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Phonological Typology with Contrastive Hierarchies

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Introduction

Phonological Databases

Phonological databases have become an important resource for typological research.

Notable are the Stanford Phonology Archive (SPA; Crothers et al. 1979), the UCLA Phonological Segment Inventory Database (UPSID; Maddieson 1984; Maddieson & Precoda 1990), and P-base (Mielke 2008).

These databases include phonological inventories of hundreds of languages, and are easily accessible for use in cross-linguistic surveys.

Phonological Databases

However, the very qualities that make these databases easy to use also significantly limit their reliability: they provide a single (sometimes misleading) symbol for every phoneme of an inventory.

Though the problems inherent in such databases are well known (Simpson 1999), they continue to be used because there are no real alternatives.

Arriving at a deeper and more informative phonemic analysis requires considerable research.

Phonological Activity

There may, however, be a middle path between these extremes.

If phonological representations are limited to contrastive features (Dresher & Rice 2007, Hall 2007, Dresher 2009), then relevant information is limited to two kinds: patterns of activity and phonetic variation.

A feature is *active* if it plays a role in the phonological computation; that is, if it is required for the expression of phonological regularities in a language, including both static phonotactic patterns and patterns of alternation (adapted from Clements 2001: 77).

Phonetic Variation

Contrastive features may also be reflected in the phonetic ranges exhibited by vowels.

We might expect that a vowel with a marked feature might be less variable in its realizations than its unmarked counterpart; phonetic realization may be further affected by the application or not of enhancement (see Dyck 1995; Rice 1995; Hall 2011).

Extracting this kind of information from primary sources falls well short of an in-depth analysis, and may be amenable to the sort of limited categories that large databases require.

PHOIBLE

We will illustrate this approach by looking at PHOIBLE (Moran, McCloy & Wright 2014), a relatively new online database of phonological inventories that incorporates a number of earlier ones.

We will look in particular at some of the 49 three-vowel inventories: we will show that different-looking inventories, such as /i, a, u/, /ɪ, a, ʊ/, /ɪ, e, ʊ/, /i, a, ə/, are not necessarily different from each other.

Conversely, we will show that inventories designated /i, a, u/ are not all the same, typologically.

Welcome to PHOIBLE Online

PHOIBLE Online is a repository of cross-linguistic phonological inventory data, which have been extracted from source documents and tertiary databases and compiled into a single searchable convenience sample. The 2014 edition includes 2155 inventories that contain 2160 segment types found in 1672 distinct languages.

A bibliographic record is provided for each source document; note that some languages in PHOIBLE have multiple entries based on distinct sources that disagree about the number and/or identity of that language's phonemes.

Two principles guide the development of PHOIBLE, though it has proved challenging both theoretically and technologically to abide by them:

1. Be faithful to the language description in the source document (now often called 'doculect', for reasons indicated above)
2. Encode all character data in a consistent representation in Unicode IPA

In addition to phoneme inventories, PHOIBLE includes distinctive feature data for every phoneme in every language. The feature system used was created by the PHOIBLE developers to be descriptively adequate cross-linguistically. In other words, if two phonemes differ in their graphemic representation, then they necessarily differ in their featural representation as well (regardless of whether those two phonemes coexist in any known doculect). The feature system is loosely based on the feature system in Hayes 2009 with some additions drawn from Moisiuk & Esling 2011.

However, the final feature system goes beyond both of these sources, and is potentially subject to change as new languages are added in subsequent editions of PHOIBLE.

The 2014 edition includes inventories from the following contributors:

Contributor	Description	Sources	Number of inventories
Christian Chanard and Rhonda L. Hartell (AA)	The inventories in Alphabets of Africa (AA) come from the work of Christian Chanard's Systèmes alphabétiques des langues africaines , an online database of the work of <i>Alphabets des langues africaines</i> , published in 1993 by the Regional Office in Dakar, Senegal, and edited by Rhonda L. Hartell. AA contains the phoneme inventories and orthographies of 200 languages. Incorrect ISO 639-3 language name identifiers and incorrect Unicode IPA characters were updated before the inventories from the online version were added to PHOIBLE (see Moran 2012, chp 4 for details). Christopher Green verified the inventories' contents and in cases where there were discrepancies between Chanard and Hartell, additional resources were consulted to resolve these issues (ibid.).	Hartell, Rhonda L. 1993 C. Chanard 2006	203
Christopher Green and Steven Moran (GM)	Christopher Green and Steven Moran extracted phonological inventories from secondary sources including grammars and phonological descriptions with the goal of attaining pan-Africa coverage. This is a work in progress.		460
PHOIBLE (PH)	Steven Moran and Daniel McCloy and Richard Wright.	Steven Moran 2012	389
Ramaswami, N. (RA)	These inventories come from <i>Common Linguistic Features in Indian Languages: Phoentics</i> , by N. Ramaswami. This source contains 100 languages' phoneme inventories, as compiled from	Ramaswami, N. 1999	100

Cite

Moran, Steven & McCloy, Daniel & Wright, Richard (eds.) 2014. PHOIBLE Online. Leipzig: Max Planck Institute for Evolutionary Anthropology. (Available online at <http://phoible.org>, Accessed on 2015-03-10.)

[cite](#)

This is the PHOIBLE home page. There are various menus at the top; we'll click on 'Inventories'.

PHOIBLE Online - Inventories

phoible.org/inventories

[ˈfɔɪ.bɪl] Home Inventories Languages Segments Sources

Inventories

Showing 1 to 49 of 49 entries (filtered from 2,155 total entries)

← Previous 1 Next →

Language (Contributor)	Source name	# segments	# vowels	# consonants	# tones	Contributor	Cite
<input type="text" value="Search"/>	<input type="text" value="Search"/>		<input type="text" value="3"/>	<input type="text" value="Search"/>	<input type="text" value="Search"/>	--any--	
Aklanon (PH)	Aklan	20	3	17	0	PHOIBLE	cite
Alabama (UPSID)	ALABAMA	17	3	14		UCLA Phonological Segment Inventory Database	cite
Aleut (UPSID)	ALEUT	27	3	24		UCLA Phonological Segment Inventory Database	cite
Antakarinya (UPSID)	WESTERN DESERT	20	3	17		UCLA Phonological Segment Inventory Database	cite
Ayacucho Quechua (SAPHON)	Ayacucho Quechua	17	3	14	0	South American Phonological Inventory Database	cite
Bana (GM)	bana	44	3	37	4	Christopher Green and Steven Moran	cite
Bella Coola (UPSID)	BELLA COOLA	31	3	28		UCLA Phonological Segment Inventory Database	cite
Caddo (UPSID)	CADDO	23	3	20		UCLA Phonological Segment Inventory Database	cite
Cajamarca Quechua (SAPHON)	Cajamarca Quechua	22	3	19	0	South American Phonological Inventory Database	cite
Cebuano (GM)	Cebuano	21	3	18	0	Christopher Green and Steven Moran	cite
Central Atlas Tamazight (GM)	Tamazight Berber	39	3	36	0	Christopher Green and Steven Moran	cite
Central Aymara 2 (SAPHON)	Aymara (Chilean dialect)	31	3	28	0	South American Phonological Inventory Database	cite

We have entered '3' under '# vowels'. The page displays all the languages (49) with 3 vowels. Let's click on Aklanon.

PHOIBLE Online -

phoible.org/inventories/view/1095

Home Inventories Languages Segments Sources

Inventory Aklanon (PH)

Source name: *Aklan*

Segment list [IPA chart](#)

Showing 1 to 20 of 20 entries

Segment	Representation	Segment class	Combined class
<input type="text" value="Search"/>	<input type="text" value="Search"/>	--any--	--any--
m	2053/2155 (95%)	consonant	c
k	2016/2155 (94%)	consonant	c
i	1998/2155 (93%)	vowel	v
a	1961/2155 (91%)	vowel	v
j	1901/2155 (88%)	consonant	c
p	1873/2155 (87%)	consonant	c
u	1873/2155 (87%)	vowel	v
w	1812/2155 (84%)	consonant	c
n	1742/2155 (81%)	consonant	c
s	1663/2155 (77%)	consonant	c
t	1604/2155 (74%)	consonant	c
b	1533/2155 (71%)	consonant	c
l	1421/2155 (66%)	consonant	c
h	1405/2155 (65%)	consonant	c
g	1380/2155 (64%)	consonant	c

Contributor


PHOIBLE [cite](#)

Sources

[Chai, Nemia Melgarejo 1971](#)

Aklanon

Map



Coordinates [WGS84](#) 11°33'N, 122°21'E
11.55, 122.35

[Links](#)

This page gives a list of the phonemes. The vowels are /i/, /a/, and /u/.

Pama-Nyungan 3-vowel Inventories

PHOIBLE lists 12 Pama-Nyungan languages with three vowels, and 2 with three short and three long vowels:

Antakarinya; Dieri; Dyirbal; Eastern Arrernte; Kalkutung; Kuku-Yalanji; Wangaaybuwan-Ngiyambaa; Yidiny	/i, a, u/
Yanyuwa	/ɪ, a, ʊ/
Western Arrarnta	/i, a, ə/
Karadjeri	/i, a, u/
Dhuwal	/ɪ, e, ʊ/
Ngarinman	/i, a, u, i:, a:, u:/
Antakarinya	/i, a, ʊ, i:, a:, u:/

Pama-Nyungan 3-vowel Inventories

PHOIBLE lists 12 Pama-Nyungan languages with three vowels, and 2 with three short and three long vowels:

How significant are these differences? For example,

between /i/ and /ɪ/,

or /u/ and /ʊ/,

or /a/, /ɑ/, and /æ/?

What is the status of /ə/ in /i, a, ə/?

/i, a, u/

/ɪ, a, ʊ/

/i, a, ə/

/i, ɑ, u/

/ɪ, ɐ, ʊ/

/i, a, u, i:, a:, u:/

/i, a, ʊ, i:, a:, u:/

Case Study 1:
Antakarinya
(Pama-Nyungan)

Pama-Nyungan 3-vowel Inventories

Antakarinya (Pama-Nyungan) is listed twice in PHOIBLE:

Antakarinya; Dieri; Dyirbal; Eastern Arrernte; Kalkutung; Kuku-Yalanji; Wangaaybuwan- Ngiyambaa; Yidiny	/i, a, u/
Yanyuwa	/ɪ, a, ʊ/
Western Arrarnta	/i, a, ə/
Karadjeri	/i, a, u/
Dhuwal	/ɪ, e, ʊ/
Ngarinman	/i, a, u, i:, a:, u:/
Antakarinya	/i, a, ʊ, i:, a:, u:/

Pama-Nyungan 3-vowel Inventories

Antakarinya (Pama-Nyungan) is listed twice in PHOIBLE:

Antakarinya (UPSID)	/i, a, u/
Yanyuwa (UPSID)	/ɪ, a, ʊ/

- once from UPSID as a 3-vowel inventory /i, a, u/;
- and once from SPA as a 6-vowel inventory /i, a, ʊ, i:, a:, u:/.

Aside from the length contrast, there is a discrepancy between UPSID /u/ versus SPA /ʊ/.

Note that UPSID does use /ʊ/, as in Yanyuwa.

Antakarinya (SPA)	/i, a, ʊ, i:, a:, u:/
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Antakarinya Vowel System

This distinction between /u/ and /ʊ/ is treated as significant in PHOIBLE.

Thus, the UPSID listing of the phonemes of Antakarinya is counted as one of the 1873 languages (87% of the total) that contain /u/:

k	2016/2155 (94%)	consonant	c
i	1998/2155 (93%)	vowel	v
a	1961/2155 (91%)	vowel	v
j	1901/2155 (88%)	consonant	c
p	1873/2155 (87%)	consonant	c
u	1873/2155 (87%)	vowel	v
w	1812/2155 (84%)	consonant	c
n	1742/2155 (81%)	consonant	c

Antakarinya Vowel System

This distinction between /u/ and /ʊ/ is treated as significant in PHOIBLE.

Similarly, the SPA listing of the phonemes of Antakarinya is counted as one of the 341 (16% of the total) languages that contain /ʊ/:

l	1421/2155 (66%)	consonant	c
ŋ	1217/2155 (56%)	consonant	c
r	664/2155 (31%)	consonant	c
i:	628/2155 (29%)	vowel	v-d
a:	612/2155 (28%)	vowel	v-d
u:	562/2155 (26%)	vowel	v-d
ʊ	341/2155 (16%)	vowel	v
t	177/2155 (8%)	consonant	c

Antakarinya Sources

Let us start with the sources. Under both the UPSID and SPA listings the same two sources are given:

- **Douglas 1955:** Douglas, Wilfrid H. 1955. Phonology of the Australian Aboriginal language spoken at Ooldea, South Australia, 1951-1952. *Oceania* 25: 216–229.
- **Douglas 1964:** Douglas, Wilfrid H. 1964. *An introduction to the Western Desert language. (Oceania Linguistics Monographs, 4)*. Sydney: The University of Sydney, Australia.

Douglas 1964 links only to the first few front pages (the date is 1958, not 1964). This monograph is not available here.

Antakarinya Sources

But Douglas 1955 is available online:

The name ‘Antakarinya’ does not appear in this article, which refers to ‘the Australian Aboriginal language spoken at Ooldea, South Australia’.

‘The language is regarded as a dialect of the great desert language of South and Western Australia.’

PHOIBLE indicates the source name as ‘Western Desert’. WALS refers to it as ‘Western Desert (Ooldea)’.

PHONOLOGY OF THE AUSTRALIAN ABORIGINAL LANGUAGE SPOKEN AT OOLDEA, SOUTH AUSTRALIA, 1951-1952

By W. H. DOUGLAS

I. ORIENTATION

THIS description is based on research conducted personally at the United Aborigines Mission Station, Ooldea, South Australia, during six months of 1951 and two and a half months of 1952.

The language is regarded as a dialect of the great desert language of South and Western Australia. The area includes Cundeelee, Kalgoorlie, Laverton and Warburton Ranges, in Western Australia, and Ernabella, Oodnadatta and the trans-Australian railway line in South Australia.¹

Ooldea was, at the time of the study,² a popular native ceremonial ground, as well as a government ration depot and mission station. Visitors from other dialect areas were frequently passing through the district, and it was noted that informants modified their speech according to their temporary associations with members of other dialect areas. The phonological modifications followed definable lines, and receive mention in the following description of the Ooldea dialect.

II. CHART OF THE PHONETIC NORMS OF THE PHONEMES

Types of Sounds.		Labial.	Dental.	Alveolar.	Cerebral.	Velar.
Consonants	Stops	<i>p</i>	<i>t'</i>	<i>t</i>	<i>ʈ</i>	<i>k</i>
	Nasals ..	<i>m</i>	<i>n'</i>	<i>n</i>	<i>ɳ</i>	<i>ŋ</i>
	Lateral liquids		<i>l'</i>	<i>l</i>	<i>ʎ</i>	
	Central liquids			<i>r</i>	<i>ʀ</i>	
	Non - syllabic vocoids ..	<i>w</i>		<i>y</i>		
Vowels	High			<i>i</i>		<i>u</i>
	Low				<i>a</i>	

¹ See R. M. Trudinger, "Pitjantjara Grammar," *Oceania*, VIII, No. 3, 1943.
² The Ooldea Mission has since been closed down.

Antakarinya Sources

On p. 216 Douglas gives a “Chart of the Phonetic Norms of the Phonemes” which lists three vowels: *i*, *a*, and *u*.

Maybe the UPSID inventory comes from here.

However,
Douglas writes
(p. 217) that the
symbols are
chosen for
“convenience in
printing and
typing”.

Types of Sounds.		Labial.	Dental.	Alveolar.	Cerebral.	Velar.
Consonants	Stops	<i>p</i>	<i>t'</i>	<i>t</i>	<i>ʈ</i>	<i>k</i>
	Nasals ..	<i>m</i>	<i>n'</i>	<i>n</i>	<i>ɳ</i>	<i>ŋ</i>
	Lateral liquids		<i>l'</i>	<i>l</i>	<i>ʎ</i>	
	Central liquids			<i>r</i>	<i>ʀ</i>	
	Non - syllabic vocoids ..	<i>w</i>		<i>y</i>		
Vowels	High			<i>i</i>		<i>u</i>
	Low				<i>a</i>	

Antakarinya Vowel System

On p. 220 is a description of the “phonetic norms” of the vowels:

- /i/ is a “voiced high close front unrounded syllabic vocoid,” that Douglas transcribes as [i].
- /a/ is a “voiced low open central unrounded syllabic vocoid,” transcribed [ʌ].
- /u/ is a “voiced high open back rounded syllabic vocoid,” transcribed [ʊ].

If we take these norms as the inventory, we ought to list it as /i, ʌ, ʊ/; the /ʊ/ is as in SPA, but both UPSID and SPA have /a/, not /ʌ/.

Antakarinya Vowel System

So far there is no indication of a length contrast, which would be easy to overlook.

However, Douglas states on p. 222:

“Associated with vowels is a phoneme of length.”

Length appears to be contrastive as shown by the following examples; however, we will focus here on the short vowels only.

yungku	‘will give’	yu:ngku	‘the wind-break’ (subj.)
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mal-malpa	‘dangerous’	ma:l-ma:lpa	‘feint’
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Antakarinya Vowel System

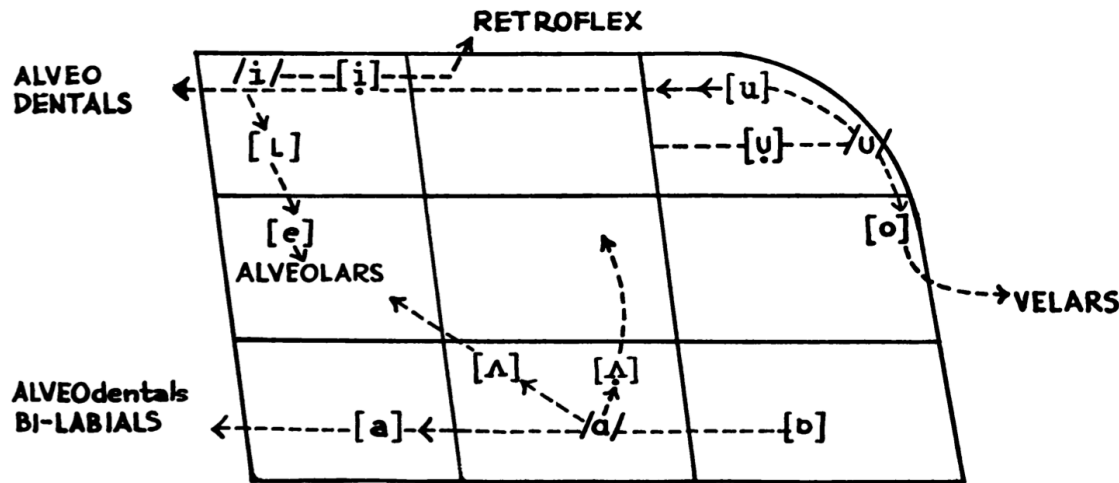
Douglas (1955) gives details of the allophonic variants of each vowel.

- /i/ has allophones [i]; retroflex [i̠] before retroflex consonants; open [ɪ] “in free fluctuation with [i]” in certain contexts; and [e] “freely fluctuating with [ɪ] and [i]” word-medially before alveolar consonants.
- /a/ has allophones [ʌ]; retroflex [ʌ̠] before retroflexes; [ɑ] before bi-labial and alveo-dental consonants; and “slightly rounded” [ɒ] in free fluctuation with [ɑ] near velars and /w/.
- /u/ has allophones [ʊ]; retroflex [ʊ̠]; [u] “in free fluctuation with [ʊ] before alveo-dental consonants”; [o] “in free fluctuation with [ʊ] before velars word-medially”; and voiceless /ʊ̥/ occurring utterance finally only, “in rapid utterances of the past tense verbal suffix *-ngu*.”

Antakarinya Vowel System

Douglas (1955: 221) sums up the phonetic realization of the vowels with the following chart:

(3) *Chart Illustrating Vowel Changes*



No three symbols can do justice to this system.

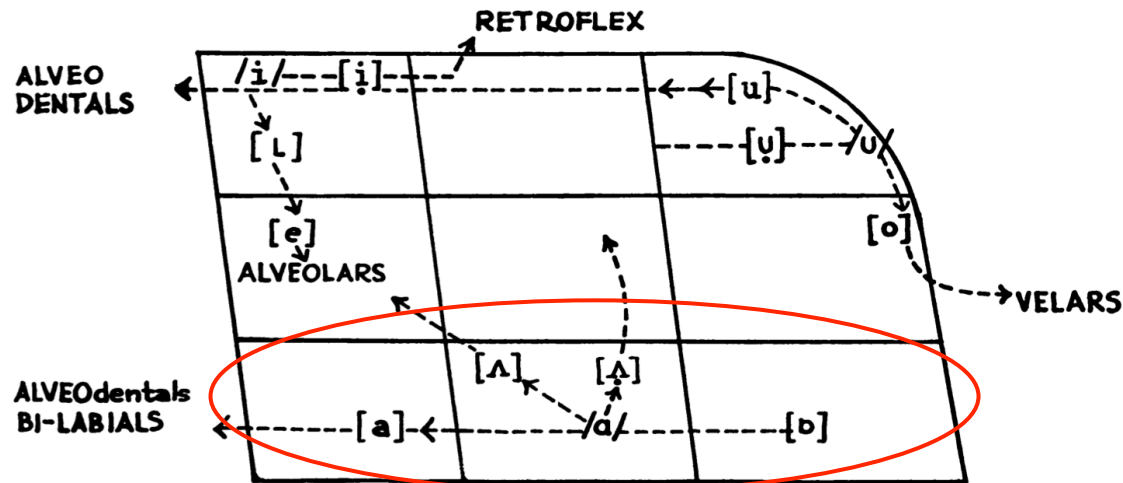
We can say that there are 3 contrasting vowels, /I, A, U/, that can be distinguished by 2 features. This is often what /i, a, u/ really means.

But which features?

Antakarinya Vowel System

Let us begin with the low vowel, /A/.

(3) Chart Illustrating Vowel Changes



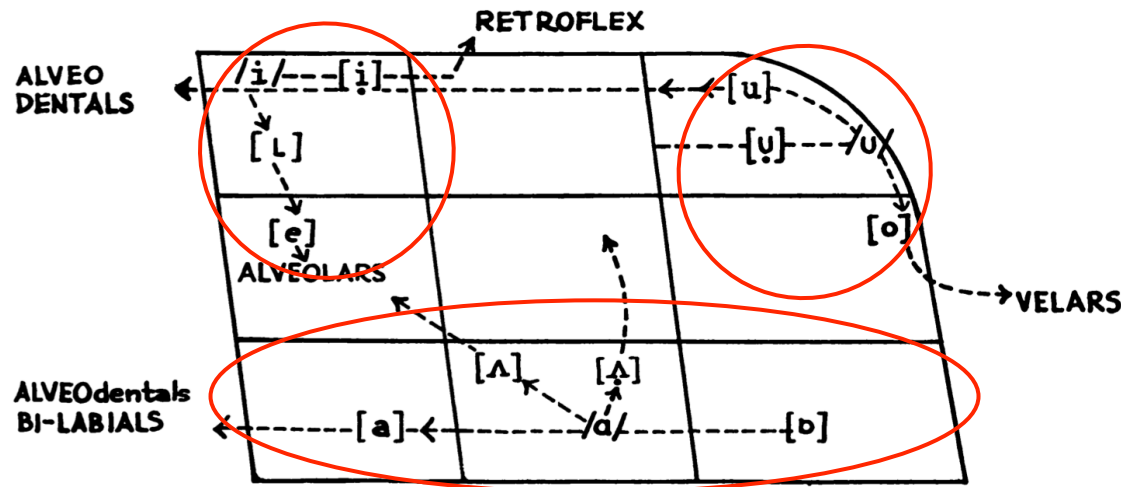
The range of this vowel extends across the low region, which we can designate [low].

It appears to have no other contrastive features.

Antakarinya Vowel System

The other vowels, /I/ and /U/, are non-low.

(3) Chart Illustrating Vowel Changes



/I/ is front and non-round, /U/ is back and round.

The properties backness and roundness go together here, and cannot be disentangled.

We propose that the contrastive feature that distinguishes them be called [front-unround] or [back-round] (cf. Jakobson (1962 [1931], Kaye, Lowenstamm and Vergnaud 1985).

Phonological Activity

Turning to activity, Douglas (1955) does not describe any alternations triggered by vowels, or other types of activity that could help us pinpoint what the contrastive features are.

He does (p. 218) mention an effect of vowels on dental consonants:

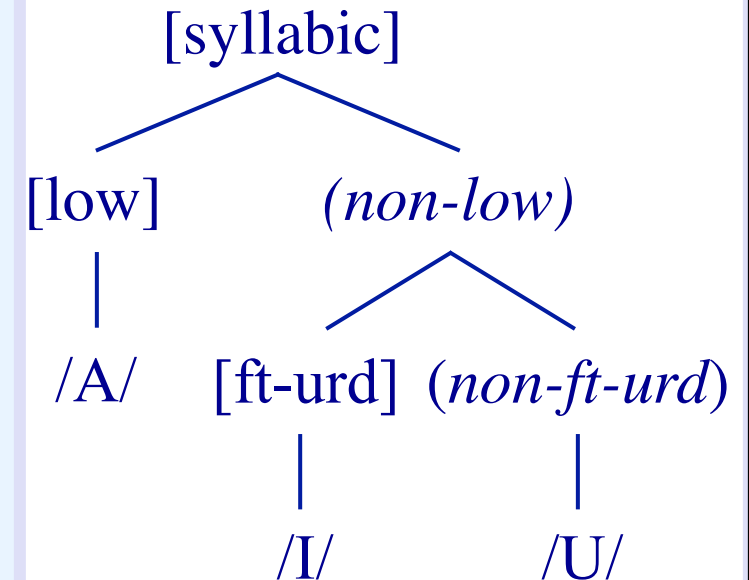
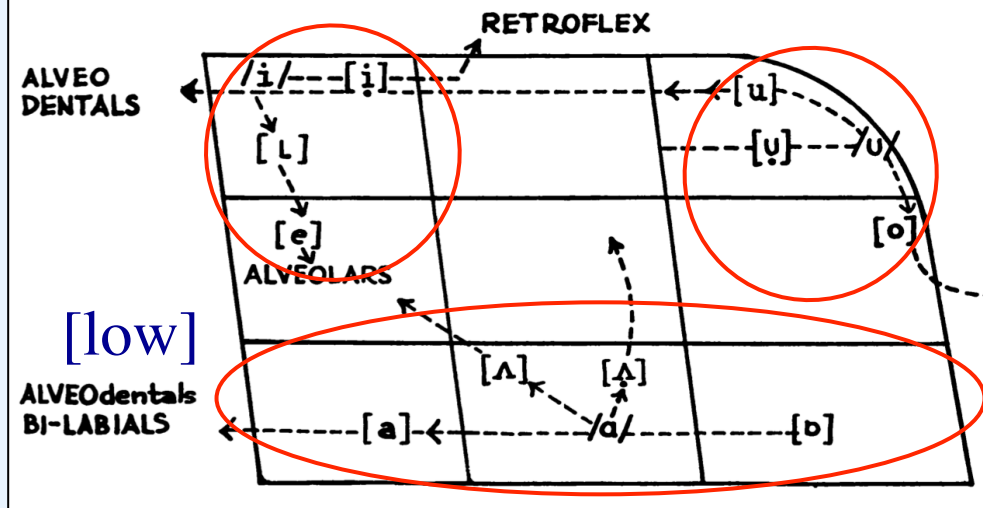
“At Ooldea there was fluctuation between the use of the interdental and the alveo-dental varieties of these consonants preceding the vowels "a" and "u" ; but before "i" the alveo-dental only occurred.”

This could suggest that /l/ has a marked feature that the other vowels lack, that we can identify with [+front-unround].

Antakarinya Vowel Features

We can therefore propose the hierarchy [low] > [front-unround]

(3) Chart Illustrating Vowel Changes



Case Study 2:
Pitjantjatjara
(Pama-Nyungan)

Pitjantjatjara Vowel System

Another dialect of the Western Desert Language of central Australia is Pitjantjatjara (not listed in PHOIBLE).

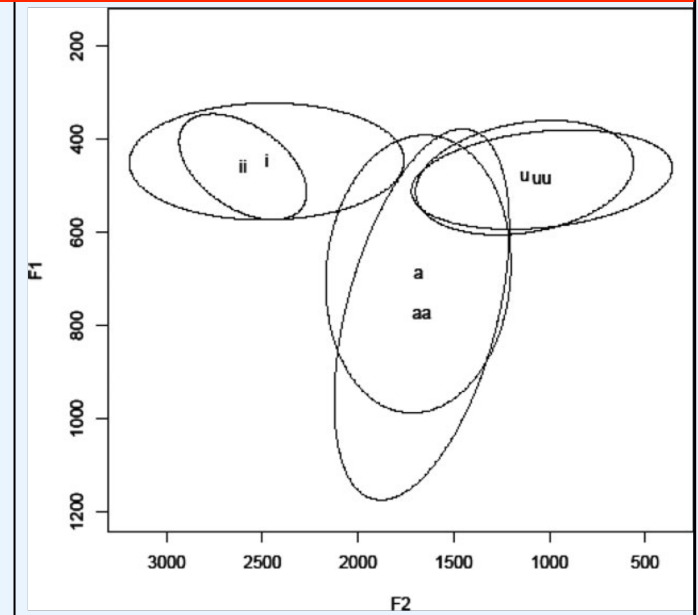
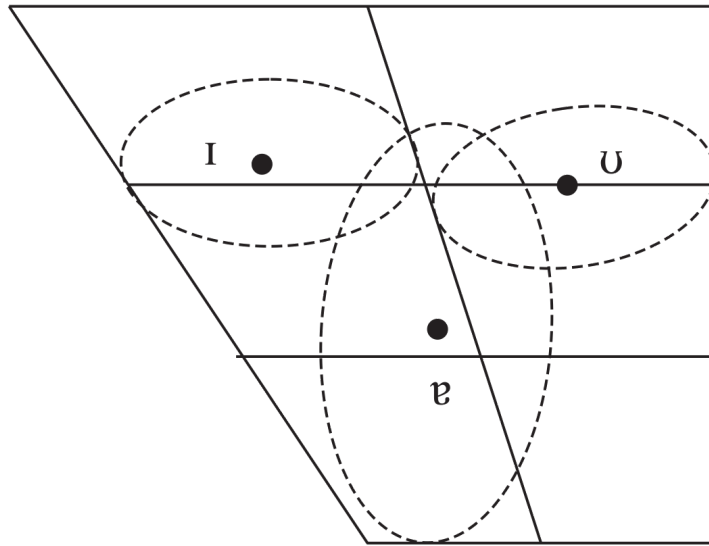
Its vowels have been studied by Tabain & Butcher (2014). They write (2014: 195):

“Pitjantjatjara has three vowel qualities [ɪ ɐ ʊ]...However, for phonemic purposes these are more commonly written /i a u/”.

They provide plots of the distribution of the vowels:

Pitjantjatjara Vowel System

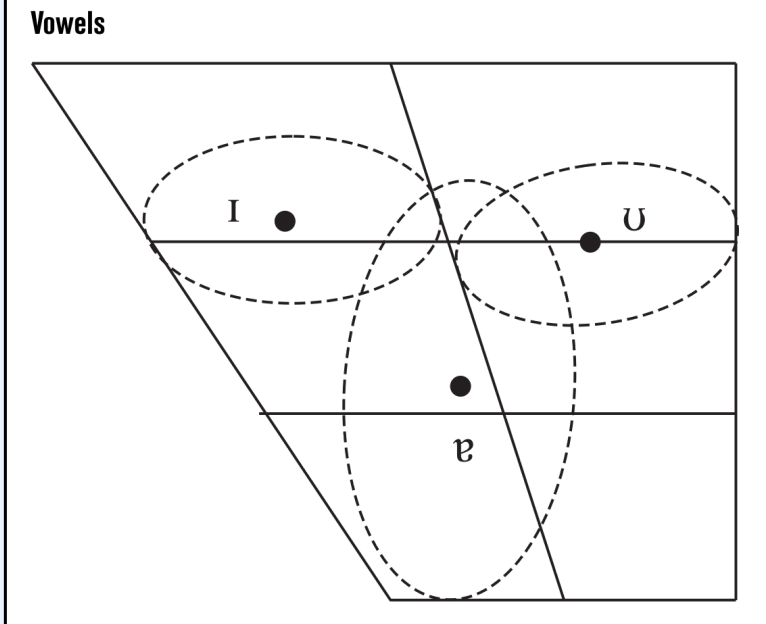
Vowels



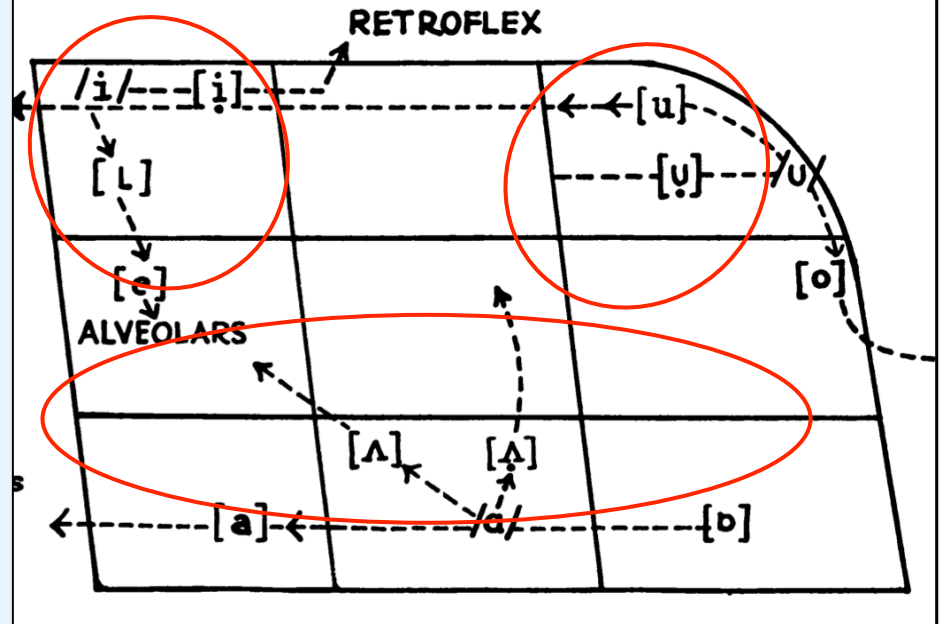
The figure on the left shows the positions of the short vowels.

The plot on the right show formants from 3 speakers for short and long vowels, collapsed across consonantal contexts.

Pitjantjatjara Vowel System



Pitjantjatjara



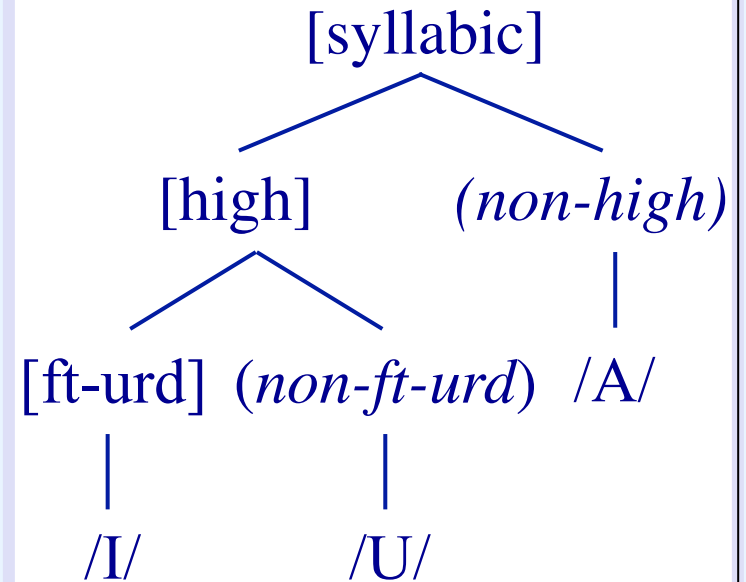
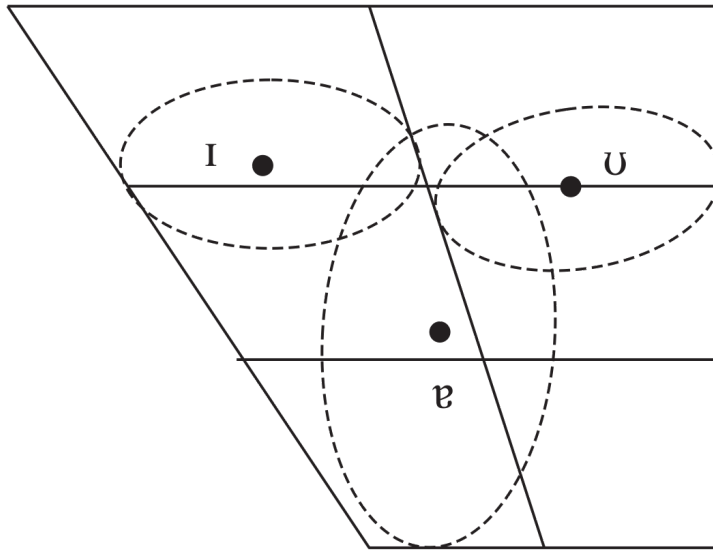
Antakarinya

Compare these vowel distributions with those of Antakarinya, which we analyzed as [low] > [front-unround]

It appears that the height feature in Pitjantjatjara is [high], not [low].

Pitjantjatjara Vowel System

Vowels



Thus, the Pitjantjatjara feature contrasts are:

[high] > [front-unround]

These contrasts are based on phonetic variation. Next we will look at a language that does show relevant activity.

Case Study 3:
Warlpiri
(Pama-Nyungan)

Warlpiri: Evidence from Activity

Warlpiri is another Pama-Nyungan language; it has three harmony rules (Nash 1986), two progressive and one regressive.

In the most regular harmony, found in all dialects, /u/ changes to /i/ following /i/, as in all the suffixes following the stem ‘dog’.

Harmony is blocked by an intervening /a/, as in the suffixes following the stem ‘cat’.

/maliki -kurlu -rlu =lku =ju =lu/
→ maliki -kirli -rli =lki =ji =li
dog -PROP -ERG =then =me =they

minia -kurlu -rlu =lku =ju =lu
cat -PROP -ERG =then =me =they

Warlpiri: Evidence from Activity

Intervening labial consonants /p/, /w/ block the spread of this harmony pattern (Hale, 1973: 406 fn. 9; Nash, 1986: 87).

Harvey & Baker (2005: 1460) propose that the interaction with labial consonants shows that the harmonizing feature is [round] (and not [back], or [round-back]).

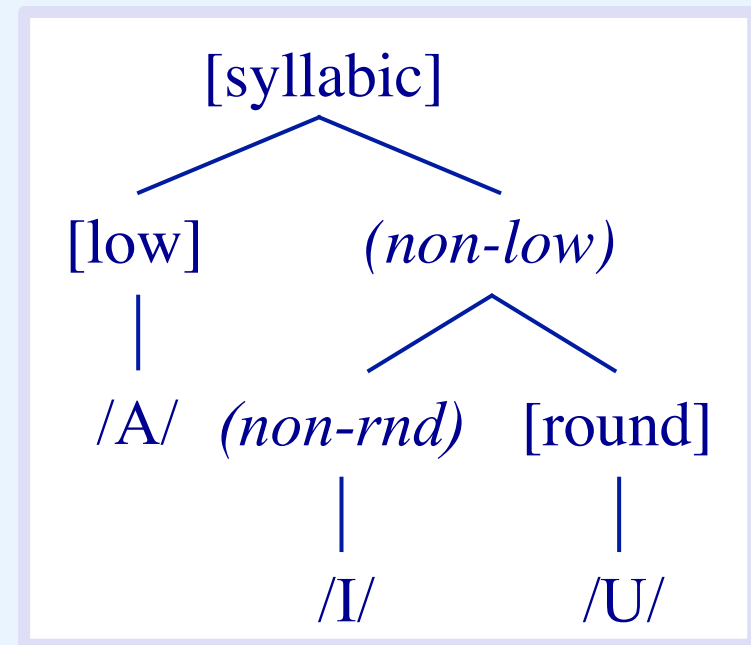
The other harmony rules change /i/ to [u] in a syllable adjacent to /u/.

<p>/maliki -kurlu -rlu =lku =ju =lu/ → maliki -kirli -rli =lki =ji =li dog -PROP -ERG =then =me =they</p>	<p>milpirri -puru cloud -during</p>
<p>minija -kurlu -rlu =lku =ju =lu cat -PROP -ERG =then =me =they</p>	<p>ngali -wurru 12 -EMPH</p>

Warlpiri: Evidence from Activity

We can draw three conclusions from these facts:

- The harmonizing feature is [round].
- The fact that /i/ and /u/ act as a class suggests that they share a height feature
- The fact that /a/ resists assimilation suggests that it has a marked feature.



Putting these together, we arrive at

[low] > [round]

Case Study 4:
Western Arrarnta
(Pama-Nyungan)

Pama-Nyungan 3-vowel Inventories

One of the Pama-Nyungan languages in PHOIBLE has a /ə/ where the other languages have some sort of /U/. What is the status of this /ə/?

Antakarinya; Dieri; Dyirbal; Eastern Arrernte; Kalkutung; Kuku-Yalanji; Wangaaybuwan-Ngiyambaa; Yidiny	/i, a, u/
Yanyuwa	/ɪ, a, ʊ/
Western Arrarnta	/i, a, ə/
Karadjeri	/i, a, u/
Dhuwal	/ɪ, e, ʊ/
Ngarinman	/i, a, u, i:, a:, u:/
Antakarinya	/i, a, ʊ, i:, a:, u:/

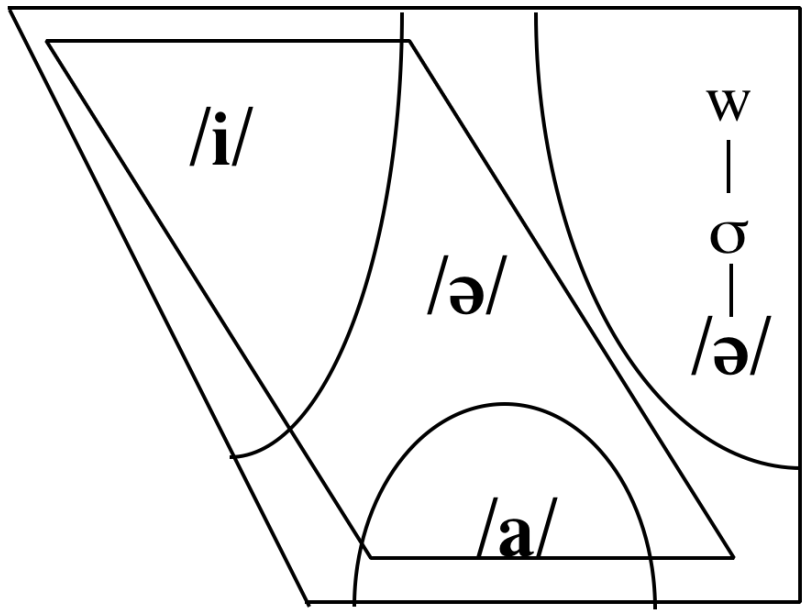
Western Arrarnta Vowel System

The source for this inventory is Anderson (2000), who calls the language Western Arrernte (aka Aranda, Arrarnta).

She writes (2000: 36–7): “Vowel phonology in Arandic languages is as yet imperfectly understood. An emerging analytical consensus, following Breen (1990), suggests that W. Arrernte has three vowel phonemes varying in height: /i/, /ə/, /a/; and that contrastive rounding is associated with some syllables, to yield rounded vowels (allophones of /ə/.)”

The above makes it sound that this language has a vertical system, but this does not appear to be correct, as can be seen from Anderson’s impressionistic plot of the vowel space (p. 37):

Western Arrarnta Vowel System

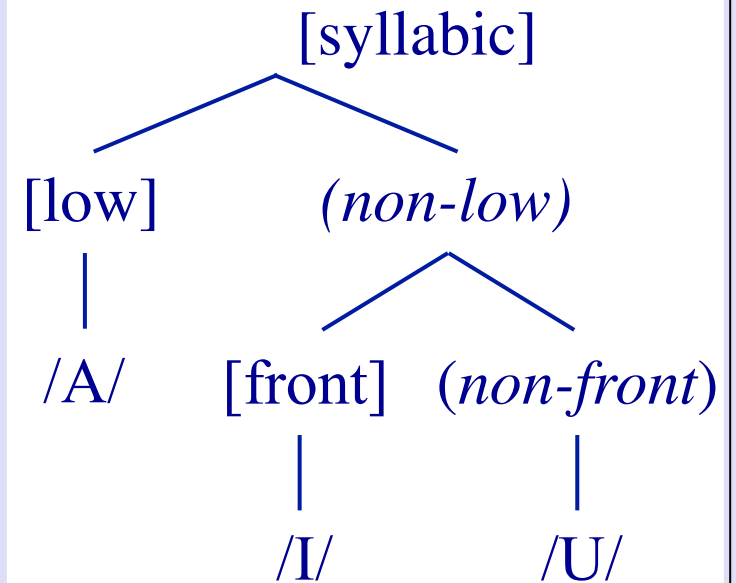
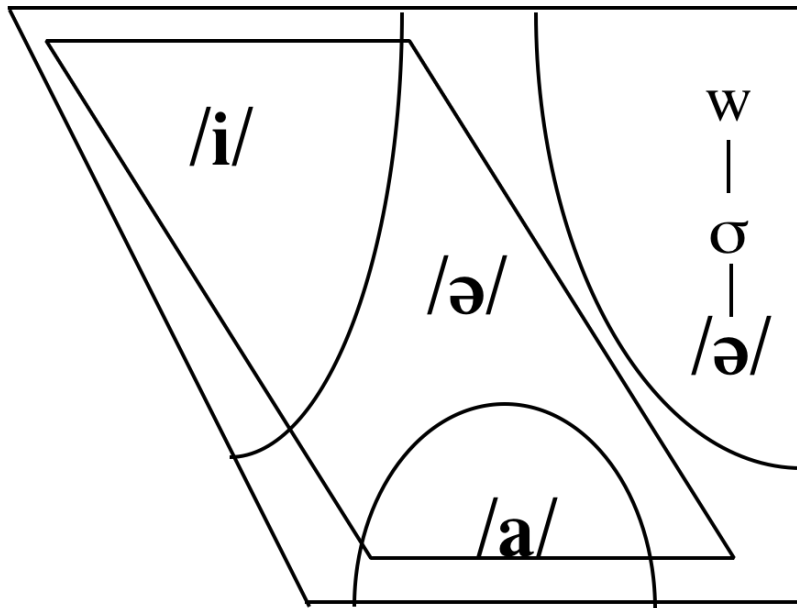


The vowel /a/ is restricted to a very small space; we infer it is [low].

/i/ “varies in quality from [ε] to [i].” We can assign it [front].

/ə/ is “extremely variable” in height and backness, and has unrounded and rounded allophones. It also appears to be the epenthetic vowel.

Western Arrarnta Vowel System



What is different about this vowel system is that the unmarked features [non-low] and [non-front] are not enhanced by [high] and [round], resulting in great variation of the /U/ vowel.

Case Study 5:
Aymara
(Aymara)

Aymara Vowel System

A vowel system in PHOIBLE that is similar to Western Arrarnta is Central Aymara (Aymara: South American).

Western Arrarnta	/i, a, ə/
Central Aymara (SPA)	/i, a, u, i:, a:, u:/

(Aymara is listed two more times as /i, a, u/.) One might suppose that the unrounded /u/ plays the same role as /ə/ in Arrarnta, and that the two systems are similar.

But consulting the source of this data (M. J. Hardman) suggests that this is not the case.

Aymara Vowel System

Hardman (2001: 18) characterizes the vowels of Aymara as front, central, and back; “Tongue height...is not distinctive in Aymara.”

She writes that the allophones are difficult to describe and occur on a “sliding scale” , with /i/ ranging from [i] to [ɛ], and similarly for /u/, whose main high allophone is unrounded.

The central vowel has a number of allophones and goes as high as [ə].

Aymara Vowel System

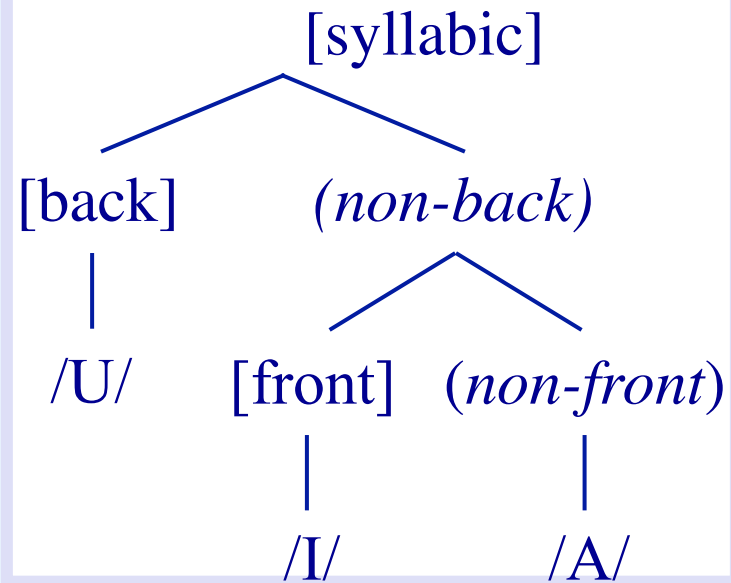
There is also some evidence from activity. Hardman (2001: 36) writes that /u/ “dominates” /i/: when the final vowel of a root or suffix ends in /u/, it causes deletion of an initial /i/ in a following suffix.

Kim (2003) shows that /i/ similarly dominates /a/, as in ‘rich person’.

These facts suggest that /a/ is unmarked, as we might expect in a vertical system.

k <u>at</u> u-	+	<u>iri</u>	>	kat <u>u</u> ri
‘to grab’		‘AGENTIVE’		‘he who grabs’
qam <u>a</u> -	+	<u>iri</u>	>	qam <u>u</u> ri
‘stay at home’		‘AGENTIVE’		‘rich person’

Aymara Vowel System

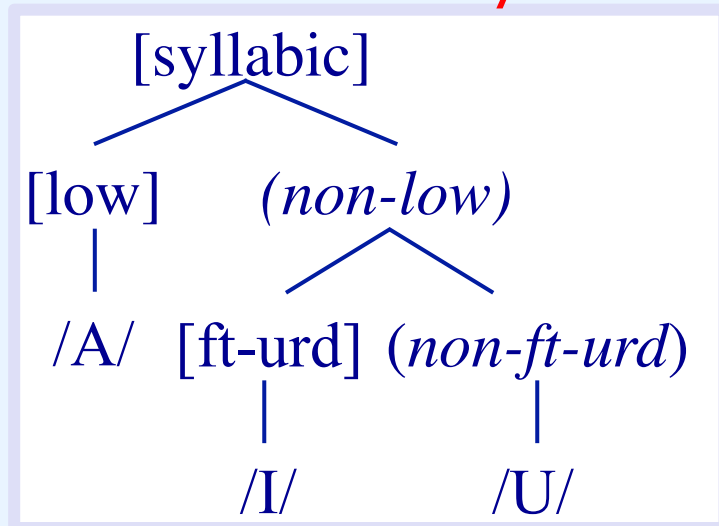


The contrastive features are thus [back] > [front].

Conclusions:

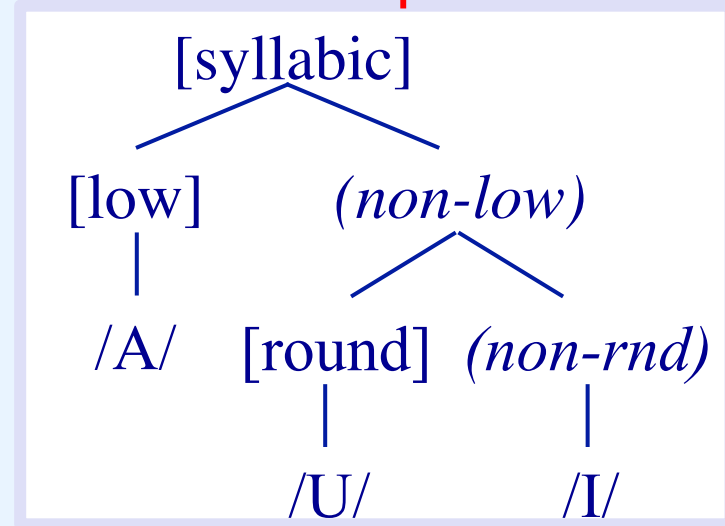
*A quick summary of 4 of
the 5 contrastive hierarchies
we have proposed*

Antakarinya



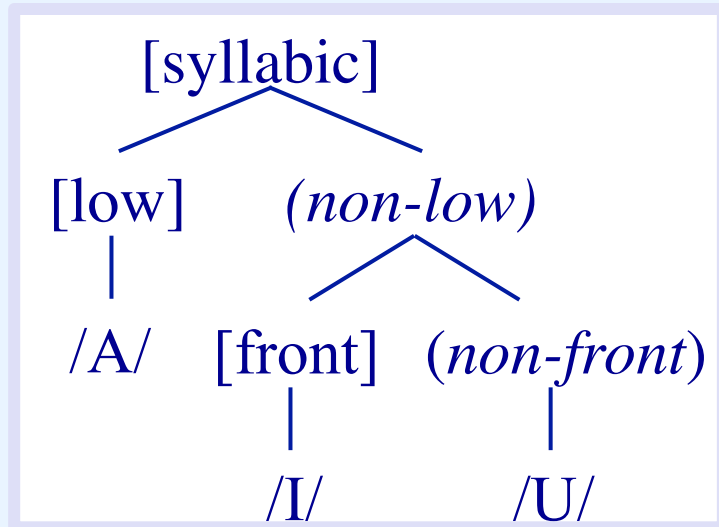
[low] > [front-unround]

Warlpiri



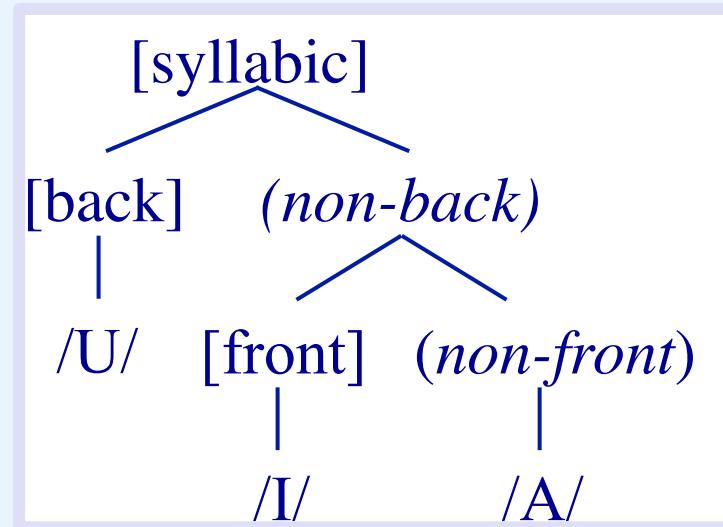
[low] > [round]

Western Arrarnta



[low] > [front]

Aymara



[back] > [front]

THANK YOU!

We are grateful to members of the project on
Markedness and the Contrastive Hierarchy in Phonology at
the University of Toronto (Dresher and Rice 2007):

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

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