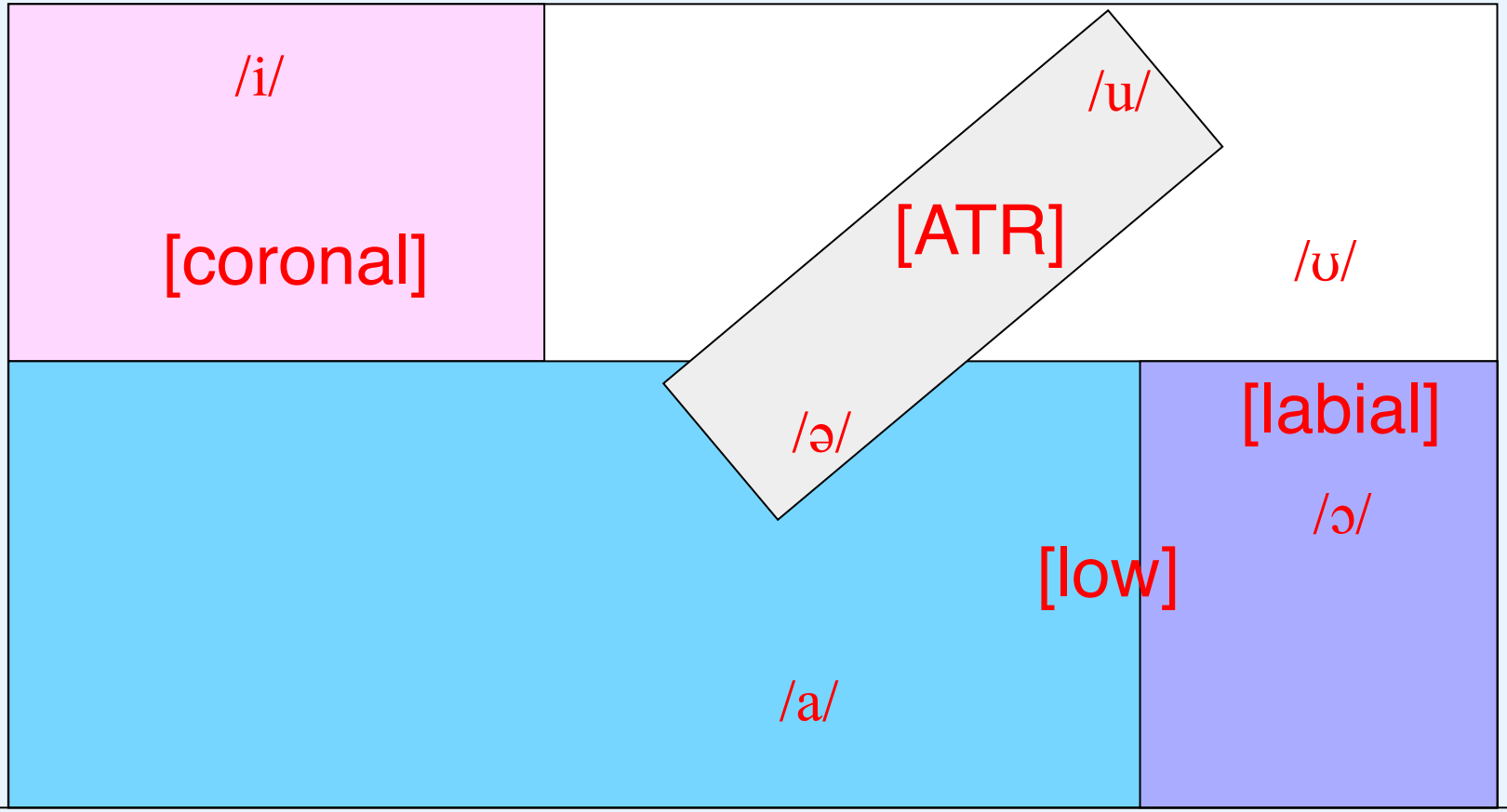
One height contrast

The alternations /ə/ ~ /a/ ~ /ɔ/ and /u/ ~ /ʊ/ are limited to a height class, and we still need to distinguish /ə/ from /u/ and /a/ from /ʊ/. We need one height feature, which we call [low].



Classical Manchu contrastive features

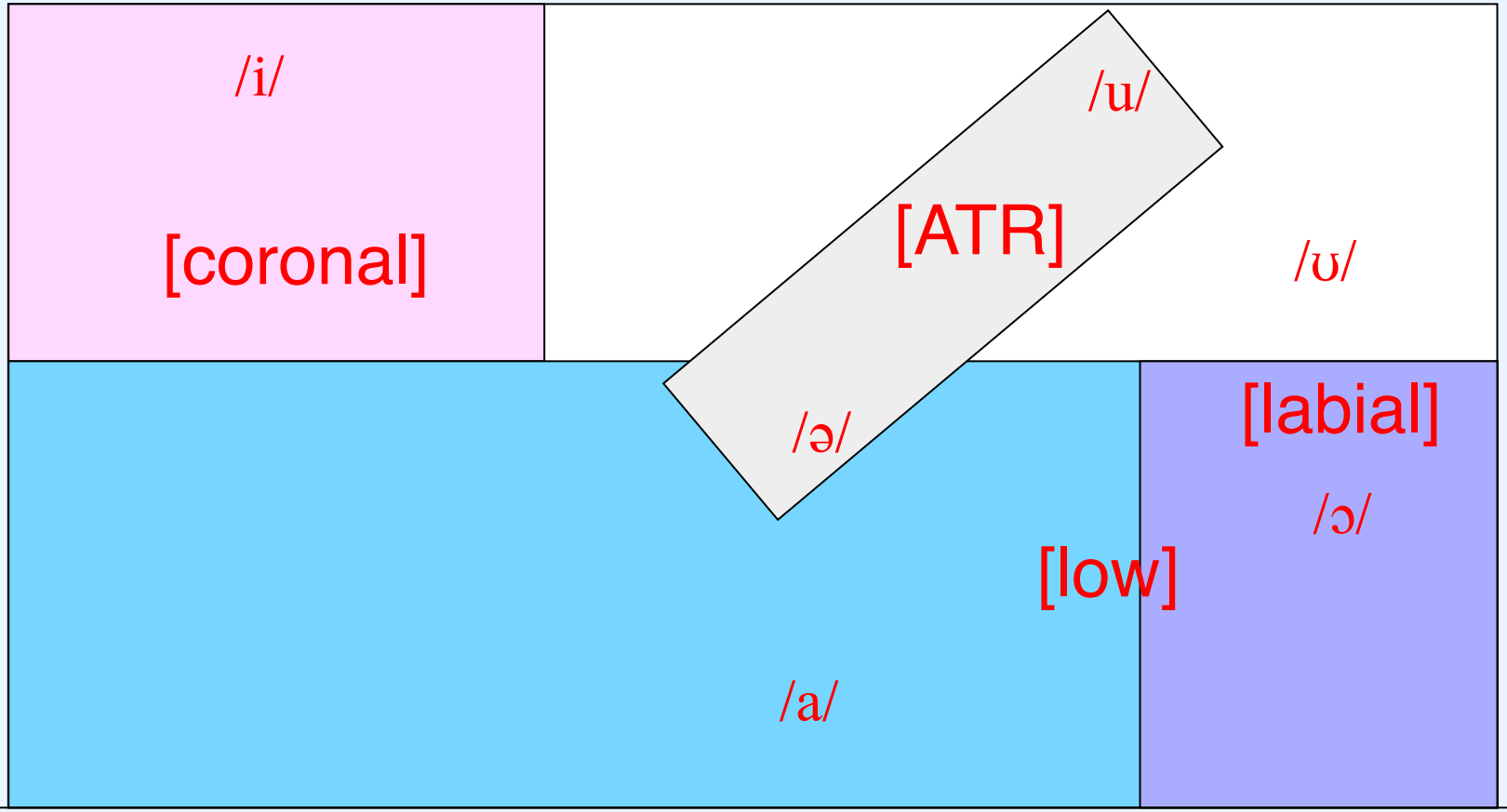
Putting together the evidence of phonological activity surveyed to here, we need to arrive at a feature hierarchy that yields the values below.



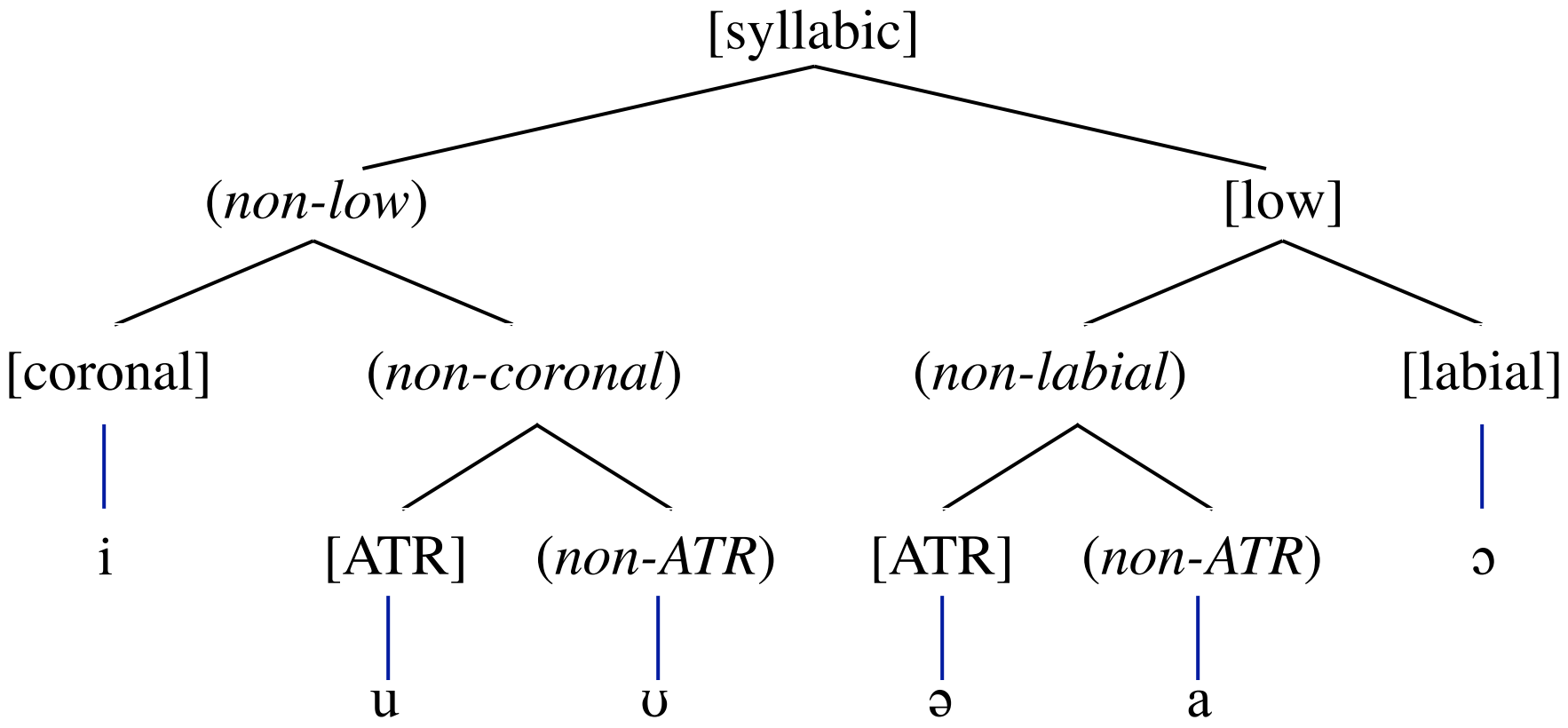
Classical Manchu contrastive features

Zhang (1996) proposes the hierarchy:

[low] > [coronal] > [labial] > [ATR]



Classical Manchu contrastive hierarchy (Zhang 1996)



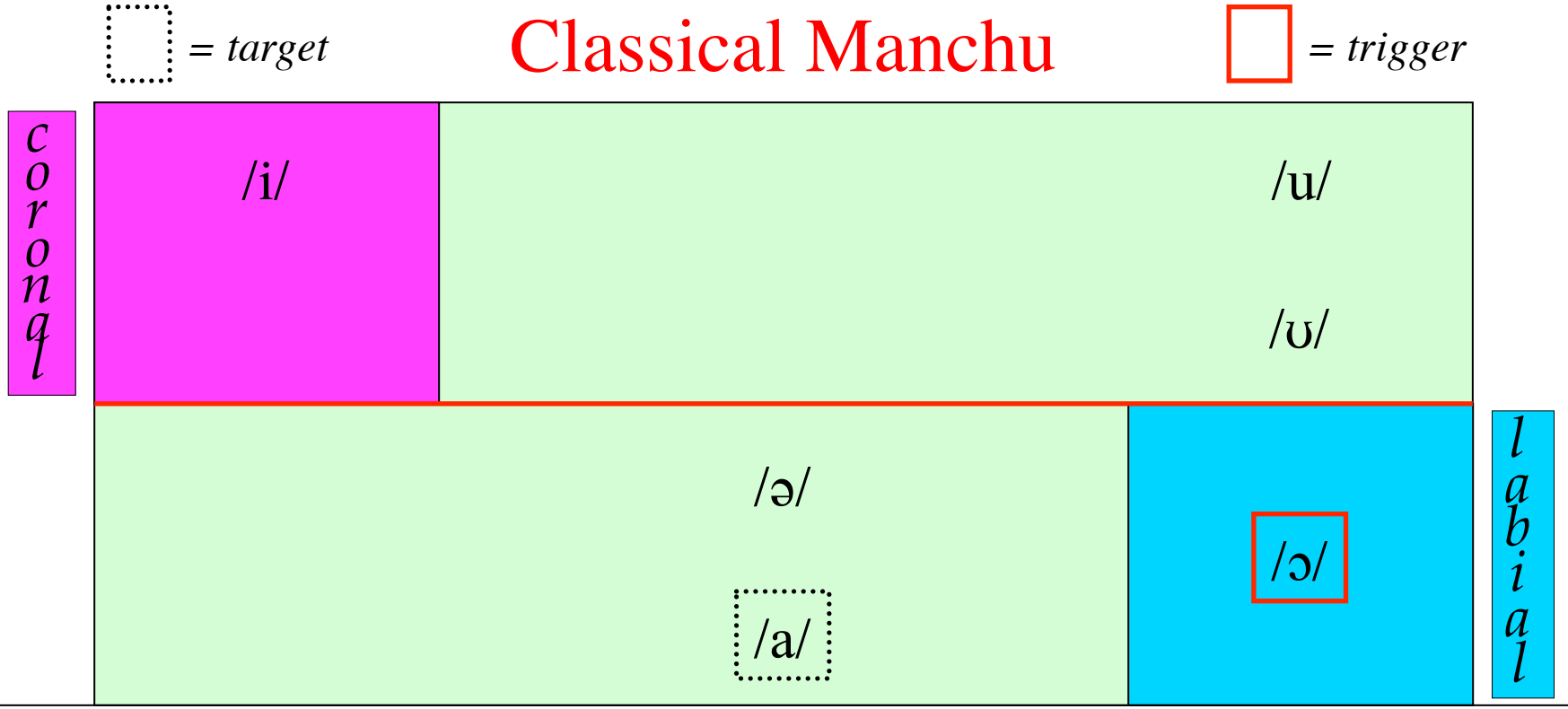
[low] > [coronal] > [labial] > [ATR]

Synchrony:
Typology of Labial Harmony

The contrastive feature hierarchy of Classical Manchu sheds light on the results of typological surveys of labial (rounding) harmony in Manchu-Tungusic, Mongolian, and Turkic (Korn 1969; Kaun 1995).

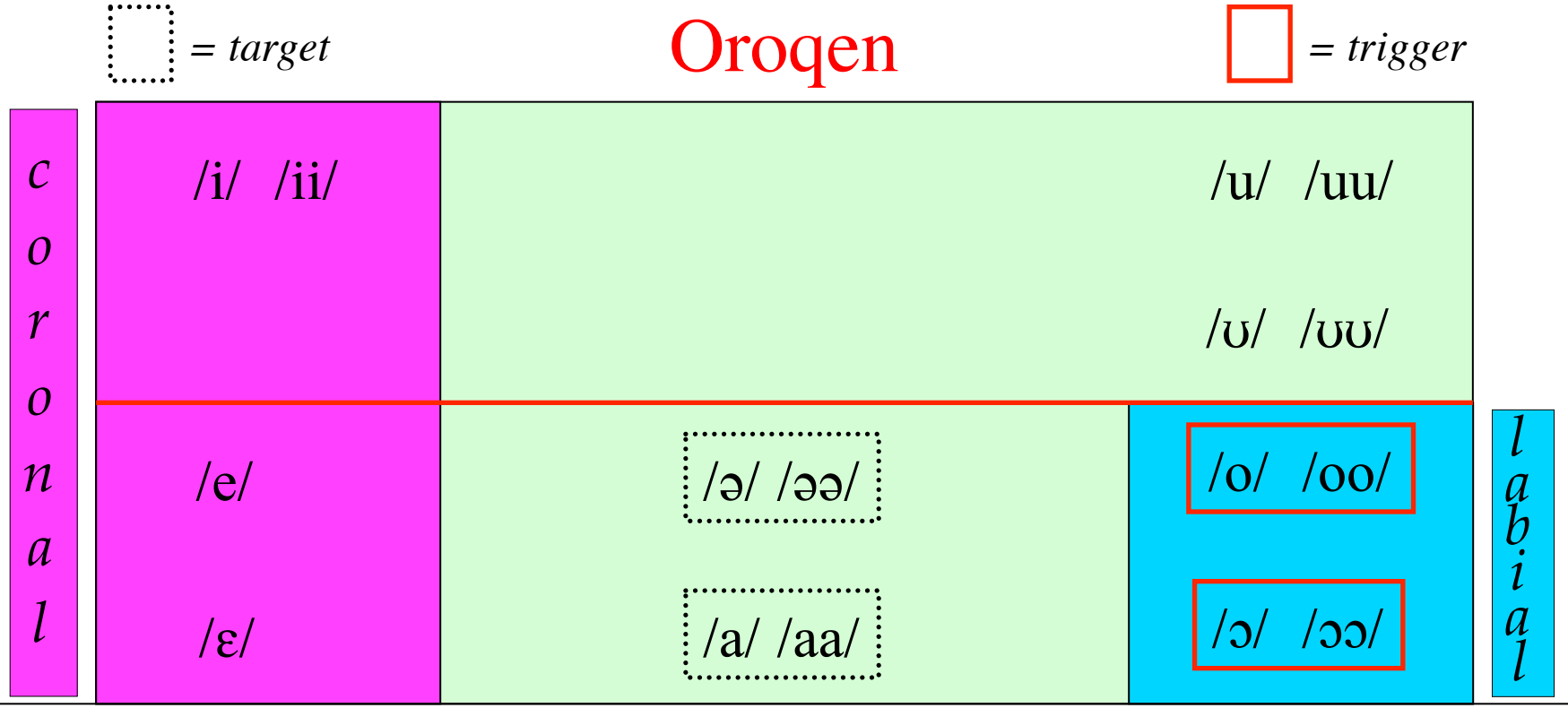
Labial harmony in Manchu-Tungusic

We have seen that labial harmony in Classical Manchu is limited to the [low] vowels. On my account, only the low vowel /ɔ/ is contrastively [labial] in this inventory.



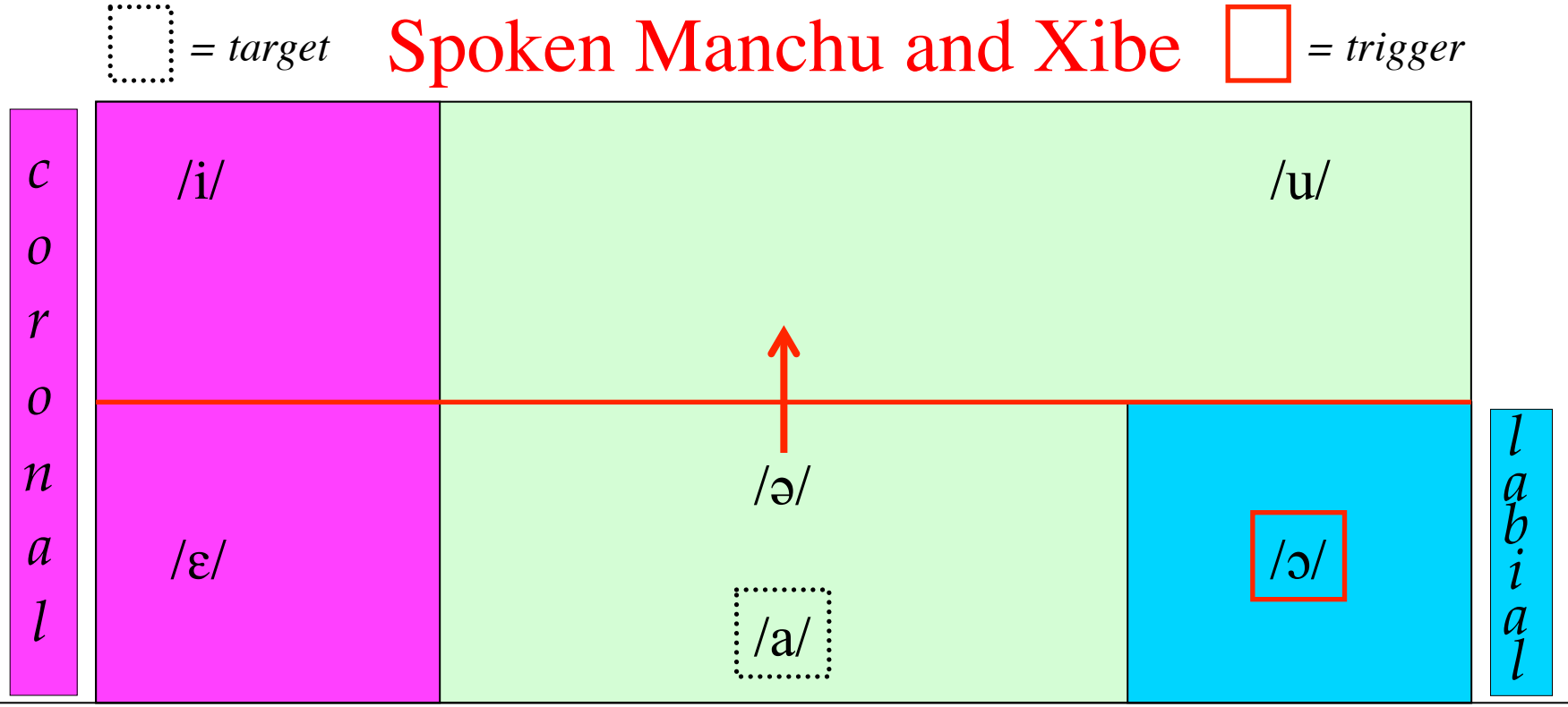
Labial harmony in Manchu-Tungusic

The same holds for most Manchu-Tungusic languages, which have similar vowel inventories. A Tungusic example is Oroqen (Zhang 1996): again, only low vowels are triggers and targets of harmony. Oroqen has both ATR and non-ATR low vowels.



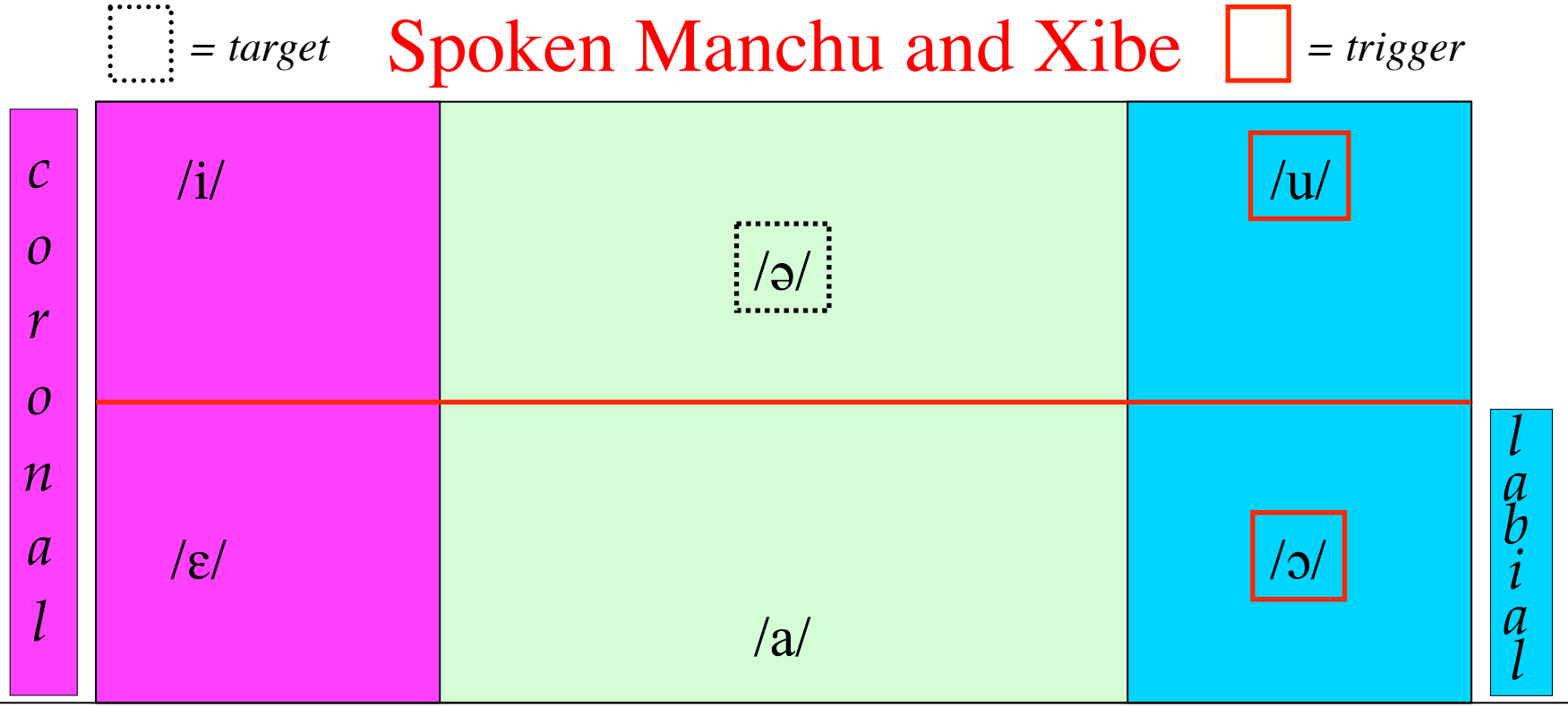
Labial harmony in Manchu-Tungusic

Notable exceptions to this pattern are Spoken Manchu and Xibe. Here [ATR] has been lost and /ə/ has become a (*non-low*) vowel (Zhang 1996; Dresher & Zhang 2005).



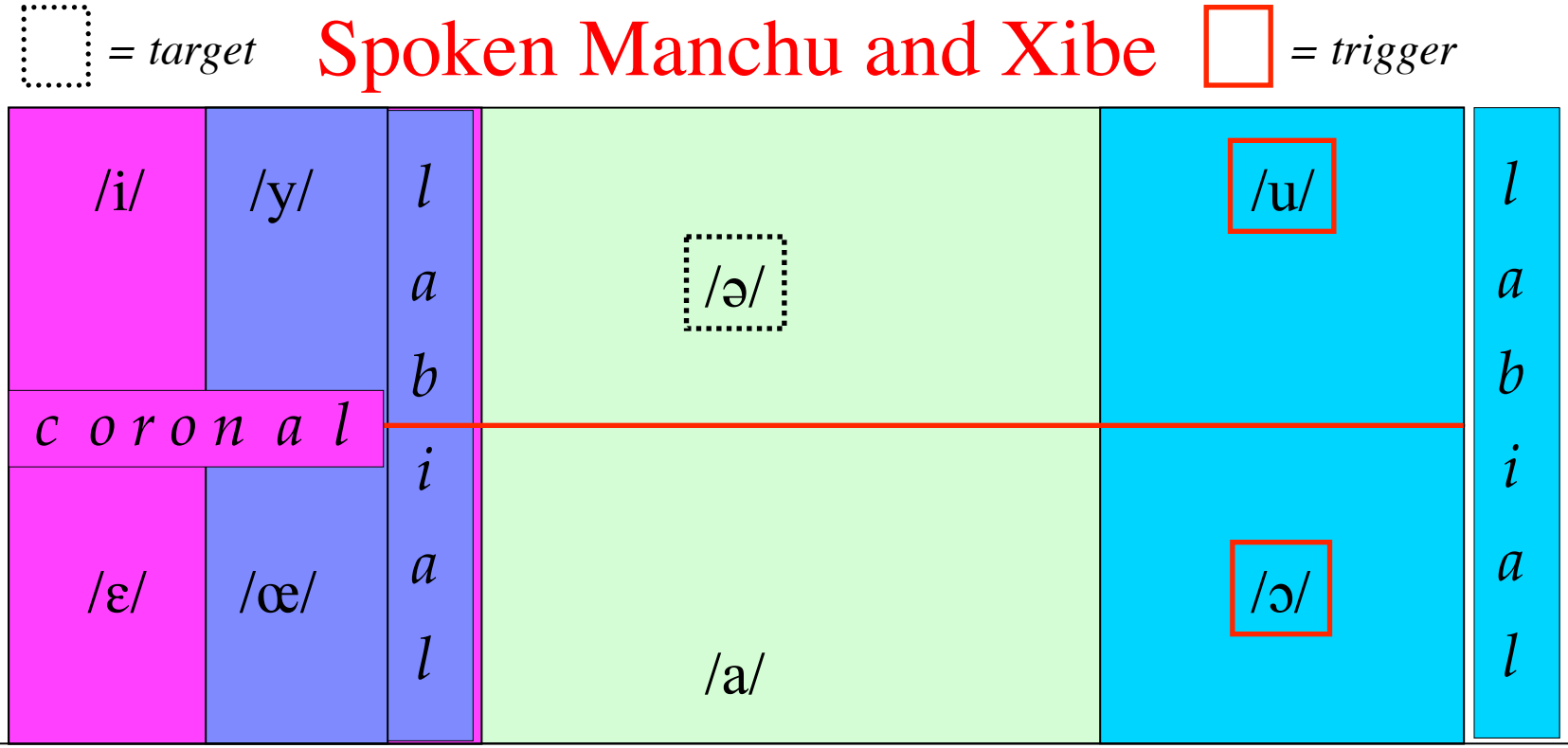
Labial harmony in Manchu-Tungusic

As a result, /ə/ now needs to be distinguished from /u/. [labial] is already in the grammar, and is extended to become contrastive on /u/. In Xibe, /u/ as well as /ɔ/ trigger rounding of /ə/.



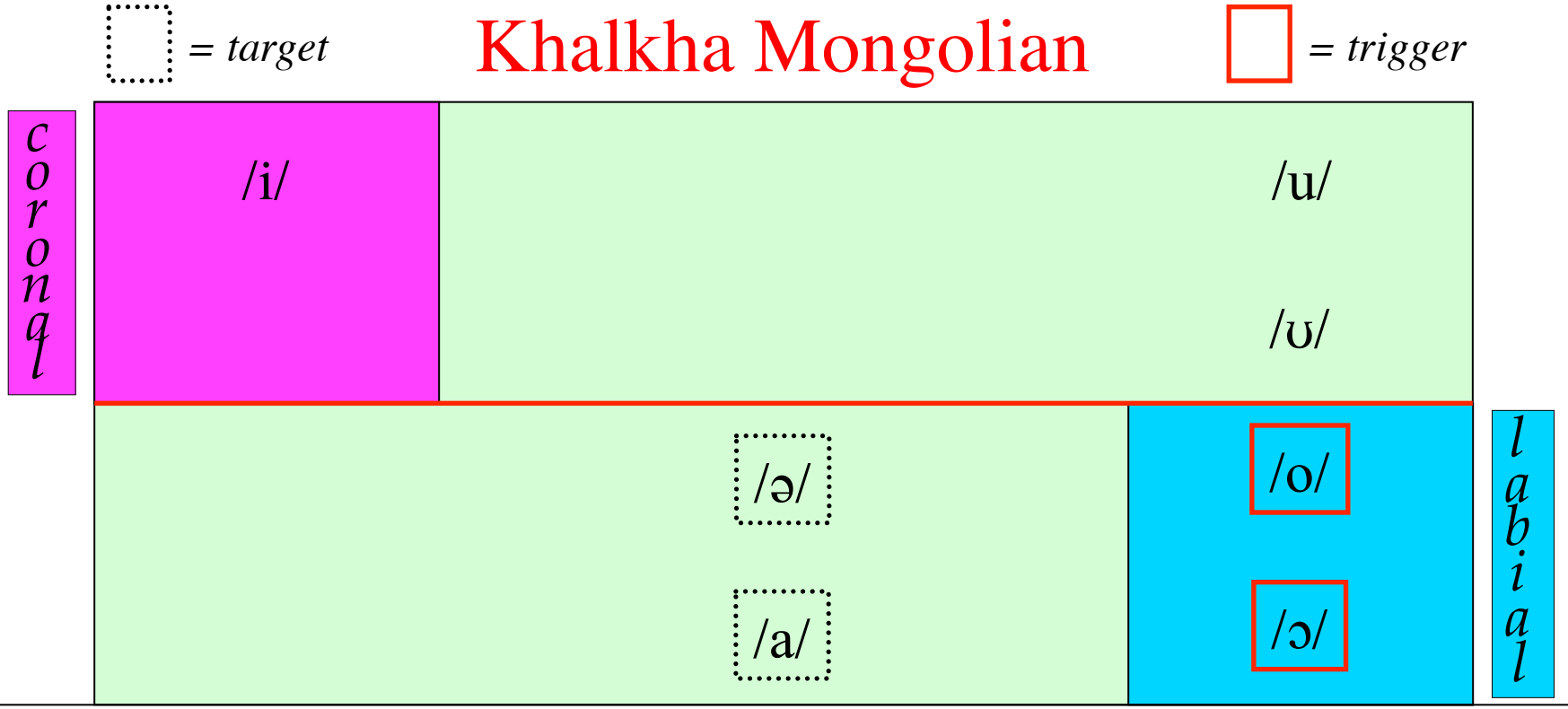
Labial harmony in Manchu-Tungusic

Xibe has also developed new phonemes /y/ and /œ/ that developed from sequences of front and round vowels, further attesting to the contrastive status of [labial] on /u/.



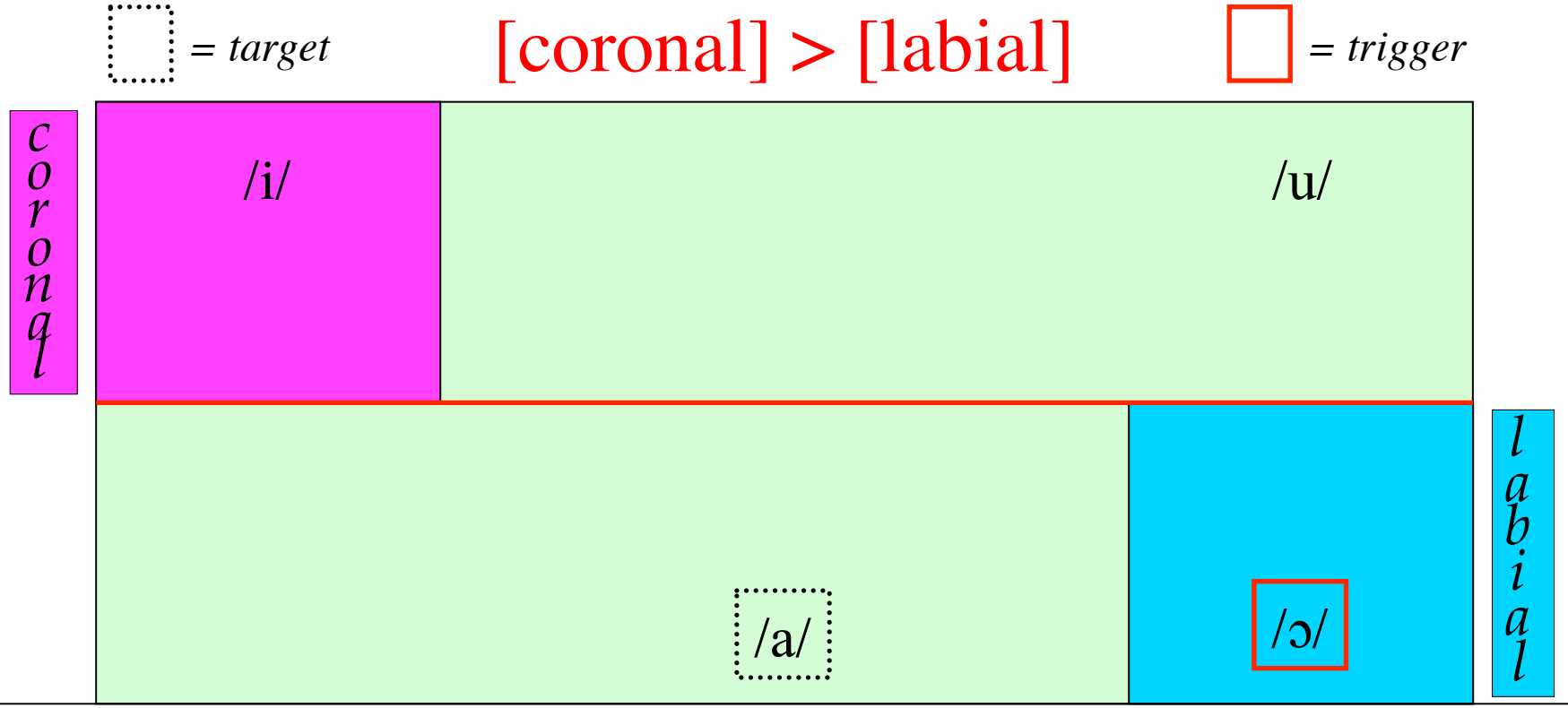
Labial Harmony in Eastern Mongolian

Eastern Mongolian languages also have labial harmony limited to low vowels. A typical example is Khalkha Mongolian (Svantesson 1985, Qinggertai 1982). I assume they have similar feature hierarchies as most of the Manchu-Tungus languages.



Labial Harmony triggered by [low] vowels

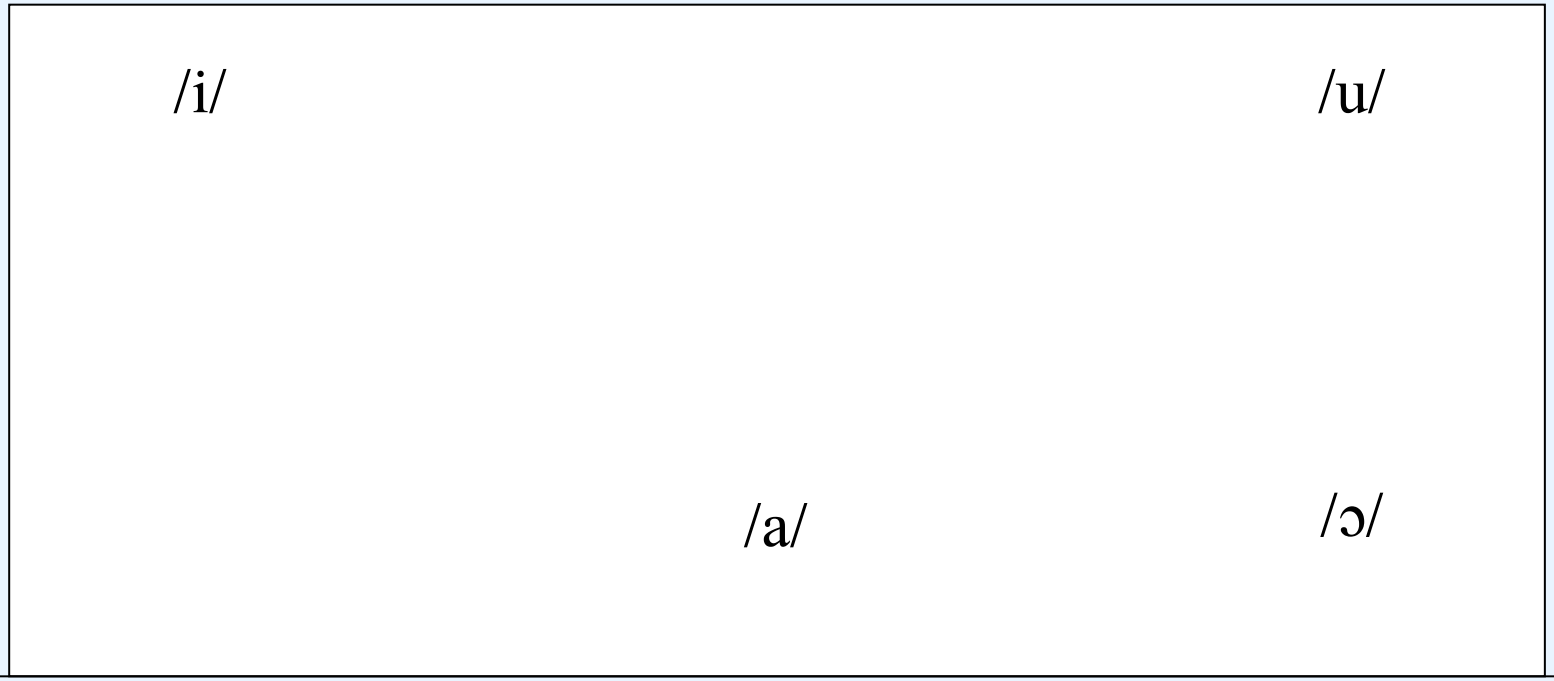
In these languages harmony triggers are non-high because only non-high vowels are contrastive for [labial], a limitation that follows from the fact that [coronal] (as well as a height feature) is higher in the hierarchy than [labial].



Labial Harmony in Yowlumne Yokuts

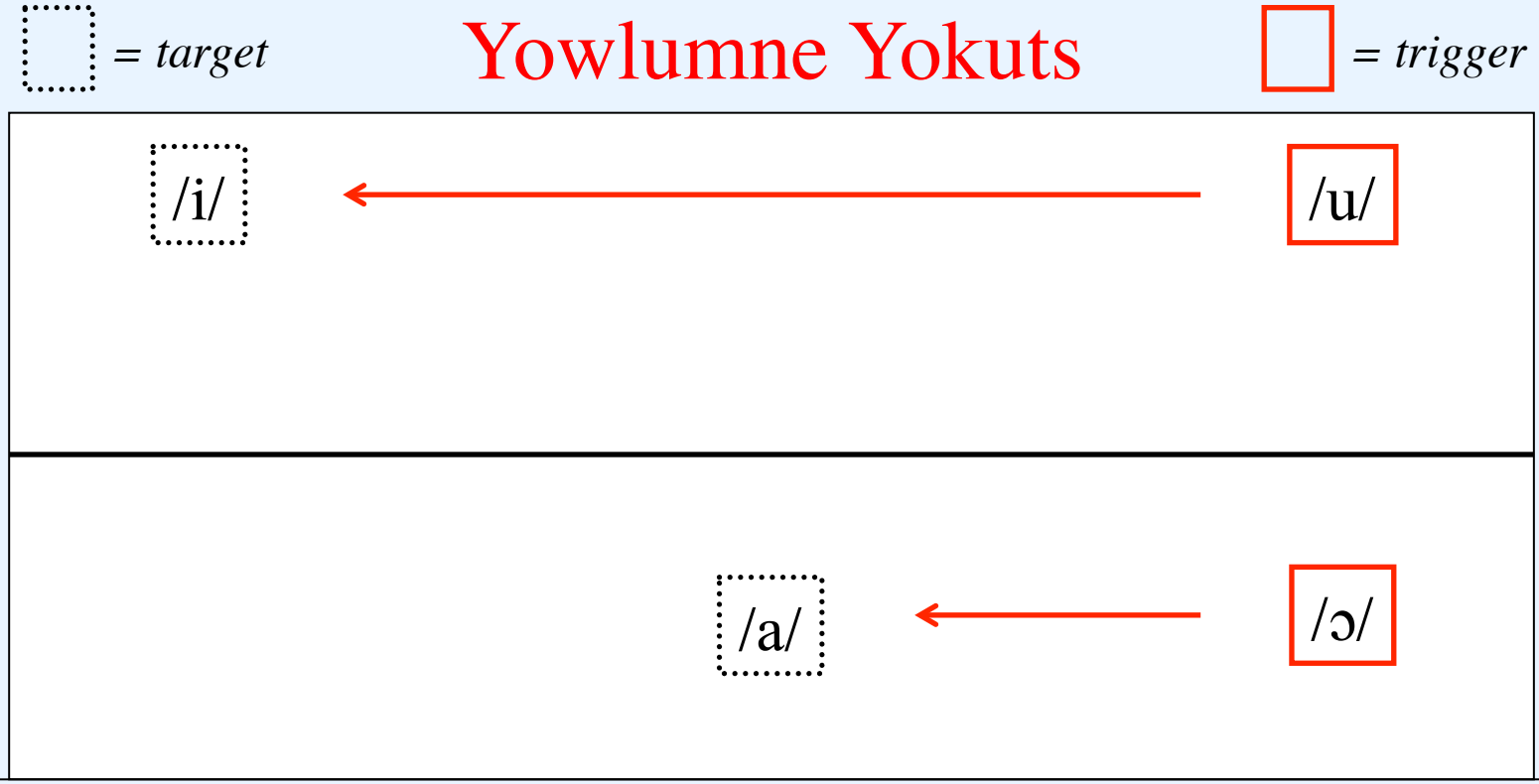
It is interesting to compare this type of language with Yowlumne Yokuts (Newman 1944), which has a vowel inventory whose basic configuration looks similar; but it is a completely different type of language.

Yowlumne Yokuts



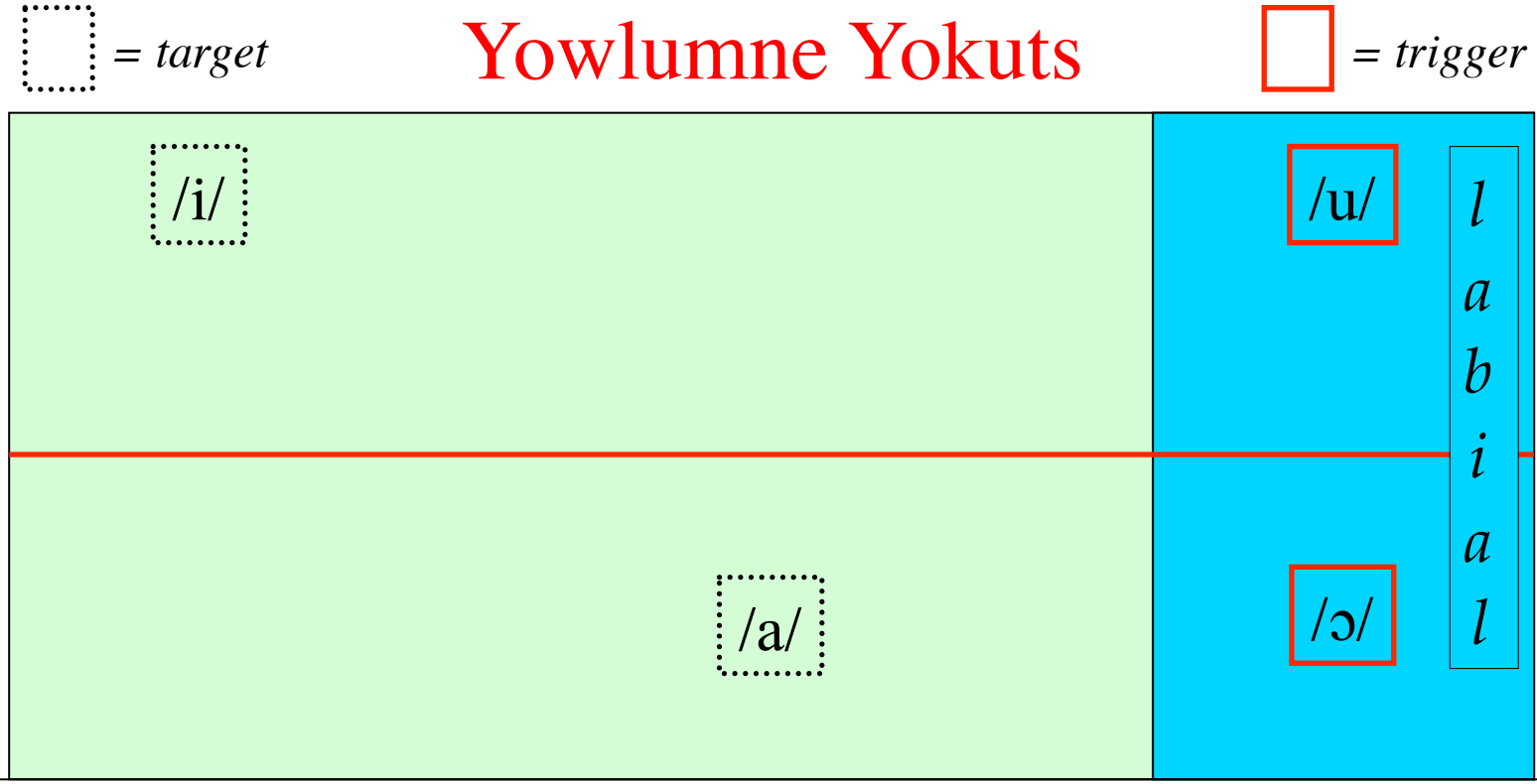
Labial Harmony in Yowlumne Yokuts

In Yokuts both /u/ and /ɔ/ trigger height-bounded labial harmony: /u/ rounds only /i/, and /ɔ/ rounds only /a/. Why can /u/ trigger harmony here, but not in Manchu-Tungusic and Eastern Mongolian?



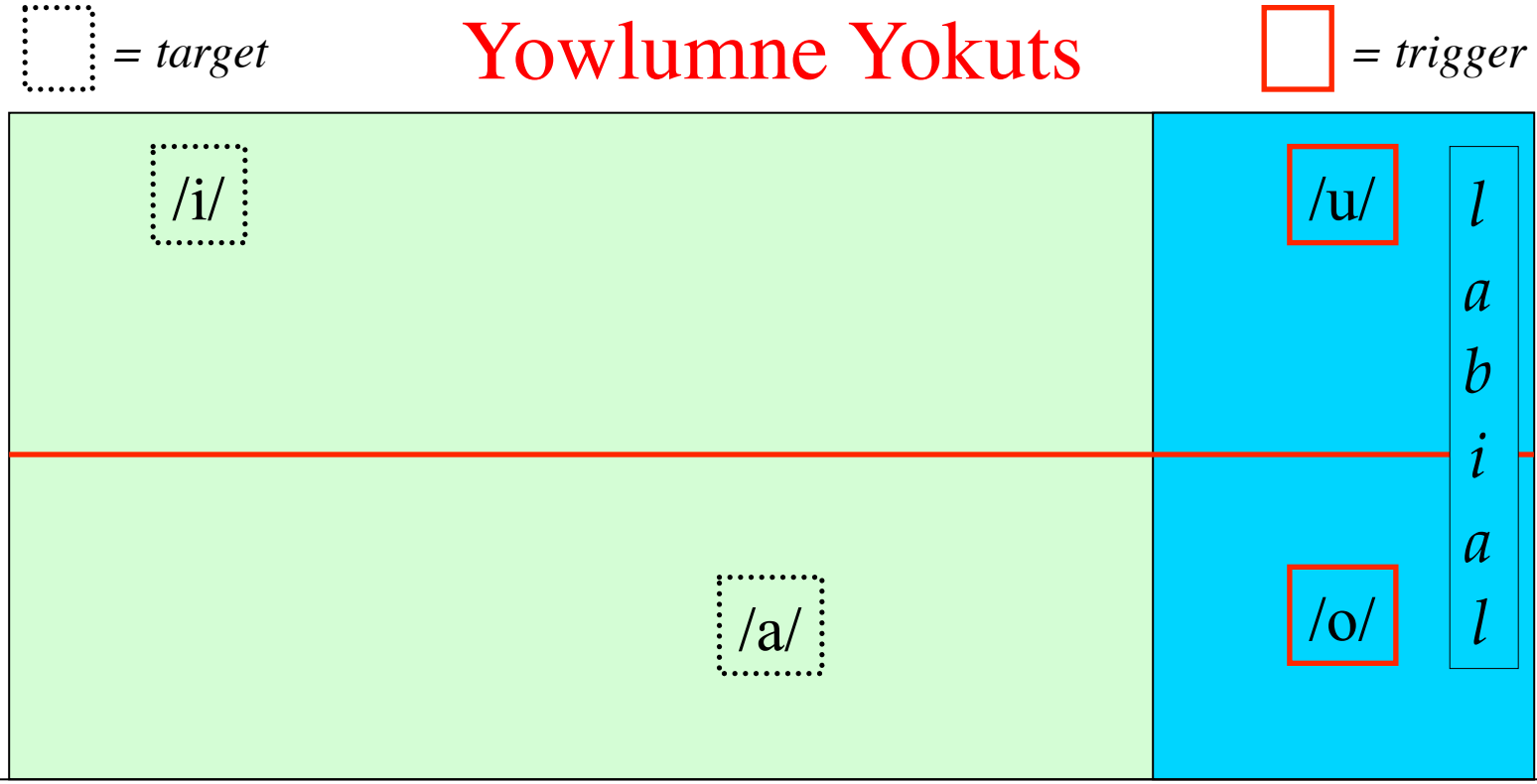
Labial Harmony in Yowlumne Yokuts

A simple solution is available in terms of the contrastive hierarchy: in Yowlumne, [labial] is ranked over [coronal]. Hence, both /u/ and /ɔ/ are [labial], and [coronal] is not a contrastive feature in this language.



Labial Harmony in Yowlumne Yokuts

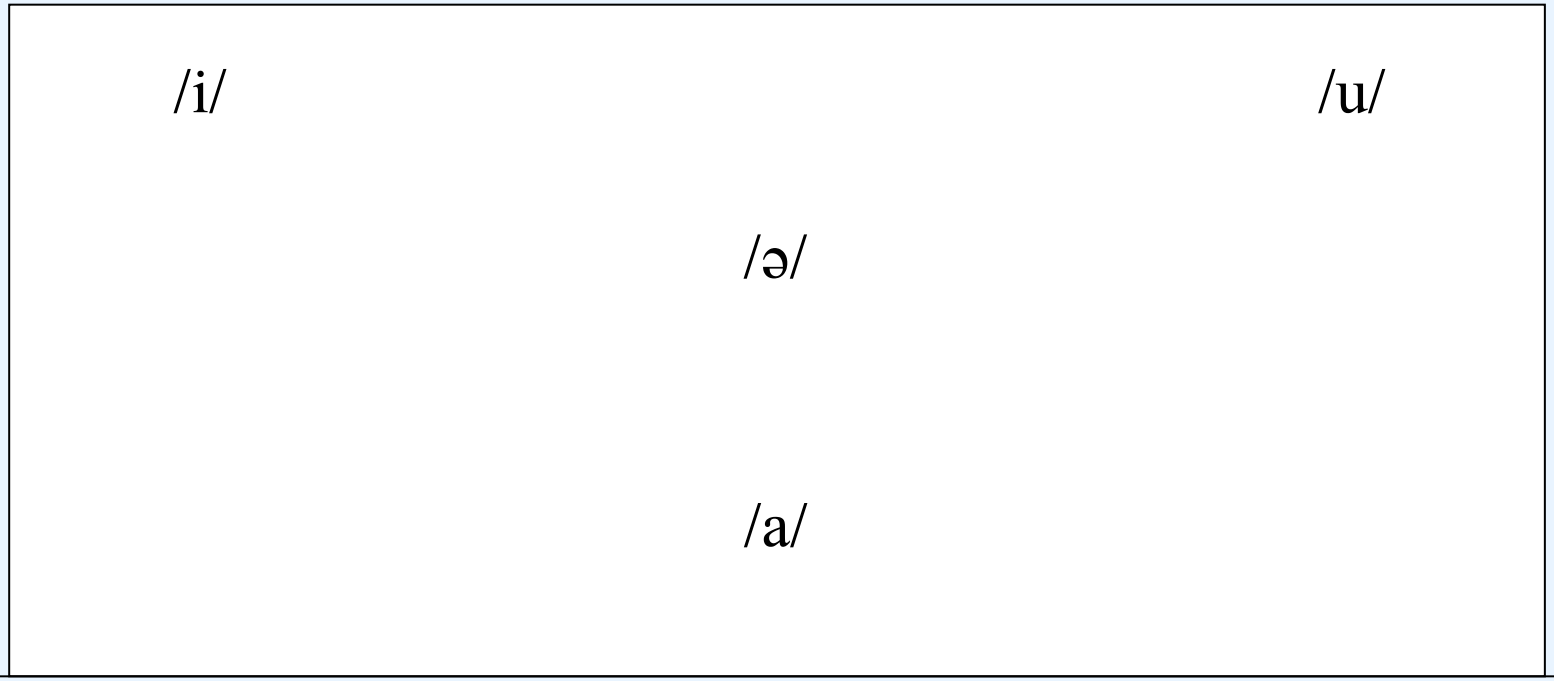
In support of this analysis, note that /i/ in Yowlumne is phonologically inert, and serves also as the epenthetic vowel. This is in sharp contrast to the [coronal] /i/in Manchu-Tungusic and many Mongolian languages.



Inuit dialects

Another language family in which [labial] is typically ordered ahead of [coronal] are the Yupik and Inuit languages that descend from Proto-Eskimo, which is reconstructed to have vowels */i/, */a/, */u/, and a fourth vowel assumed to be */ə/.

Proto-Eskimo

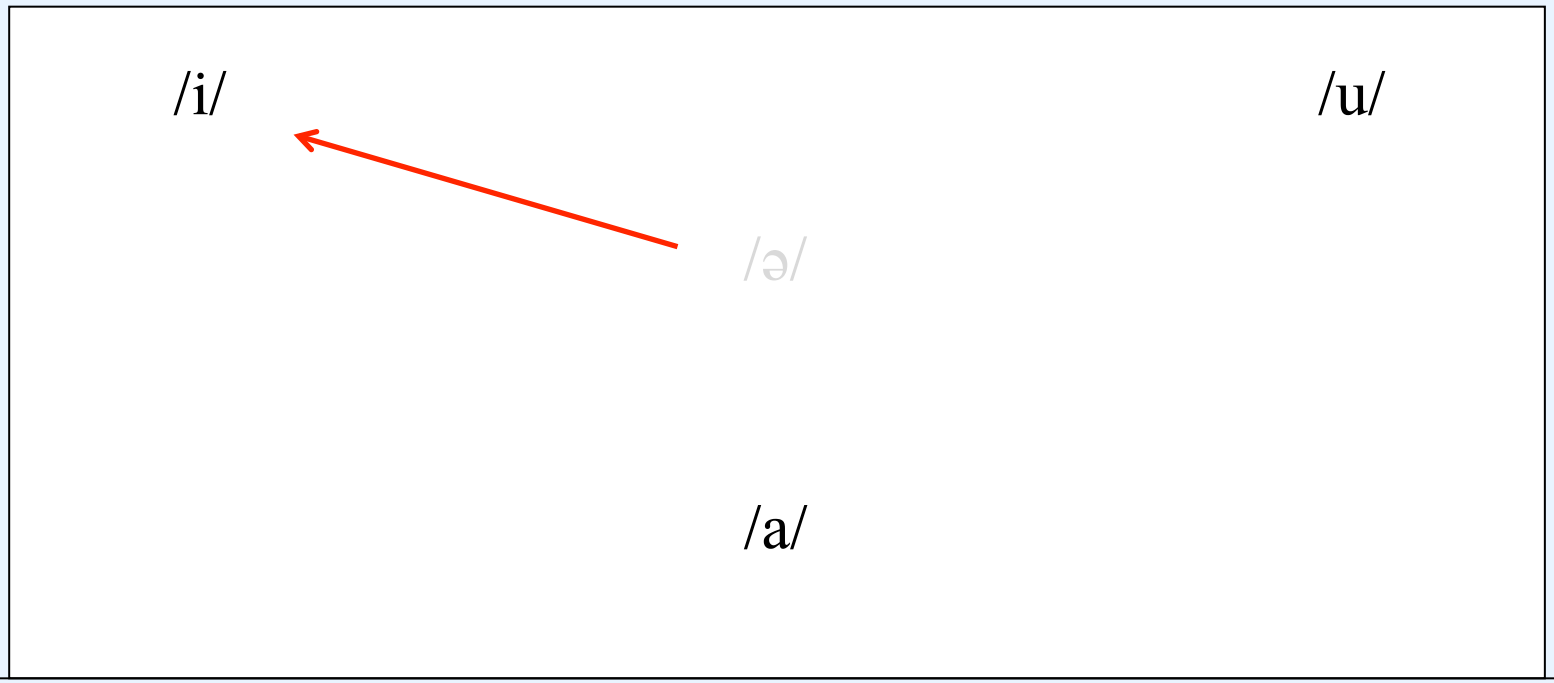


Inuit dialects

In most dialects this vowel has merged with /i/.

In some of these dialects merger is total, resulting in a three-vowel system; other dialects retain a trace of the distinction between */i/ and */ə/.

Proto-Eskimo



Inuit dialects

Original */i/ could cause palatalization of consonants, and some Inuit dialects show palatalization (or traces of former palatalization) (Dorais 2003: 33).

In the word 'foot', *i* causes a following *t* to change to *s*. This assibilation is the most common manifestation of palatalization in Inuit.

*itəɣaʁ	>	isiɣak	'foot'

Inuit dialects

In these dialects it is traditional to distinguish between 'strong *i*', which descends from */i/ and causes palatalization, and 'weak *i*', which descends from */ə/ and does not.

In some of these dialects the two types of *i* exhibit other kinds of distinct behaviour as well.

Strong *i*	*itəɣaʁ	>	isiɣak	'foot'
Weak *i*	*ətəmaɣ	>	itimak	'palm of hand'

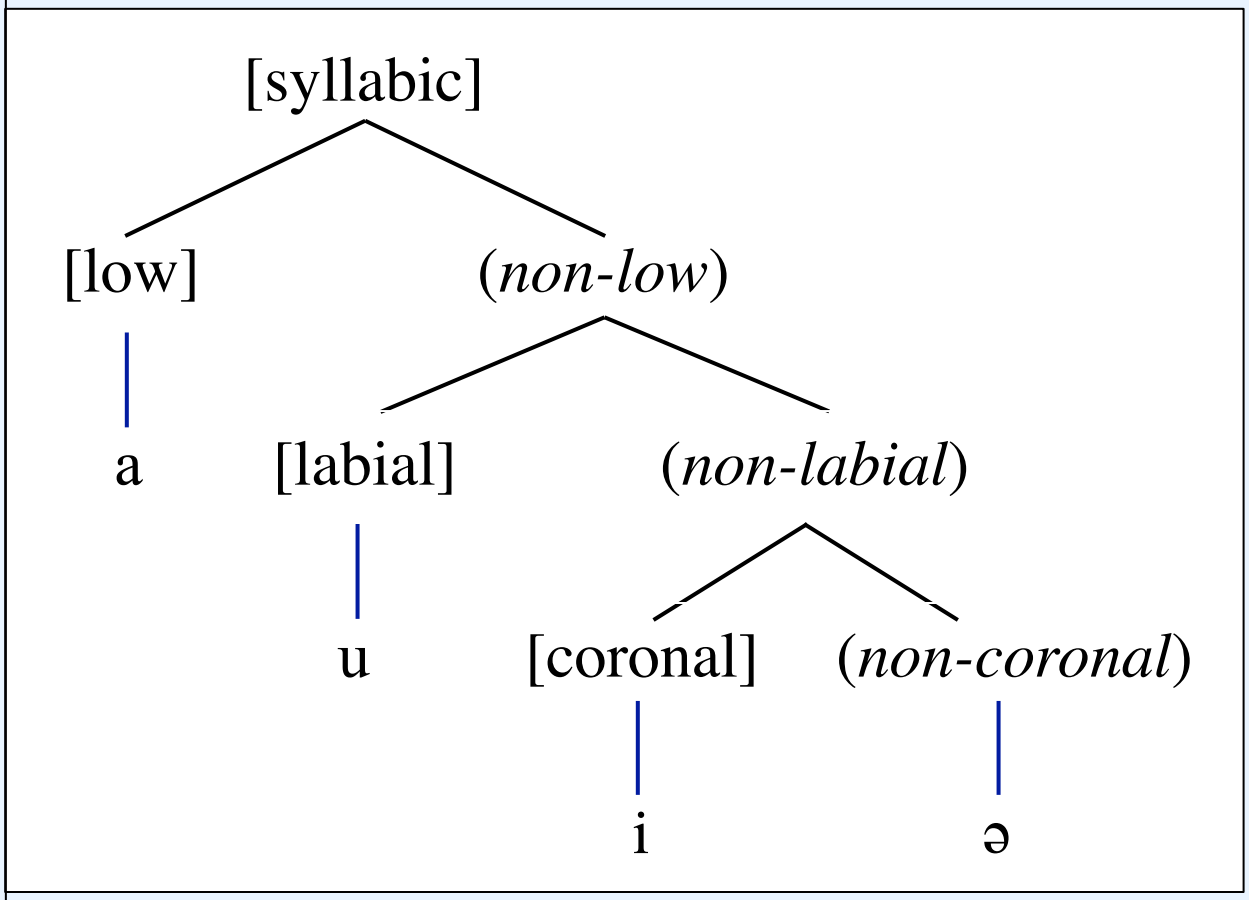
Inuit dialects

Compton and Dresher (2011) observe a generalization:

> Inuit /i/ can cause palatalization (assibilation) of a consonant only in dialects where there is evidence for a (former) contrast with a fourth vowel; where there is no contrast between strong and weak *i*, /i/ does not trigger palatalization.

This generalization follows if we assume that the feature hierarchy for Inuit and Yupik is [low] > [labial] > [coronal]:

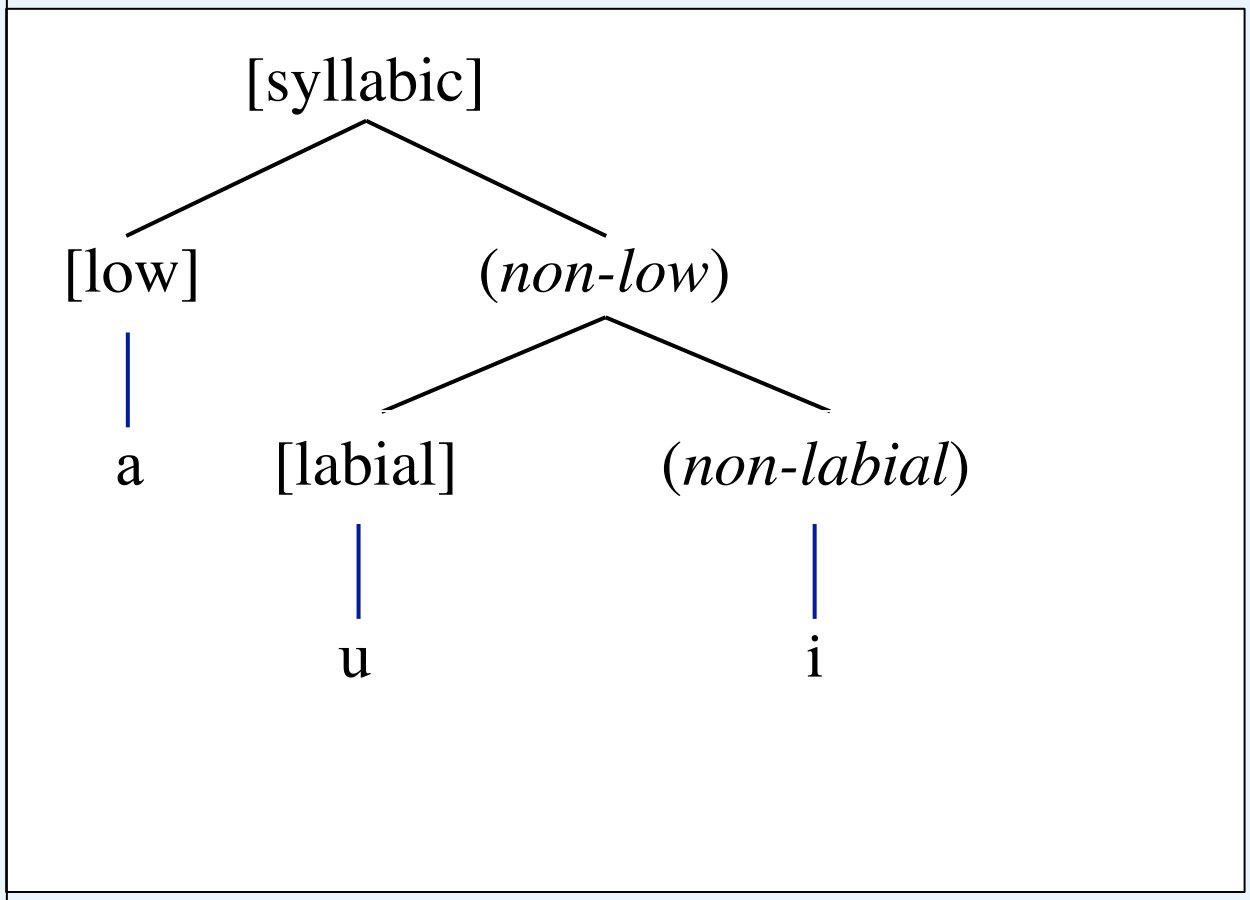
Inuit-Yupik contrastive hierarchy (Compton and Dresher 2011)



When the fourth vowel is in the underlying inventory, /i/ has a contrastive [coronal] feature that enables it to cause palatalization.

[low] > [labial] > [coronal]

Inuit-Yupik contrastive hierarchy (Compton and Dresher 2011)



But in the absence of a fourth vowel, [coronal] is not a contrastive feature.

[low] > [labial]

Labial Harmony in Turkic

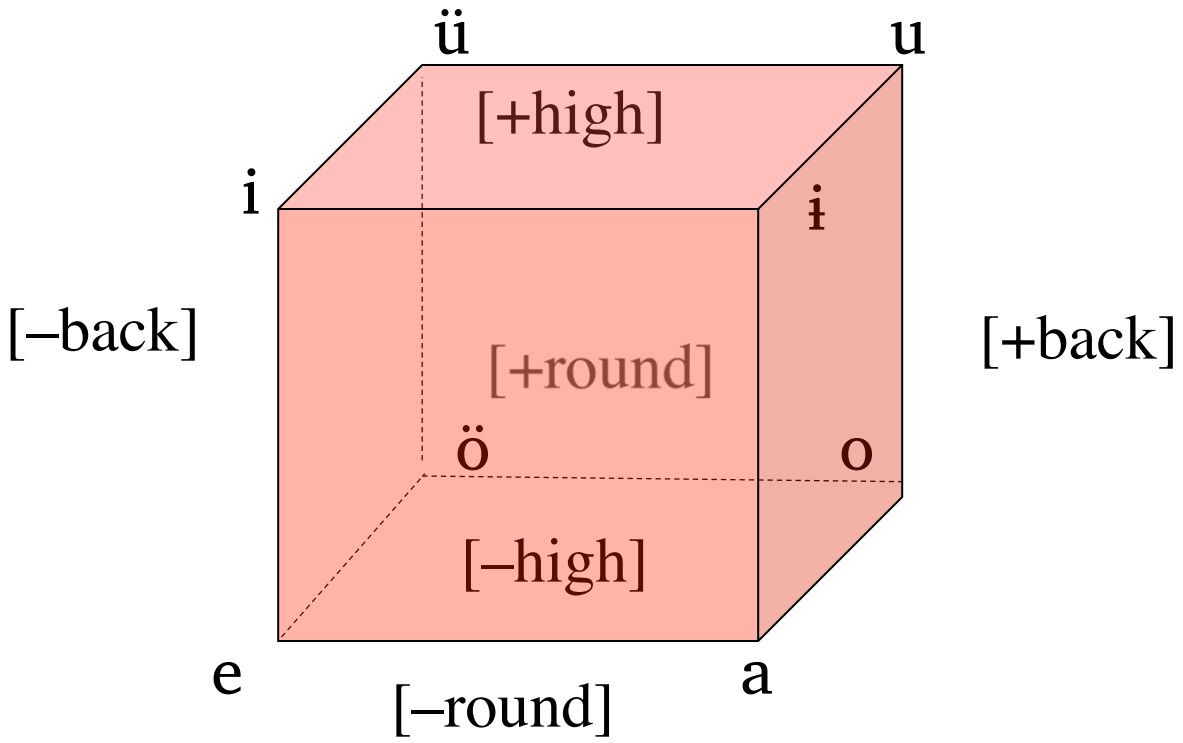
Turkic languages have symmetrical inventories. They are typically analyzed with 3 features: 1 height feature and 2 place features, as below.

Turkish

	coronal		non-coronal	
	non-labial	labial	non-labial	labial
high	/i/	/ü/	/ɨ/	/u/
low	/e/	/ö/	/a/	/o/

Turkish Vowels

Here, every feature specification is contrastive in any order; the vowels completely fill the 2 x 2 x 2 = 8 cell vowel space.



Labial Harmony in Turkic

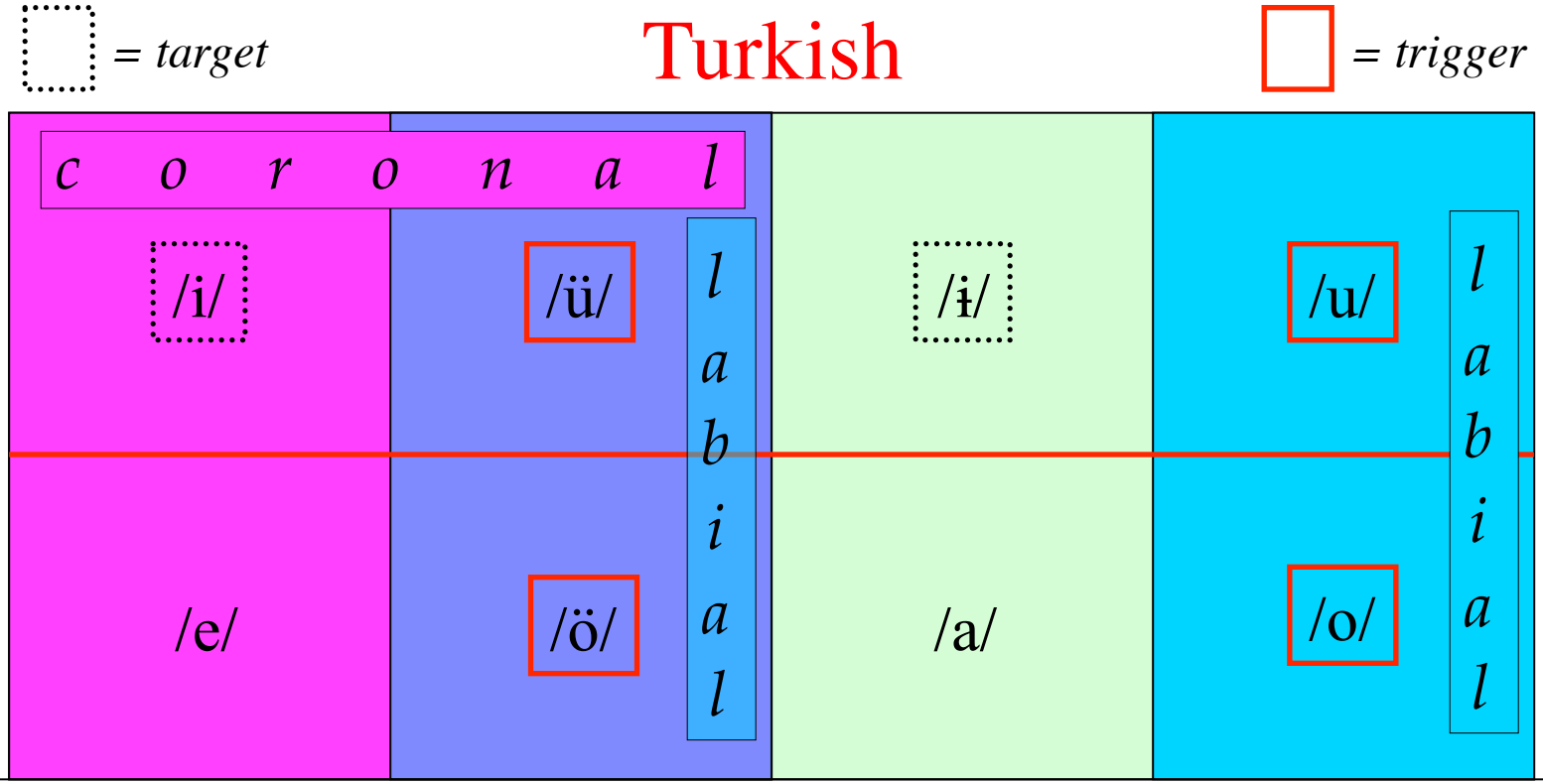
We predict, therefore, that all round vowels could potentially be triggers of labial harmony in such languages. This prediction is correct, though harmony observes limitations that are not due to contrast, but to other factors.

Turkish

	coronal		non-coronal	
	non-labial	labial	non-labial	labial
high	/i/	/ü/	/ɨ/	/u/
low	/e/	/ö/	/a/	/o/

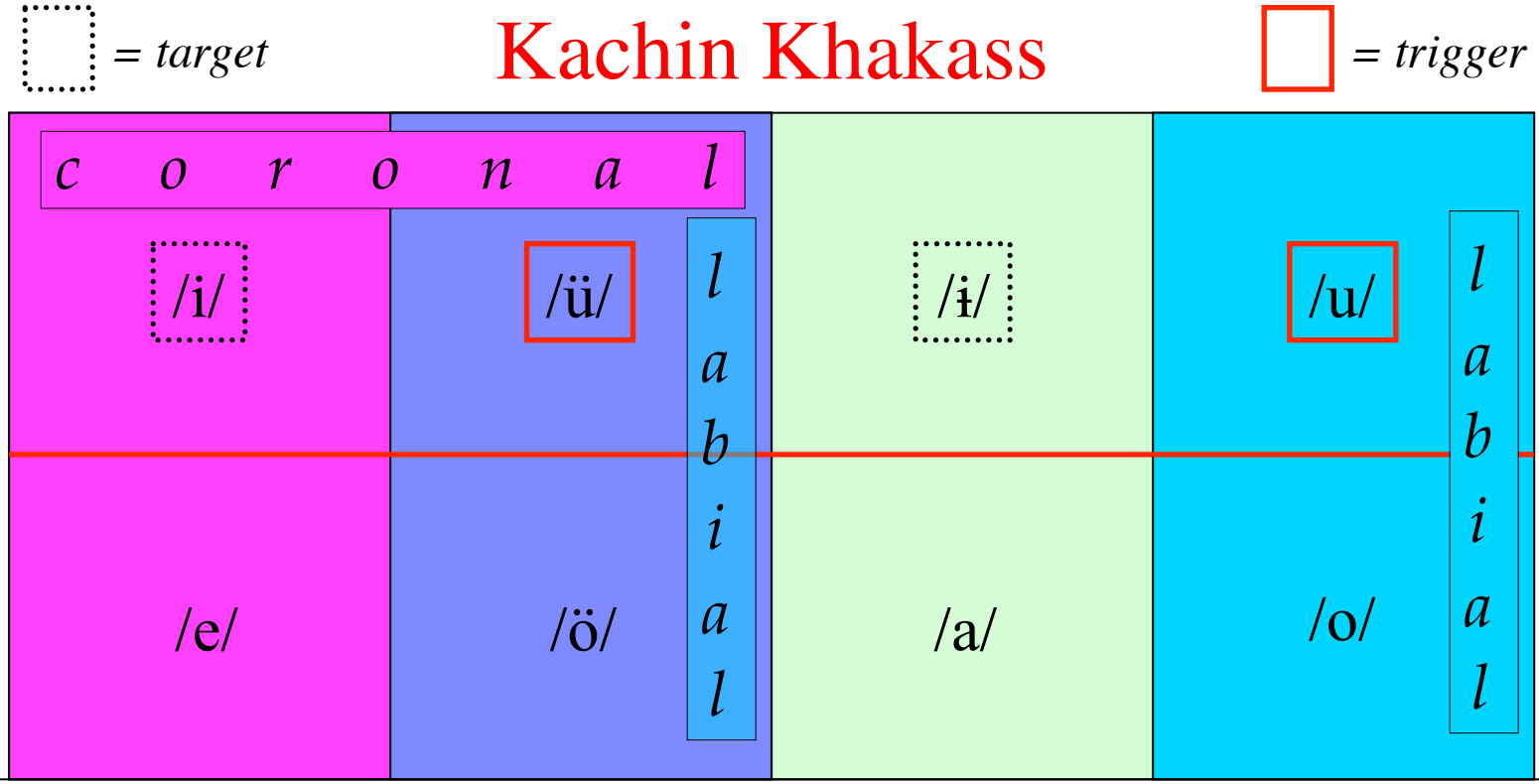
Labial Harmony in Turkic

In Turkish, for example, harmony triggers can be high or low, but targets are typically limited to high vowels.



Labial Harmony in Turkic

In Kachin Khakass (Korn 1969), both triggers and targets of labial harmony must be high, the opposite of the Manchu-Tungus-Eastern Mongolian pattern.



Summary

To sum up, we can classify languages into types based on the contrastive scopes of the vowel features [coronal] and [labial]:

- with [coronal] > [labial], /i/ can cause palatalization, but /u/ may or may not trigger labial harmony
- with [labial] > [coronal], /u/ may trigger labial harmony, but /i/ may or may not cause palatalization
- in languages where [labial] and [coronal] are contrastive for all vowels, these features may be active in all vowels

Whether a feature is contrastive on a given vowel depends on the feature hierarchy and the size of the inventory.

Contrast Shift and Diachrony

The notion that contrast shift is a type of grammar change has proved to be fruitful in the study of a variety of languages.

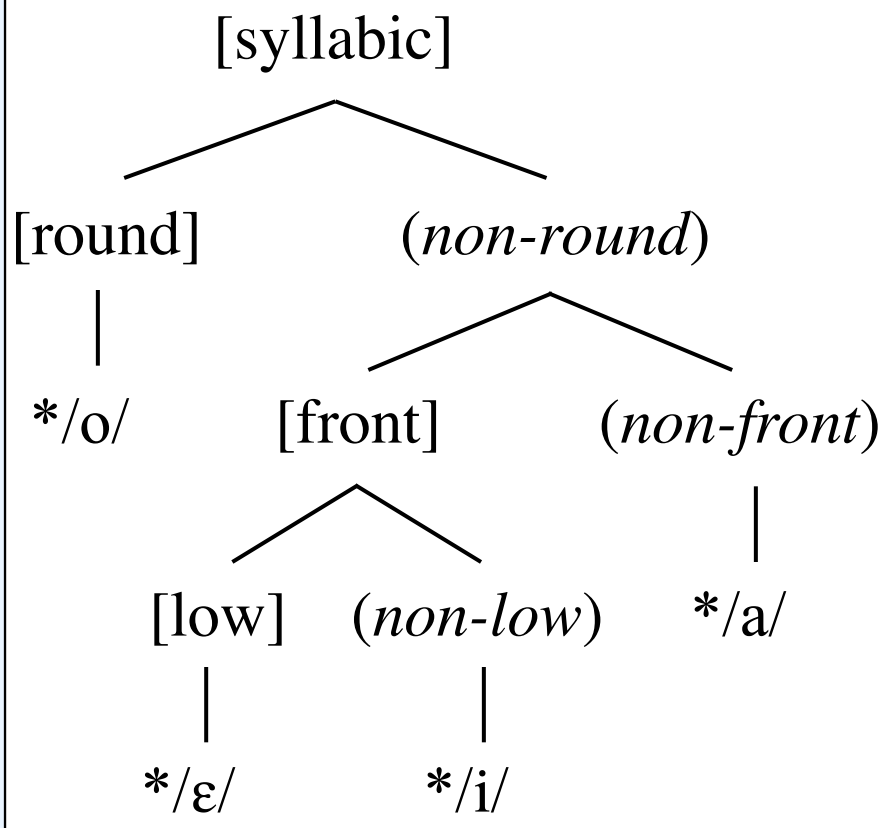
Examples include: Zhang (1996) and Dresher and Zhang (2005) on Manchu; Barrie (2003) on Cantonese; Rohany Rahbar (2008) on Persian; Dresher (2009: 215–225) on East Slavic; Compton & Dresher (2011) on Inuit; Gardner (2012), Roeder & Gardner (2012), and Purnell & Raimy (2013) on North American English vowel shifts; and large-scale studies by Harvey (2012) on Ob-Ugric (Khanty and Mansi), Ko (2010, 2011, 2012) on Korean, Mongolic, and Tungusic, and Oxford (2012a, b) on Algonquian.

Diachrony:

From Proto-Algonquian to the modern Algonquian languages

In a survey of the historical development of Algonquian vowel systems, Oxford (2012) observes that a large set of separate changes can be understood if we posit a single contrast shift.

Contrastive hierarchy for Proto-Algonquian vowels (Oxford 2012)
[round] > [front] > [low]



Oxford (2012) posits this feature hierarchy for Proto-Algonquian *(length contrast omitted for ease of exposition)*.

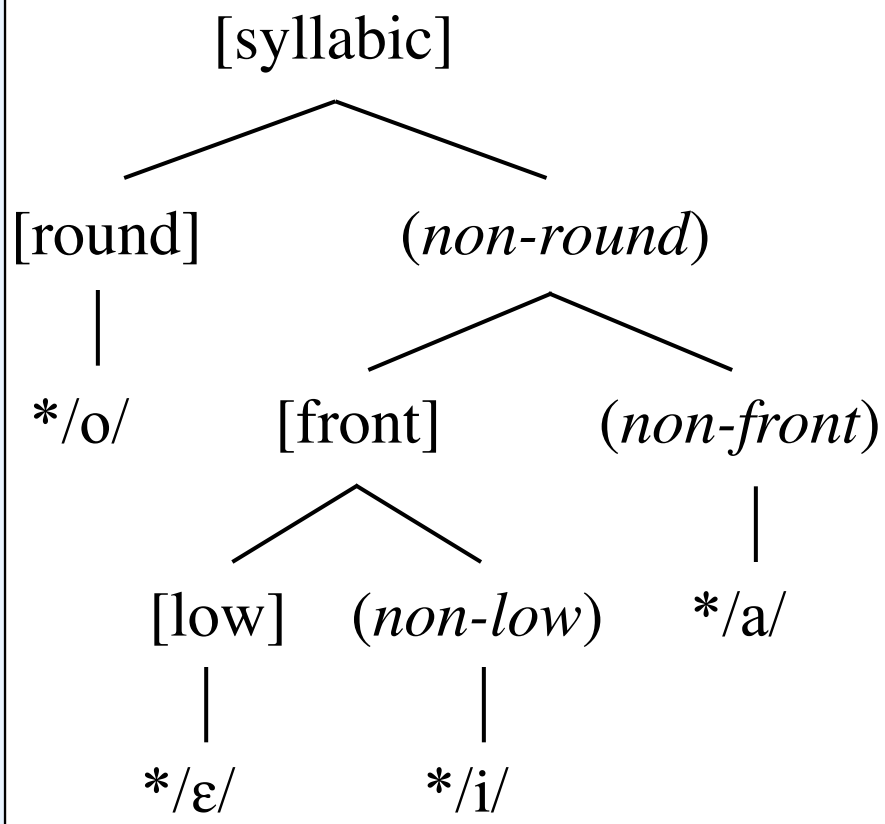
***/o/** is [round]: triggers rounding

***/i/** is [front]: triggers palatalization

***/i, ɛ/** sisters: partial neutralization

***/a/** has no marked contrastive features: is never a trigger

Contrastive hierarchy for Proto-Algonquian vowels (Oxford 2012)
[round] > [front] > [low]

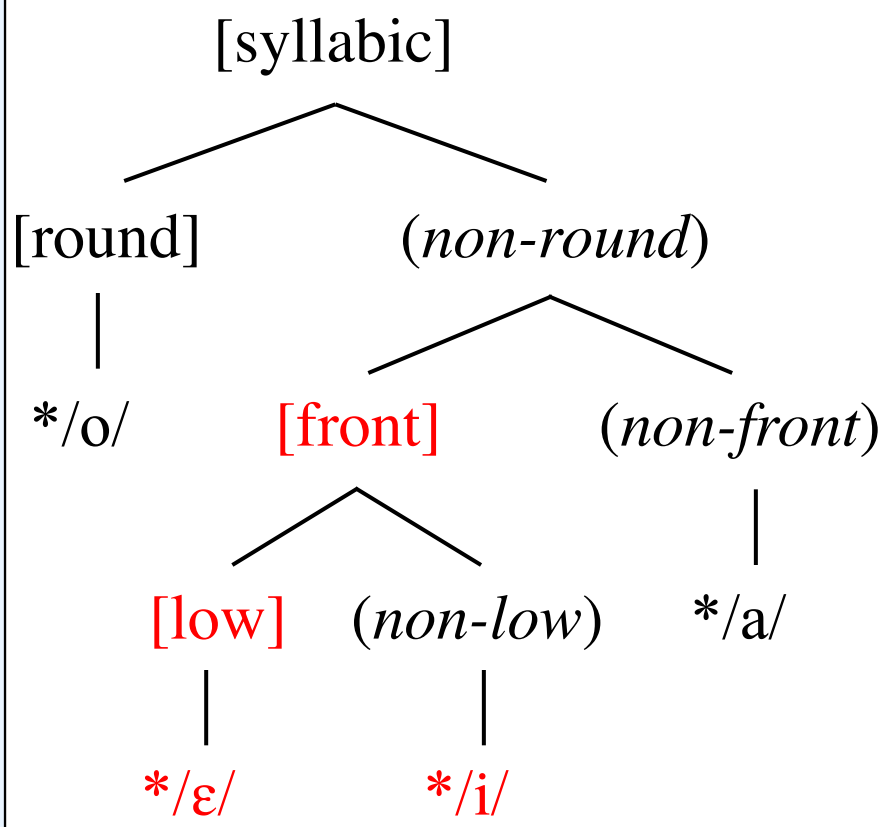


The PA hierarchy continues unchanged in the Central Algonquian languages and in Blackfoot.

It accounts for two recurring patterns:

Contrastive hierarchy for Central Algonquian and Blackfoot

[round] > [front] > [low]



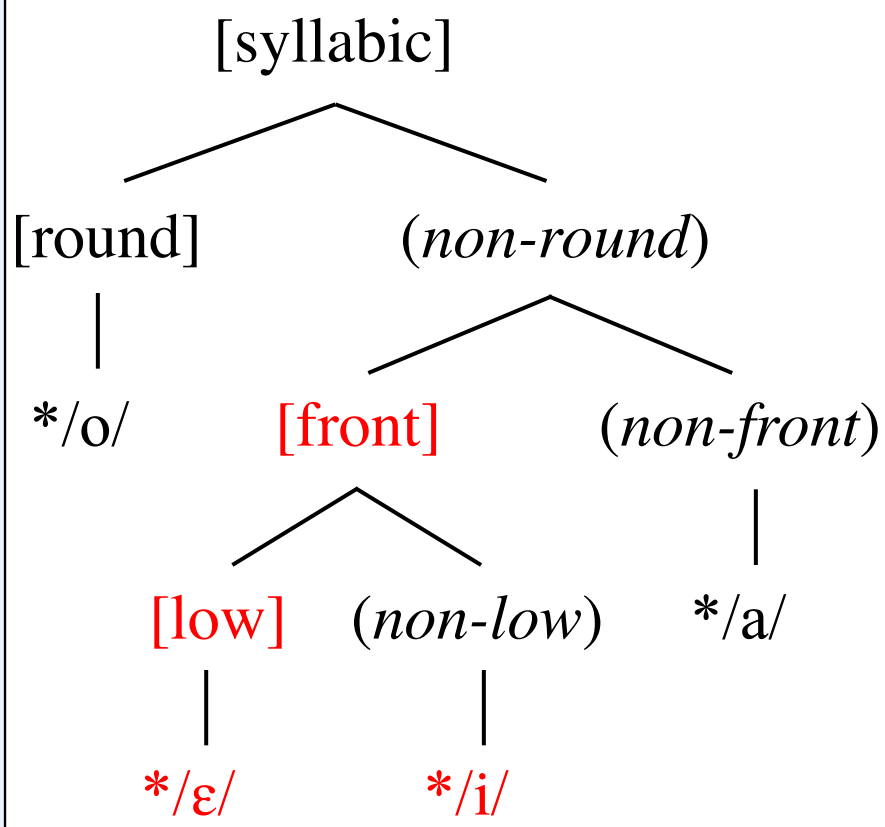
1. Palatalization always includes */i/ as a trigger

PA */t, θ/-palatalization is triggered by */i, iː/

Innu */k/-palatalization is triggered by */i, iː, ɛː/

Betsiamites Innu /t/-palatalization is triggered by /iː/

Contrastive hierarchy for Central Algonquian and Blackfoot [round] > [front] > [low]



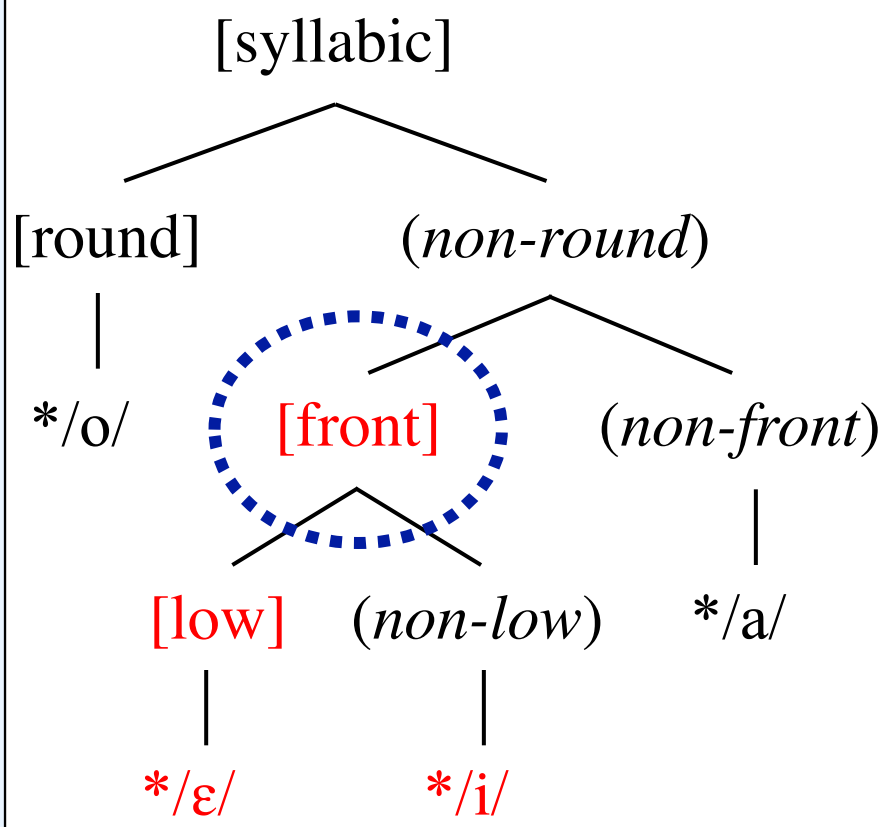
1. Palatalization always includes */i/ as a trigger

Blackfoot */k/-assibilation is triggered by PA */i, iː/

Blackfoot /t/-assibilation is triggered by Blackfoot /i, iː/

Contrastive hierarchy for Central Algonquian and Blackfoot

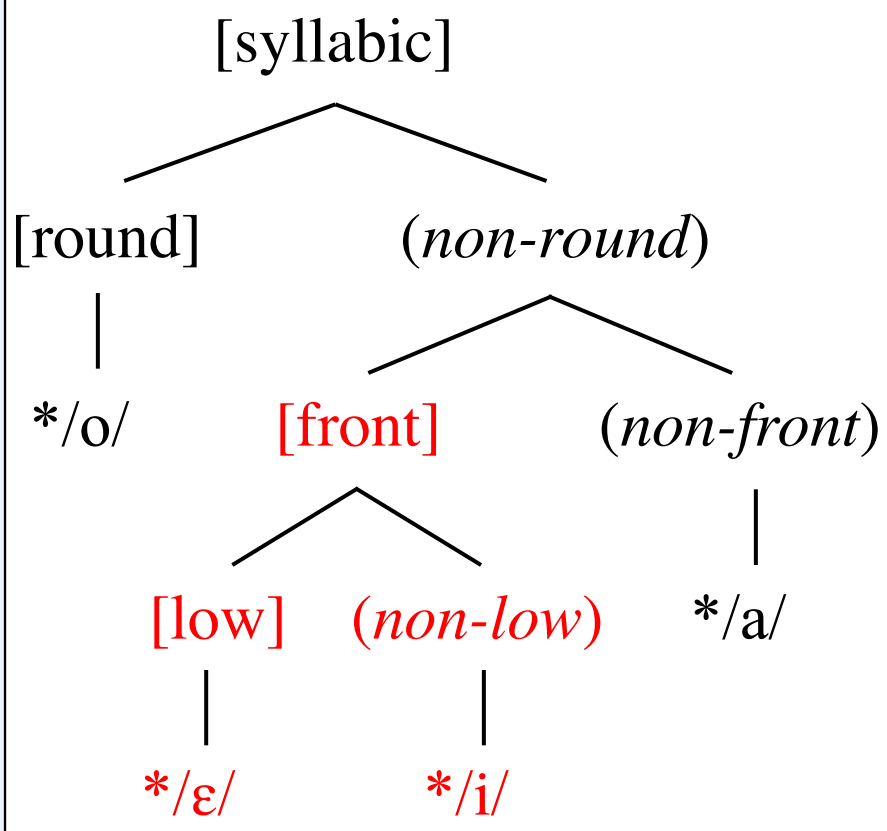
[round] > [front] > [low]



1. Palatalization always includes */i/ as a trigger

These patterns support the view that palatalization is triggered by a contrastive [front] feature, and favours vowels that are (*non-low*).

Contrastive hierarchy for Central Algonquian and Blackfoot [round] > [front] > [low]

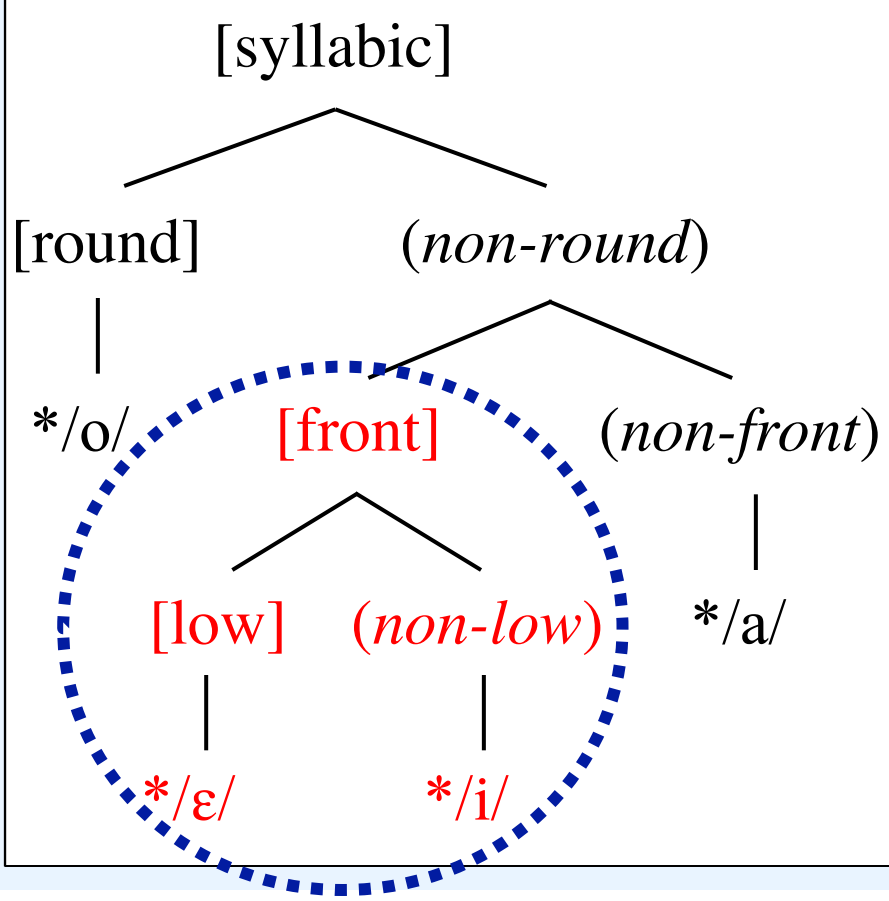


2. */ɛ/ regularly merges with */i/

Partial or complete mergers of short */ɛ/ > /i/ occur in Fox, Shawnee, Miami-Illinois, Cree-Innu, Ojibwe, and Blackfoot

Long */ɛː/ > /iː/ in Woods Cree, Northern Plains Cree, and Blackfoot

Contrastive hierarchy for Central Algonquian and Blackfoot [round] > [front] > [low]

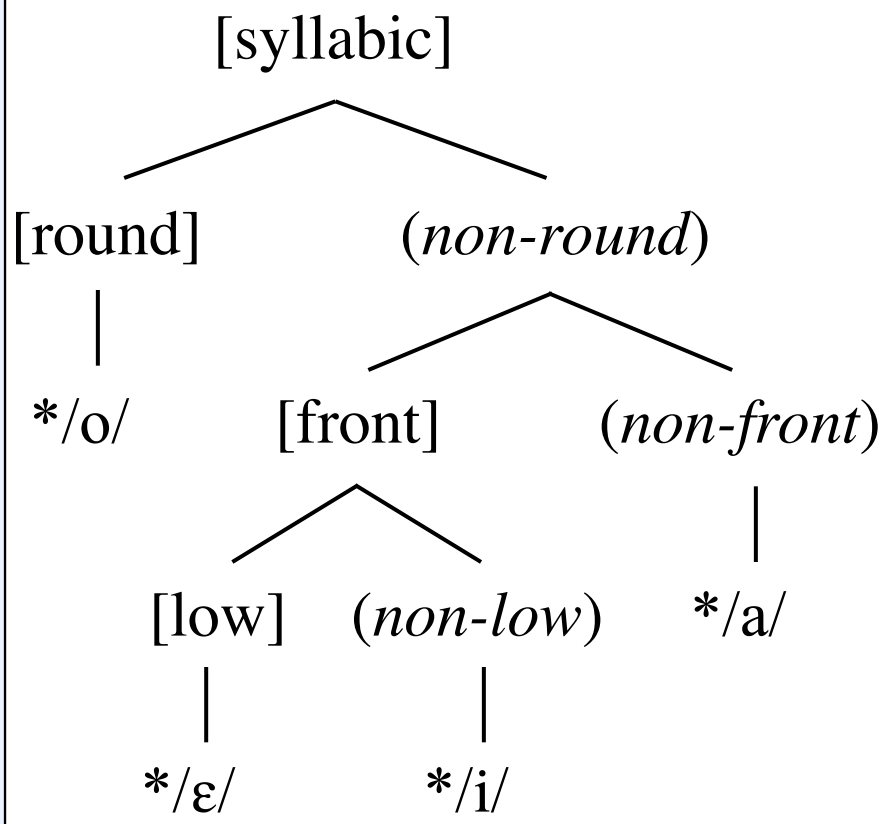


2. */ɛ/ regularly merges with */i/

These mergers are consistent with the idea that merger will tend to involve terminal nodes in the feature tree.

Eastern and Western Algonquian

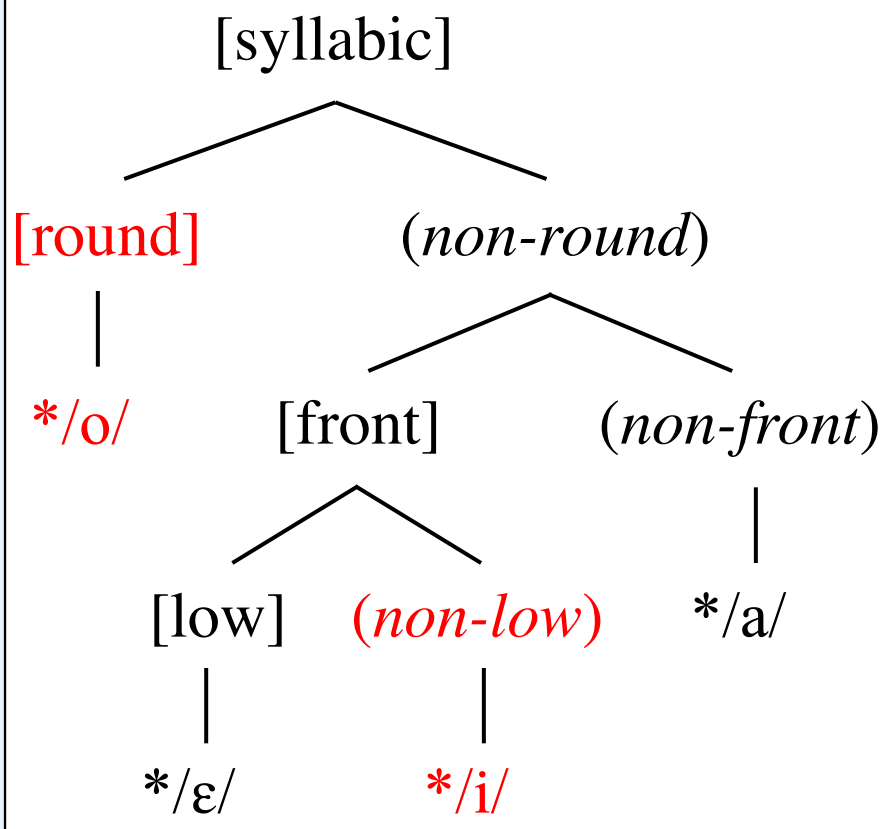
[round] > [front] > [low]



On the eastern and western edges of the Algonquian area, developments diverge from the predictions of the PA hierarchy.

Eastern and Western proto-languages

[round] > [front] > [low]



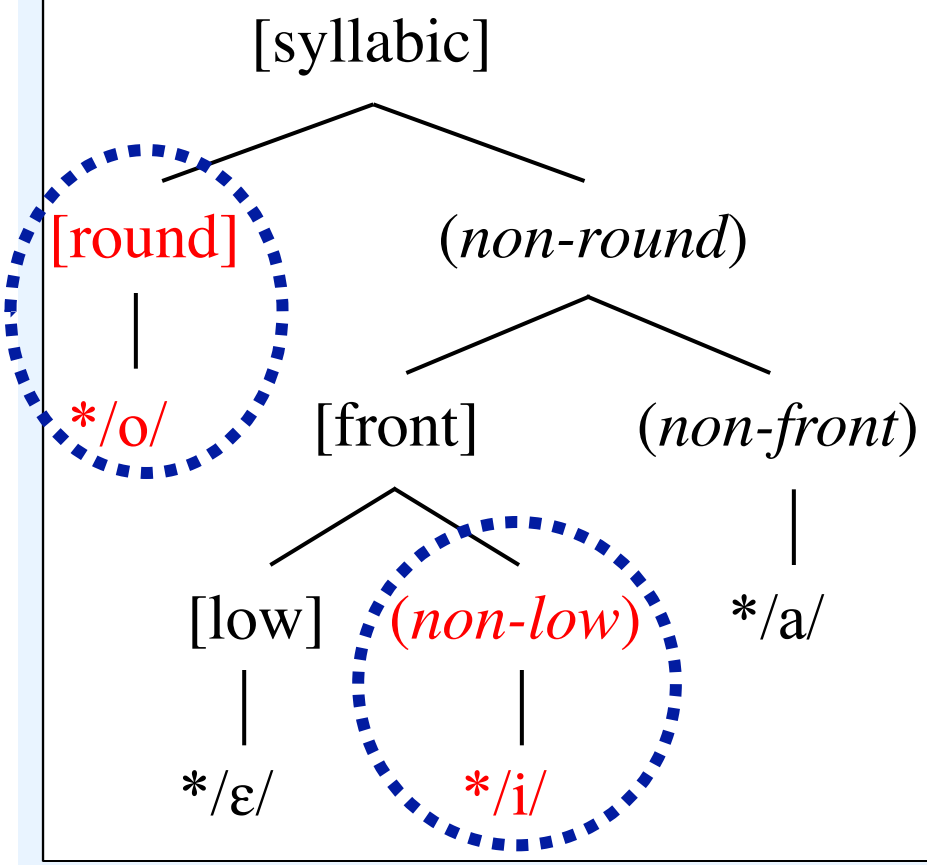
The high vowels begin to pattern together

In the east: Proto-Eastern Algonquian lost the length contrast only in the high vowels (reflexes of */o/, */i/)

In the west: Proto-Arapaho-Atsina and Pre-Cheyenne merge */o, o:/ with */i, i:/

Eastern and Western proto-languages

[round] > [front] > [low]

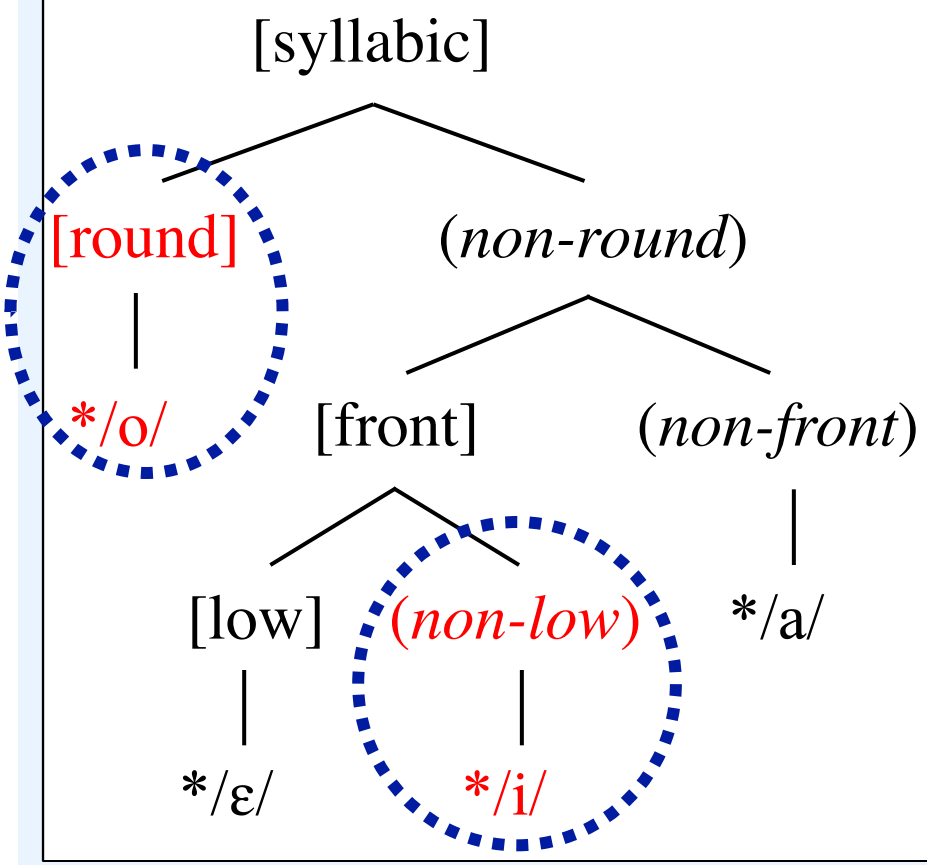


The high vowels begin to pattern together

But under the hierarchy inherited from PA, the high vowels are not a natural class!

Eastern and Western proto-languages

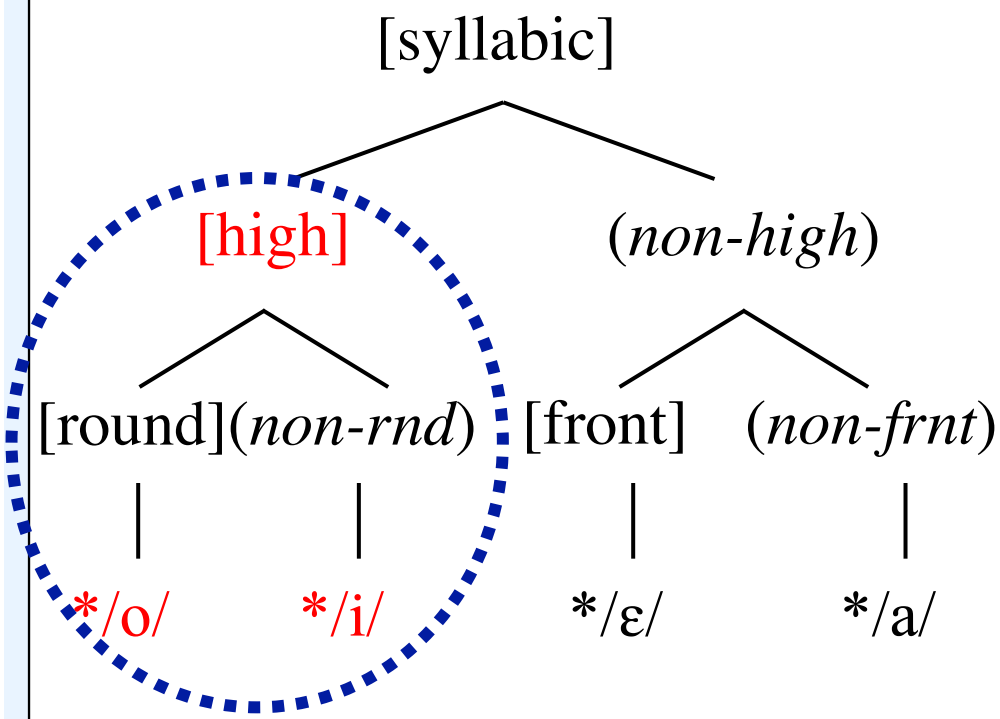
[round] > [front] > **[high]**



If the hierarchy constrains patterning, then the **height contrast** (reinterpreted as [high]) must have come to **outrank place contrasts**

Eastern and Western proto-languages

[high] > [round] > [front]

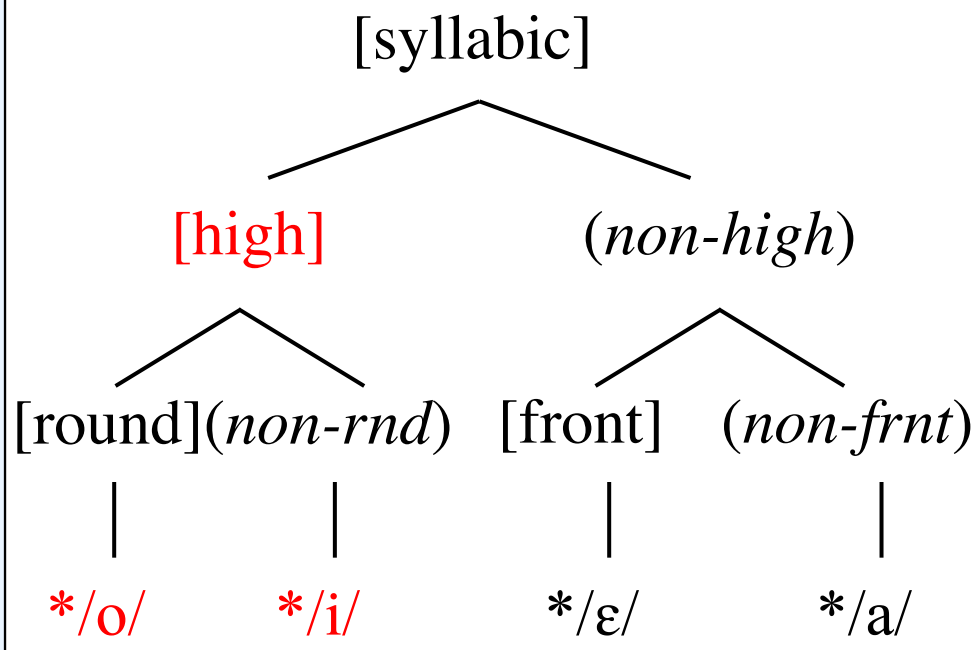


If the hierarchy constrains patterning, then the **height contrast** (reinterpreted as [high]) must have come to **outrank place contrasts**

That is, the feature [high] moves to the top of the hierarchy.

Eastern and Western daughter languages

[high] > [round] > [front]

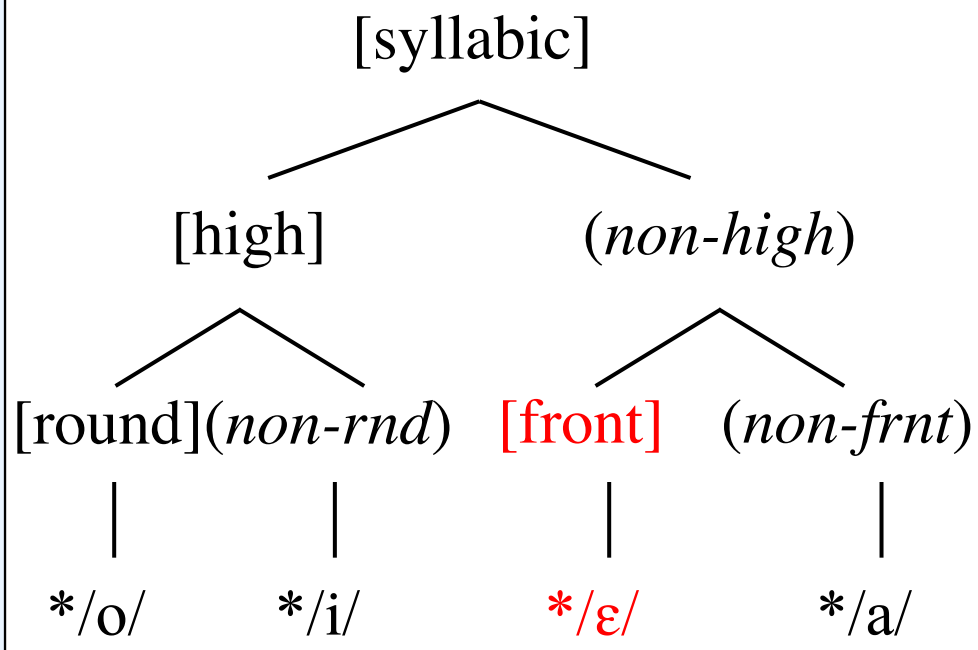


Subsequent developments in the eastern and western daughter languages follow the predictions of the new hierarchy.

The patterns consistently differ from those of Central Algonquian:

Eastern and Western daughter languages

[high] > [round] > [front]



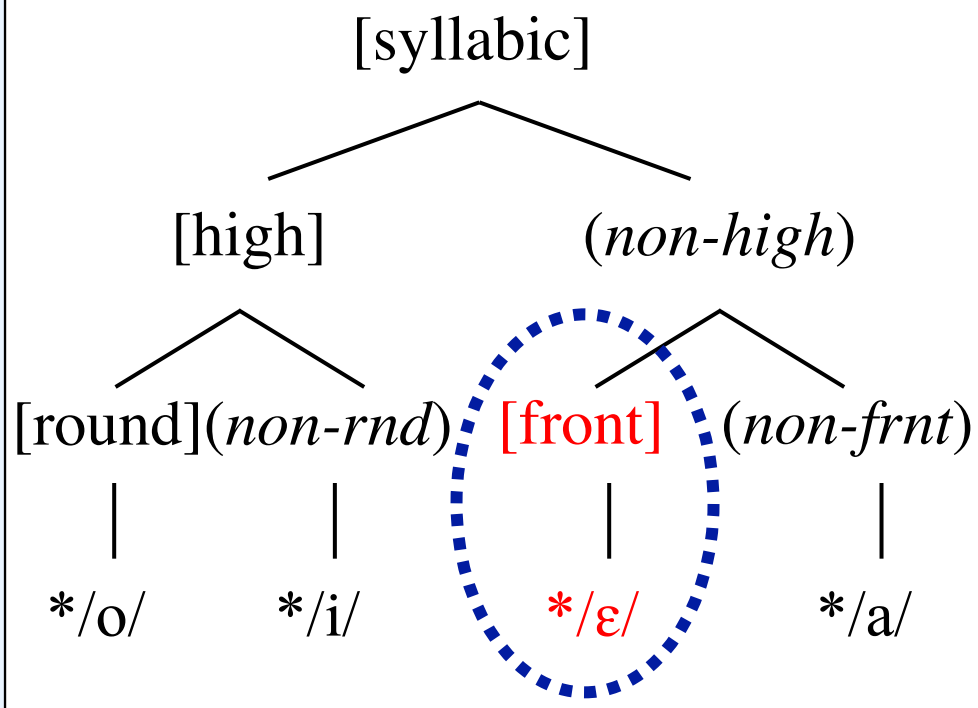
1. Palatalization is triggered by */ɛ/ but **excludes** */i/

Massachusett */k/-palatal-ization is triggered by PEA */ɛː/ but not /iː/

Cheyenne "yodation", where */k/ > /kj/, is triggered by */ɛ(ː)/ only

Eastern and Western daughter languages

[high] > [round] > [front]



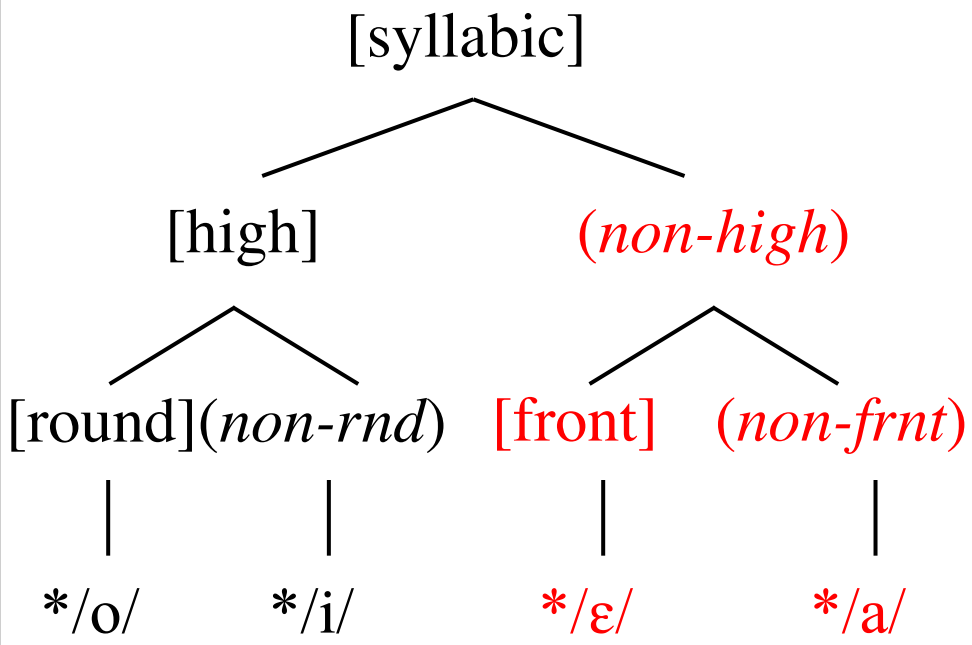
1. Palatalization is triggered by */ɛ/ but **excludes** */i/

Again, these patterns support the view that palatalization is triggered by a contrastive [front] feature.

Only /ɛ/ is contrastively [front] in these languages.

Eastern and Western daughter languages

[high] > [round] > [front]



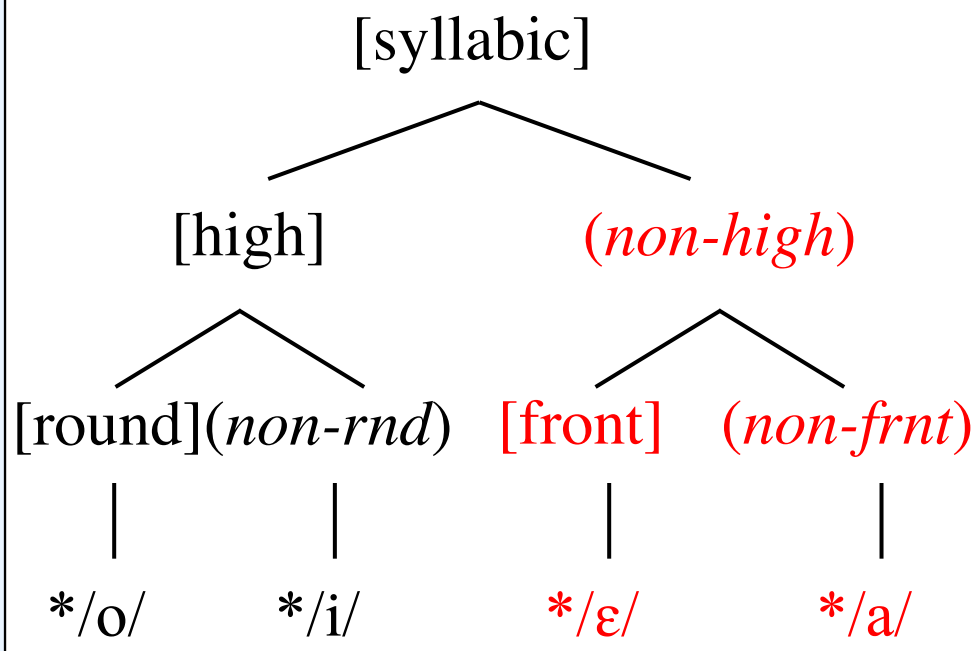
2. */ɛ/ merges with or shifts to */a/

Partial or complete mergers of PA short */ɛ/ with */a/ occur in Abenaki, Mahican, Mi'kmaq, and Maliseet-Passamaquoddy

PEA long */ɛː/ shifts to /aː/ in Massachusett and merges with */a/ in Western Abenaki

Eastern and Western daughter languages

[high] > [round] > [front]



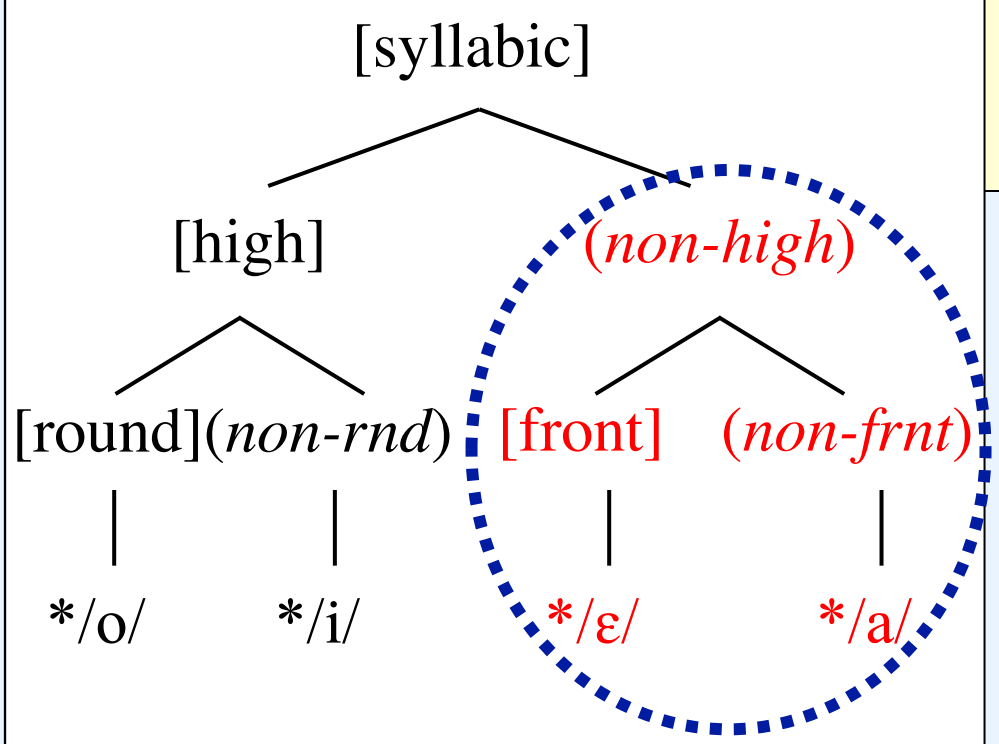
2. */ɛ/ merges with or shifts to */a/

Long and short */ɛ(ː)/ shift to /a(ː)/ in Cheyenne

Vowel harmony involves */ɛ(ː)/ and */a(ː)/ in Arapaho

Eastern and Western daughter languages

[high] > [round] > [front]

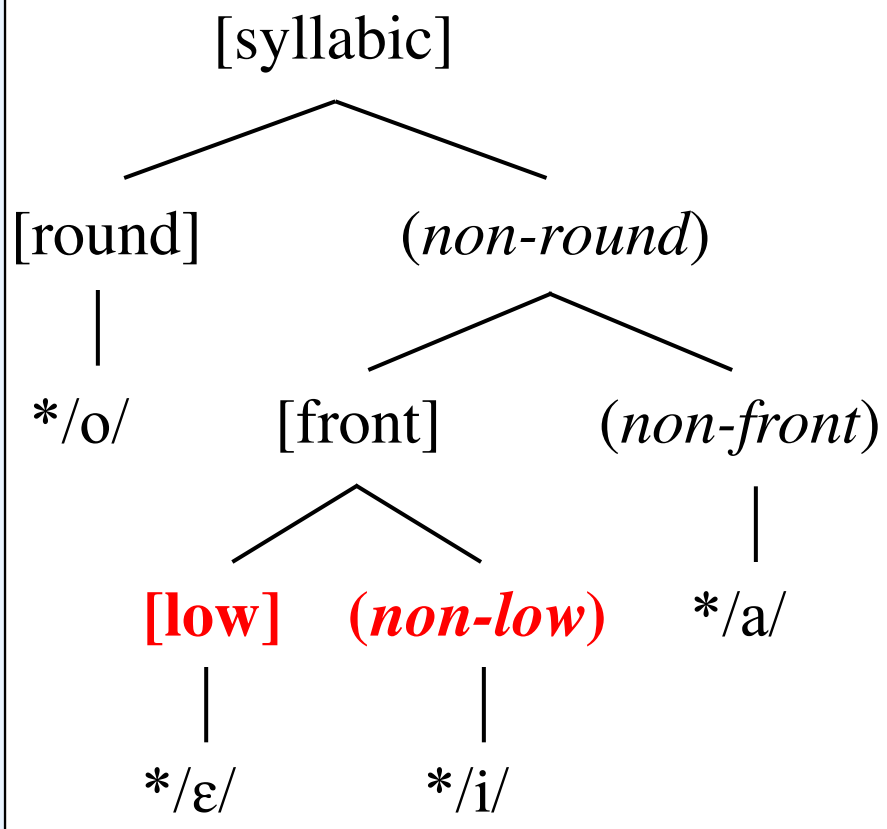


2. */ɛ/ merges with or shifts to */a/

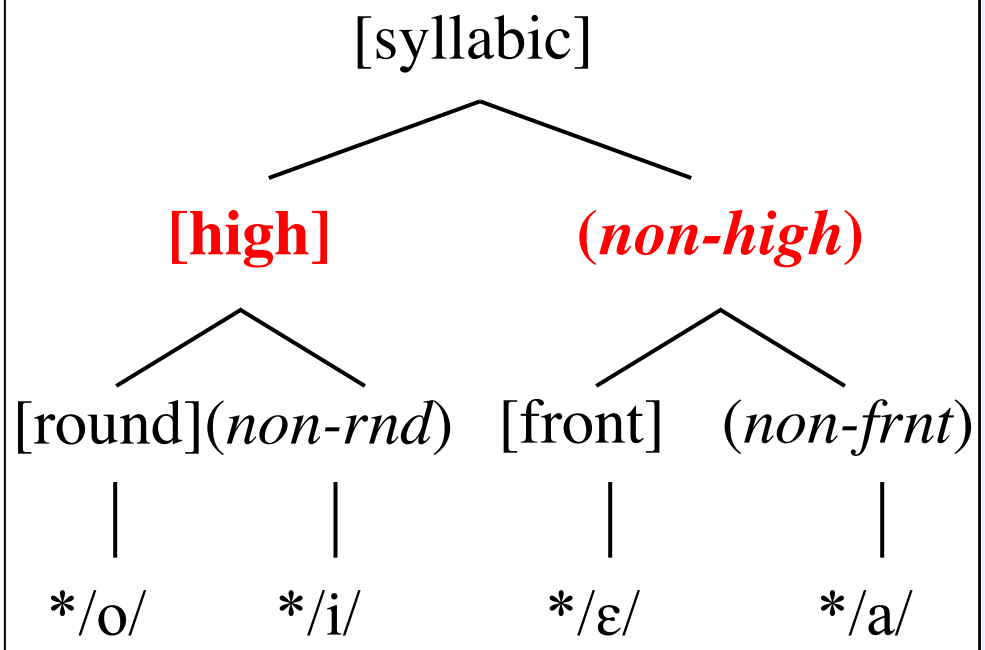
Follows from the sisterhood of */ɛ/ and */a/ under the new hierarchy.

A **single contrast shift** thus accounts for the patterning of a large number of phonological changes across the Algonquian family.

PA and Central languages



Eastern and Western languages



Areal isoglosses:

Borrowing Contrast shifts in the Ob-Ugric Mansi and Khanty languages

Harvey (2012) shows that contrastive shifts in the Ob-Ugric Mansi and Khanty languages show clear isoglosses and are borrowed between languages.

Ob-Ugric vowel systems

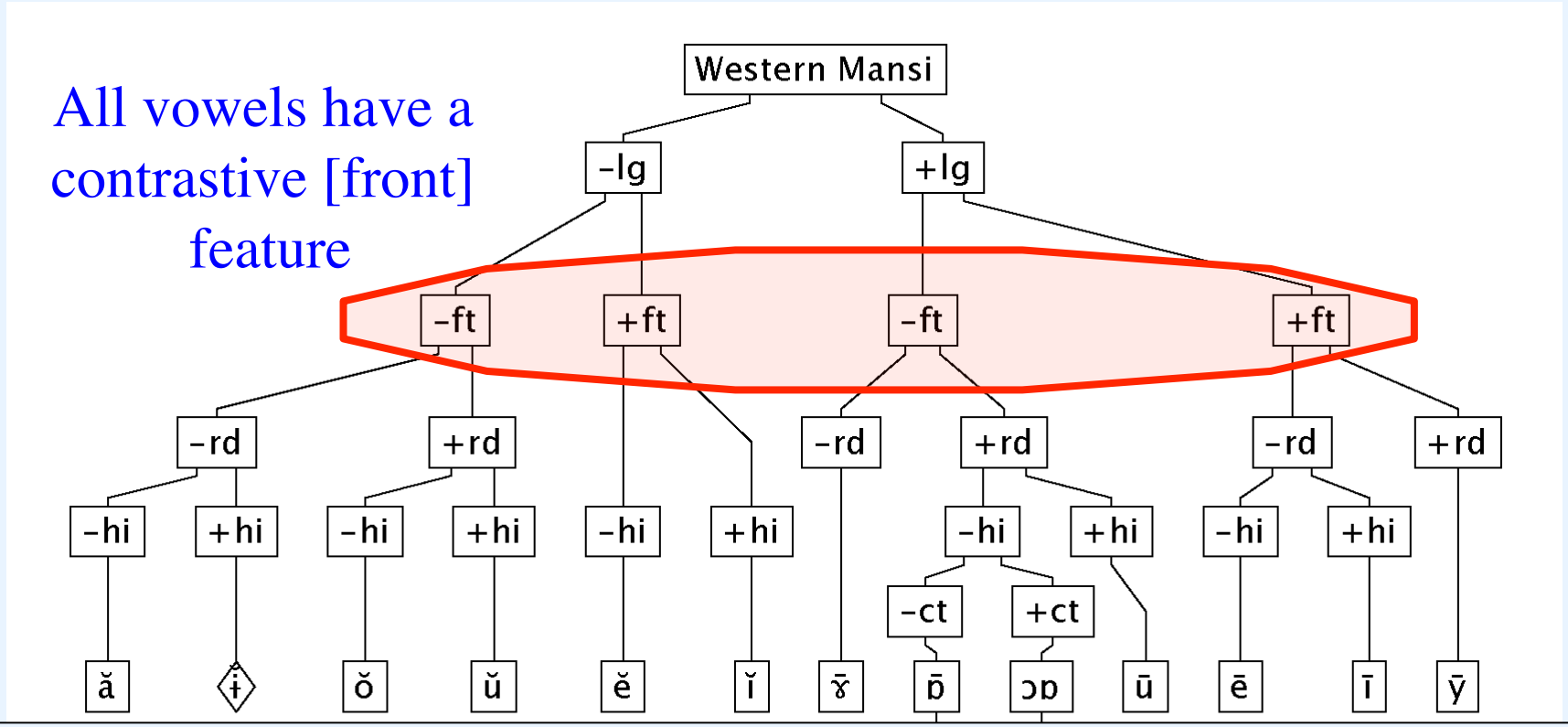
The Ob-Ugric languages are found in central Russia, to the east of the Ural mountains along the Ob river system. The two branches of Ob-Ugric are the Mansi languages, in the southwest, and the Khanty languages, to the east and north.

The Ob-Ugric languages inherited a complex vowel system: Proto-Ob-Ugric has been reconstructed to have 19 vowel phonemes (Harvey 2012, based on Sammallahti 1988).

Also characteristic of Ob-Ugric was a pervasive front-back vowel harmony that affected all vowels; we assume that the relevant feature is [front].

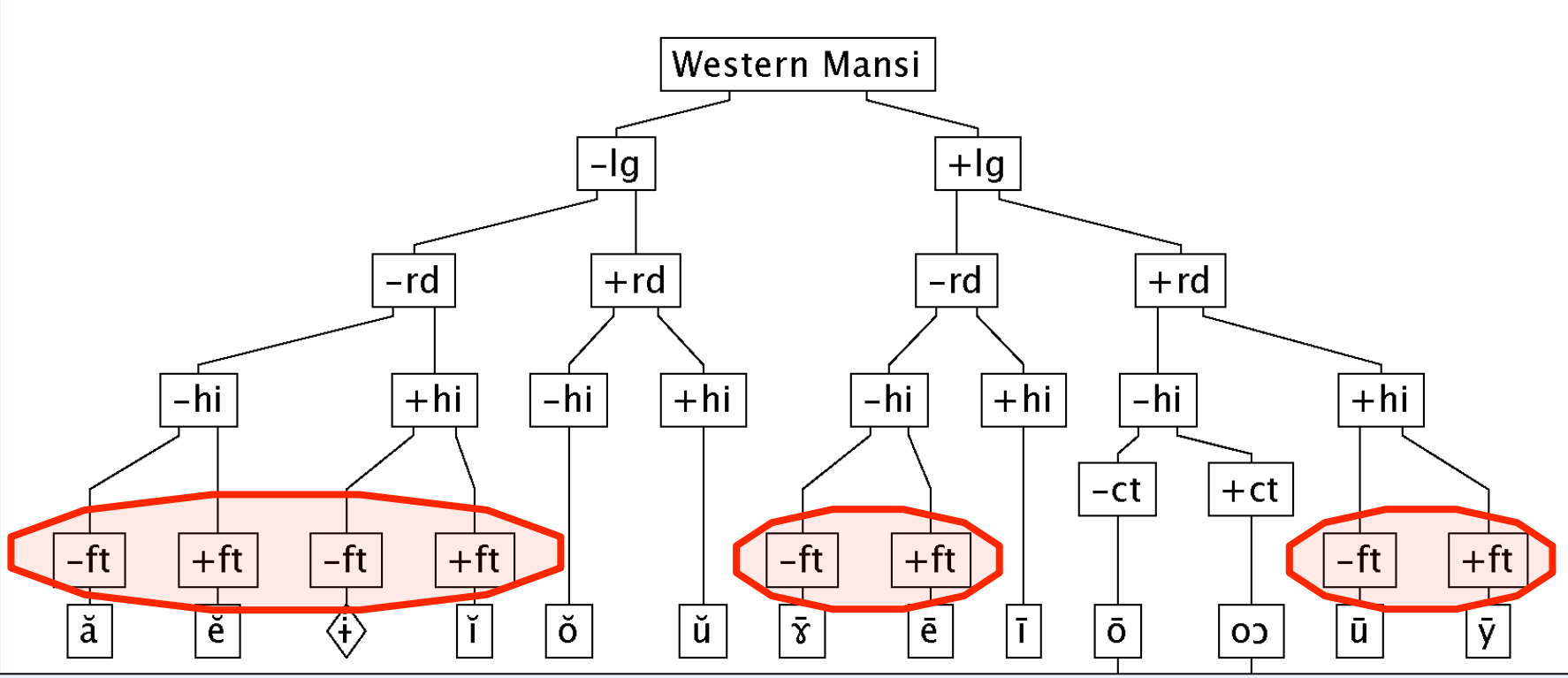
Early Western Mansi hierarchy
[lg] > [ft] > [rd] > [hi] > [ct]

For example, Early Western Mansi has the feature hierarchy below; all vowels are contrastive for [front] and all participate in vowel harmony.



Later Western Mansi:
[lg] > [rd] > [hi] > [ct] > [ft]

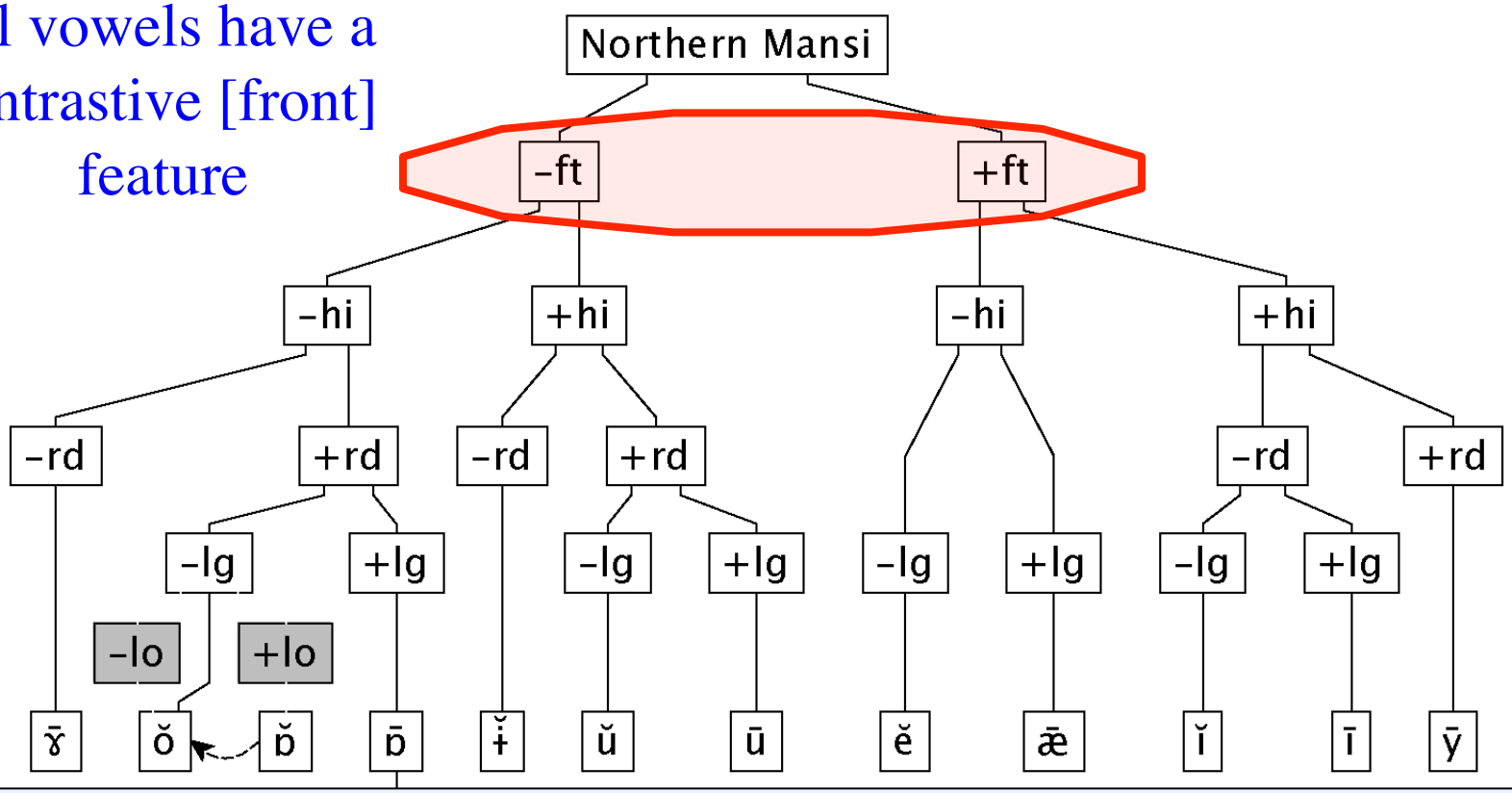
Subsequently, [front] drops to the bottom of the hierarchy. Front harmony is lost, and phonemes that were previously contrastively (*non-front*) develop front allophones.



Early Northern Mansi
[ft] > [hi] > [rd] > [lg]

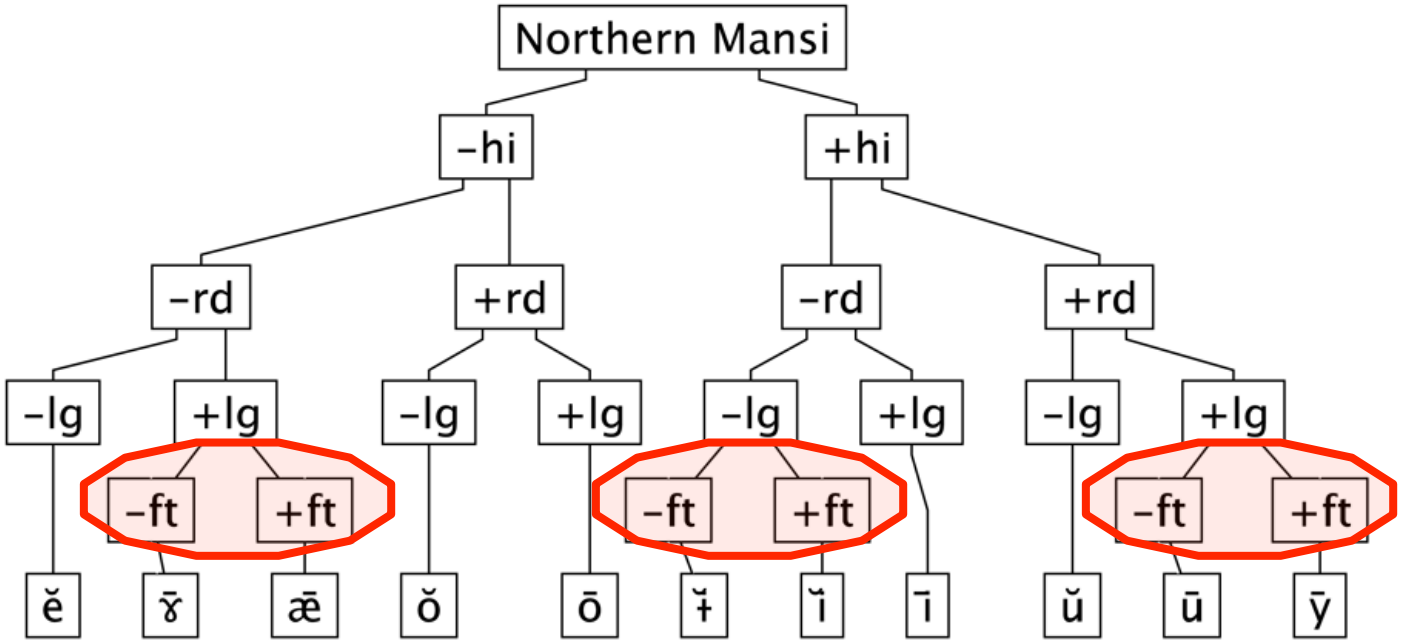
A similar development occurred in Northern Mansi.

All vowels have a contrastive [front] feature



Later Northern Mansi:
[hi] > [rd] > [lg] > [ft]

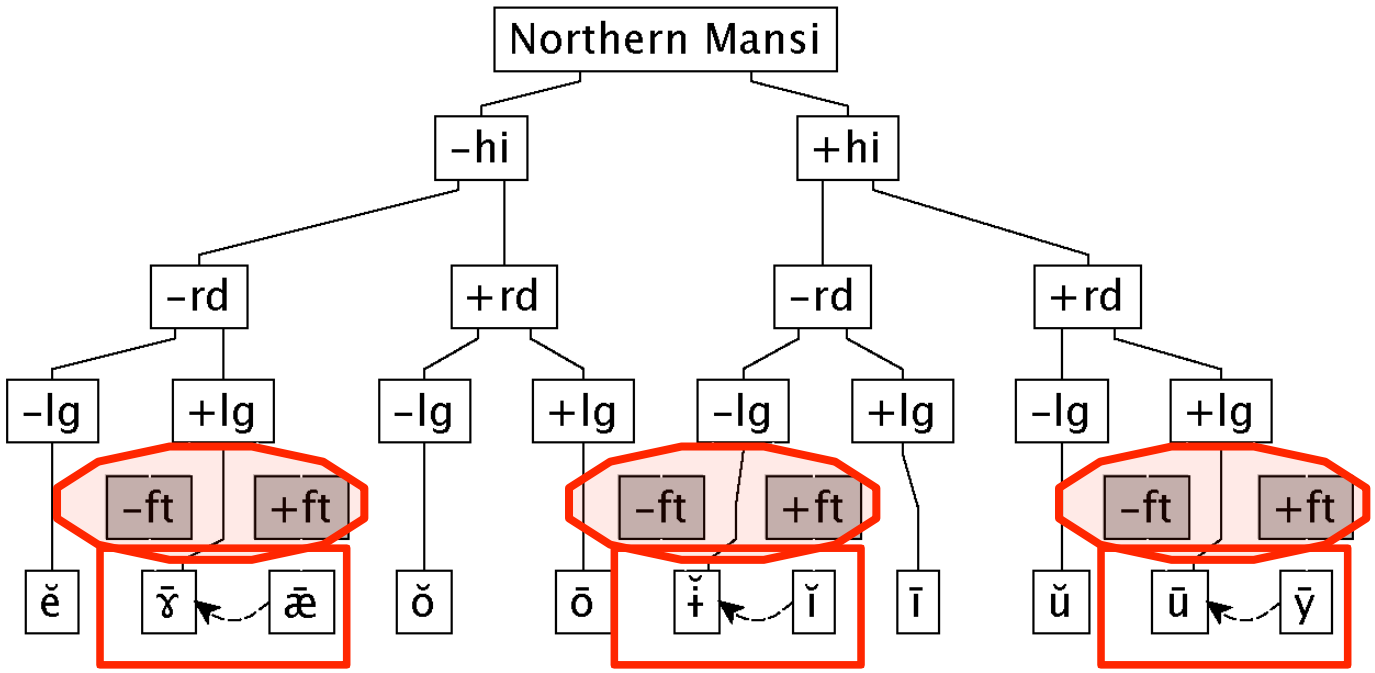
Here, too, [front] drops to the bottom, resulting in the loss of front harmony.



{*ĕ, *ŏ, *ō, *ī, *ŭ} are not contrastive for [front]

Later Northern Mansi:
[hi] > [rd] > [lg] > [ft]

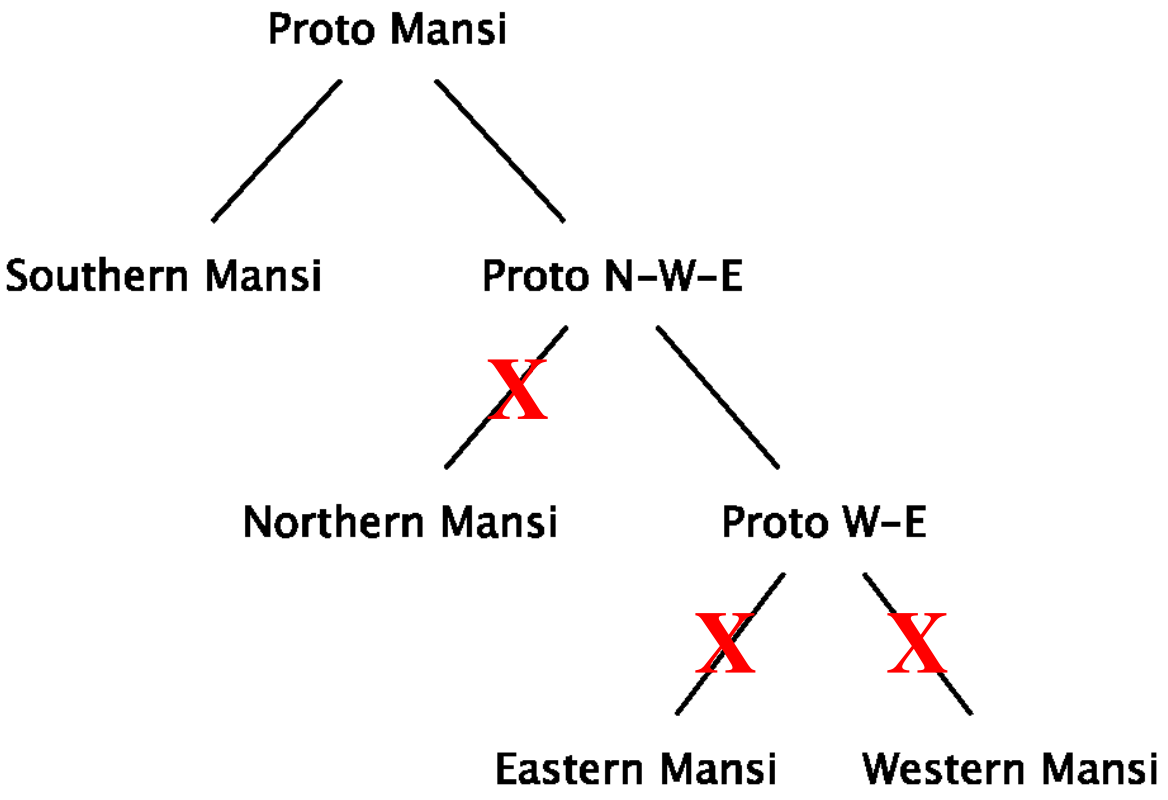
Some phonemes that were previously contrastively [front] merge with back vowels.



Terminal merger from [+front] towards (*non-front*)

Genetic or areal?

[front] dropping did not occur early on in the genetic history of Proto Mansi. The shift occurred later in the daughter languages. The red **X** indicates when the [front]-dropping shift occurred.



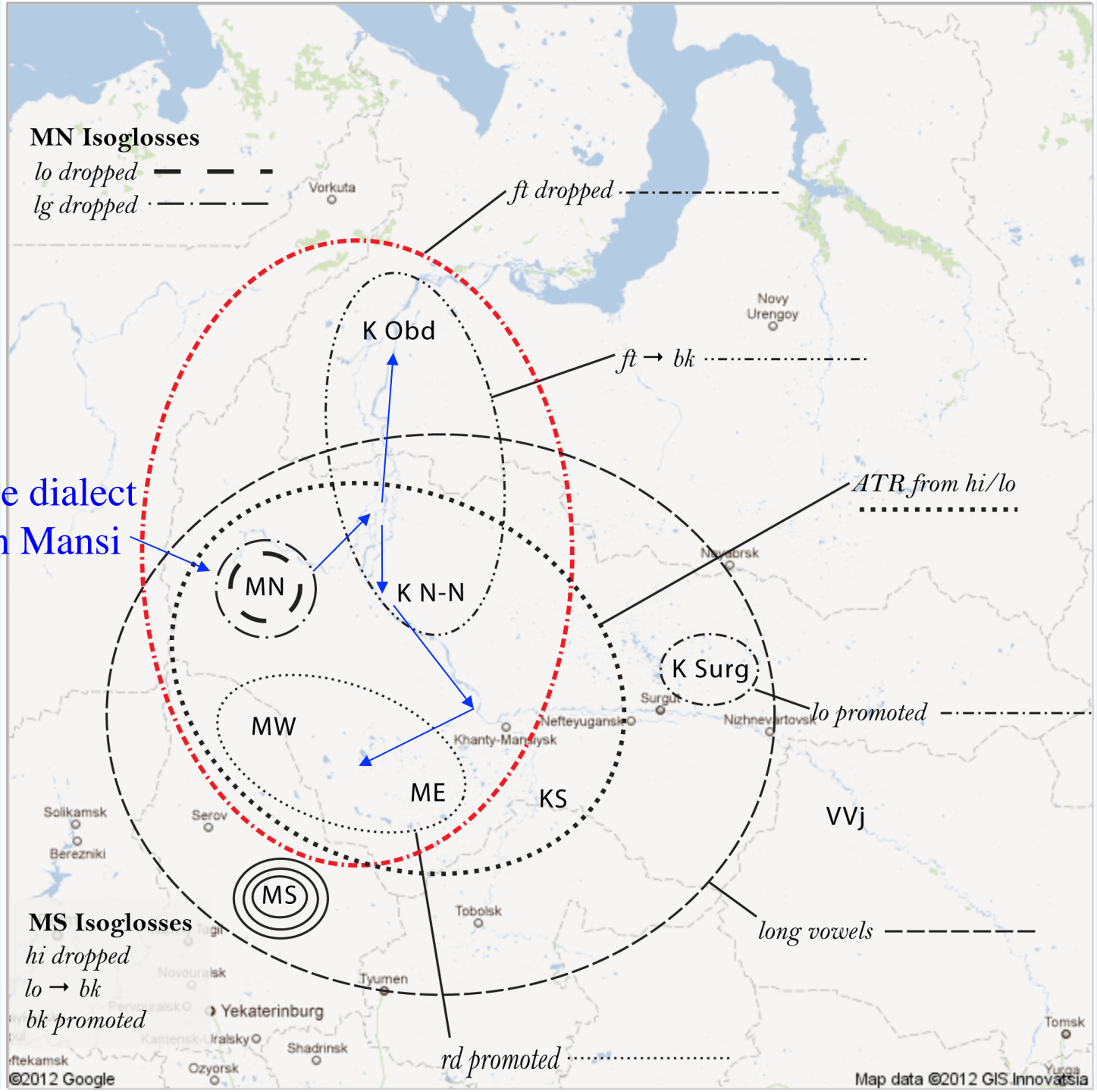
Can contrast shifts spread?

If [front] dropping is not a genetic inheritance common to the non-Southern Mansi languages, could it have been spread by areal diffusion?

That is, is can contrast shift show areal patterning, like other elements of linguistic systems?

To investigate this question, Harvey (2012) plotted a number of contrast shifts, and the results are shown on the following map. It is clear that the contrast shifts have occurred in a way that is not at all random.

Innovative dialect
Northern Mansi



Notes on the map

The map shows the Ob-Ugric language area, in central Russia to the east of the Ural mountains along the Ob river system. The blue arrows indicate the Ob river and its tributaries, which are the main routes for cultural contact and communication.

Mansi languages (M) are in the southwest, and the Khanty languages (K) are east and north. The dashed red line labelled 'ft dropped' shows all the languages which had the [front] dropping contrast shift.

It appears that the innovative dialect from which [front] dropping radiated is Northern Mansi. Northern, Western, and Eastern Mansi all participate in the shift. Interestingly, two of the Khanty languages, Kazym and Obdorsk Khanty, also had a phase where [front] dropped.

Those languages that are geographically and culturally farther away from the likely innovation centre have not borrowed the shift.

Can contrast shifts spread?

We conclude that there a pattern to these contrastive changes: they follow routes of cultural contact.

Contrast shifts show clear isoglosses and can be borrowed between languages.

It is also important to note that the contrastive analysis of the Ob-Ugric languages presented here is consistent with earlier dialect studies (Steinitz 1955; Honti 1998), and matches earlier observations about which dialects are conservative or innovative.

Conclusions

The approach to phonological typology I have sketched here is based on a fundamental distinction between a phonetic and phonological analysis of the sound systems of languages.

This view builds on approaches to phonology pioneered by Sapir and the Prague School (Jakobson and Trubetzkoy), instantiated within a generative grammar.

More specifically, it views phonemes as being composed of contrastive features that are themselves organized into language-particular hierarchies.

Because of the hypothesized connection between contrast and activity, we expect languages with similar hierarchies and inventories to exhibit similar patterns.

Conclusions

In some of the language families I have surveyed here, feature hierarchies appear to be relatively stable, as exemplified by Manchu-Tungusic, Eastern Mongolian, Yupik-Inuit, and branches of Algonquin.

Contrast shifts can occur, however, for various reasons, and these can result in dramatic differences in patterning, as shown by the modern Manchu languages, Central Algonquin as compared with Eastern and Western, and extensive changes in Ob-Ugric vowel systems (over a long period of time).

Finally, Ob-Ugric shows that elements of feature hierarchies can spread and be borrowed, like other aspects of linguistic structure.

Conclusions

Like Sapir's languages C and D, we have seen that languages with similar contrastive structures may show varying phonetic behaviour.

For example, the breakdown of the front-back contrast had different phonetic results in Western and Northern Mansi: in the former it resulted in some back vowels fronting, and in the latter a series of vowels that used to be front retracted and merged with back vowels.

What the two dialects have in common is the dropping and subsequent loss of [front] as a contrastive feature; thus, it no longer constrained the phonetic ranges of the vowels.

Conclusions

In Algonquian, the various palatalizations and mergers show phonetic differences, and the phonetic descriptions of the vowels vary from dialect to dialect.

But dialects sharing the same contrastive hierarchy show similar patterns at that level.

The proposal here is that contrastive feature hierarchies provide an interesting level of representation for typological research.

THANK YOU!

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http://homes.chass.utoronto.ca/~contrast/

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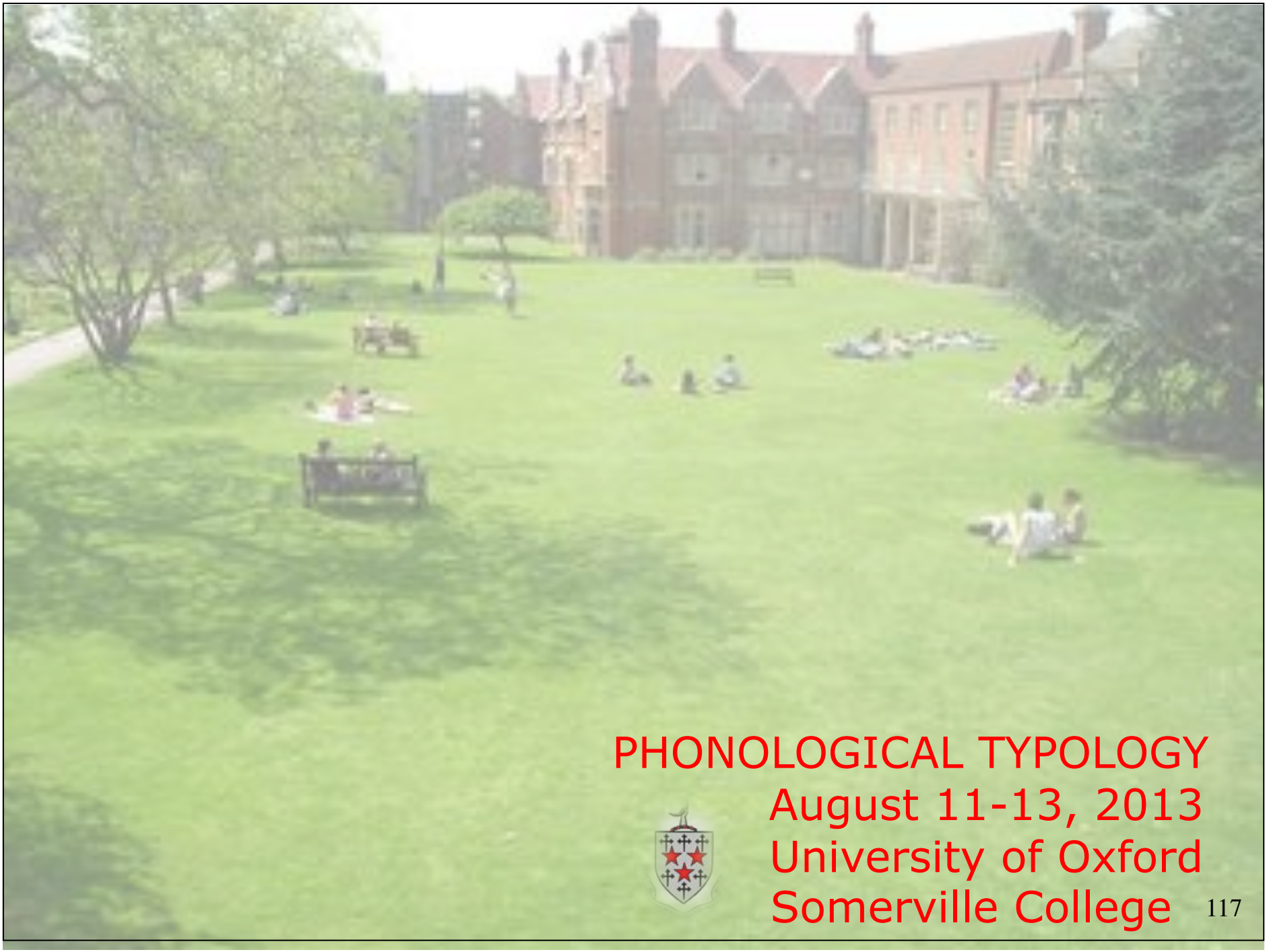
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