

# Thai Pronunciation

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1. Thai (Tai, formerly, Siamese). Its syllables have a rather simple structure. They necessarily begin with a consonant, including /<sup>#</sup>PV/. Besides, /p, t, k/ [p, t, k], may be followed by /h, w, r, l/ (including /khw/).

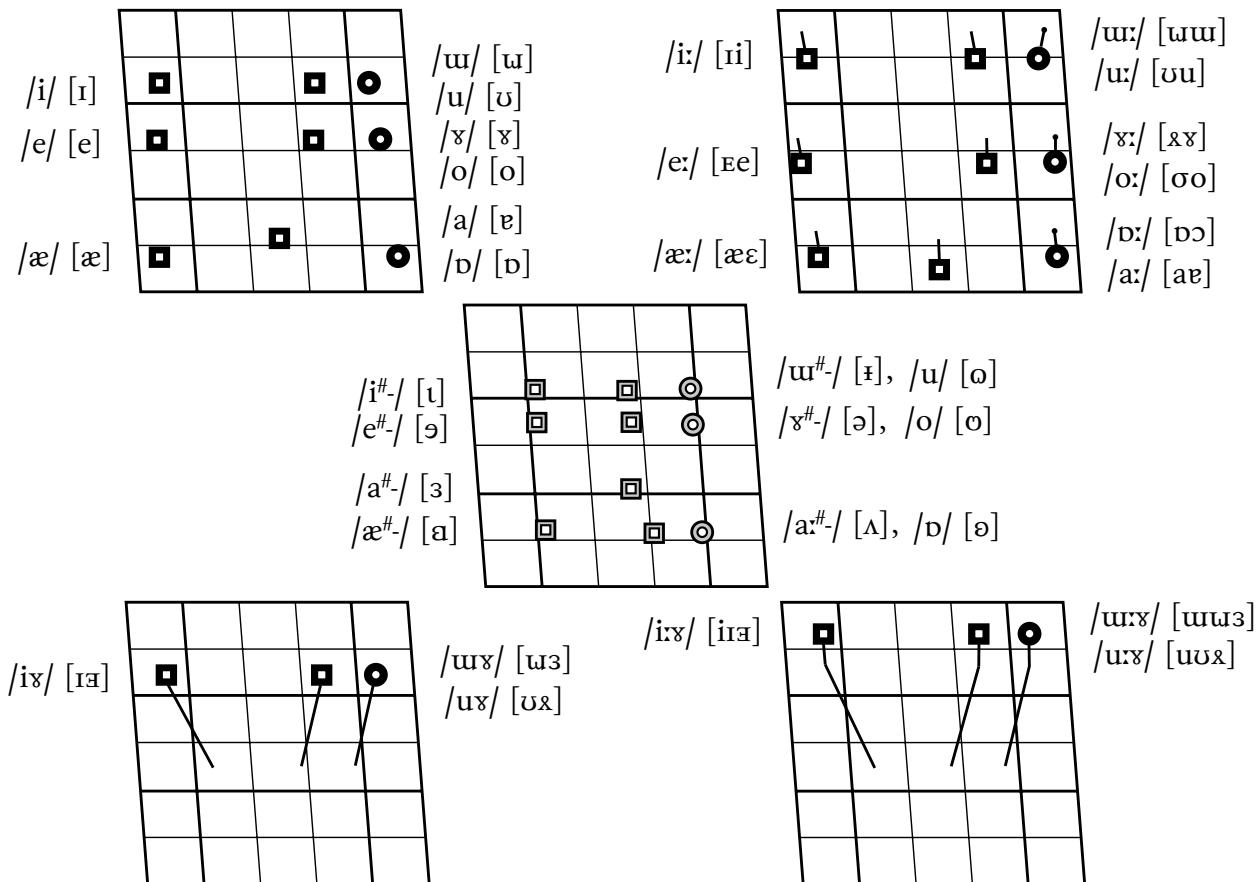
Of course, in spite of poorly inherited from traditional spelling, /ph, th, kh; tʃh/ are simple and normal sequences, and nothing like circus-like things as '/p̪, t̪, k̪, tʃ̪/'.

In syllable-final position, /V/ may be followed only by /p, t, k, ɺ; m, n, ɳ/ [p, t, k, ɺ; m, n, ɳ] (including /b, d, g; f, s, h; r; l/, in loans, and initial /st, str/, but speakers behave differently in such cases). The diphthongs and triphthongs shown in fig 1 are also typical of the final position, including short vowels, which are followed by /ɻ/, too.

Of course, /Vi, Vu/ diphthongs must not be humiliated as if they were '/Vj, Vw/'.

2. *Vowels*. Thai has nine vowels, both short and long (ie narrow diphthongs), and three peculiar phonemic opening diphthongs, /iɤ, uɤ, uɤ/ [iɤ, uɤ, uɤ], as well as many others resulting from the juxtaposition of either short or long *vowels* with

fig 1. *Neutral* Thai main vocalic elements: short and long vowels and opening diphthongs.



/i, u/ [i, u] (fronting or backing diphthongs). The most frequent are /ai, au; a:i, a:a/ [ia, ua; ia, a:a]. Initial *vowels* are /#?V/ and final short *vowels* are /V?#/ [V?] but generally [V] if unstressed. The third vocogram provides the possible realizations of the short vowels in reduced open syllables (with weaker stress and tones).

fig 2 shows the vowels and diphthongs (and triphthongs) of neutral Thai. For useful comparison, fig 3-4 and fig 5-6, respectively, show their counterparts of the *mediatic* and *traditional* accents.

fig 2. Neutral Thai further diphthongs: fronting /Vi/ & backing /Vu/.

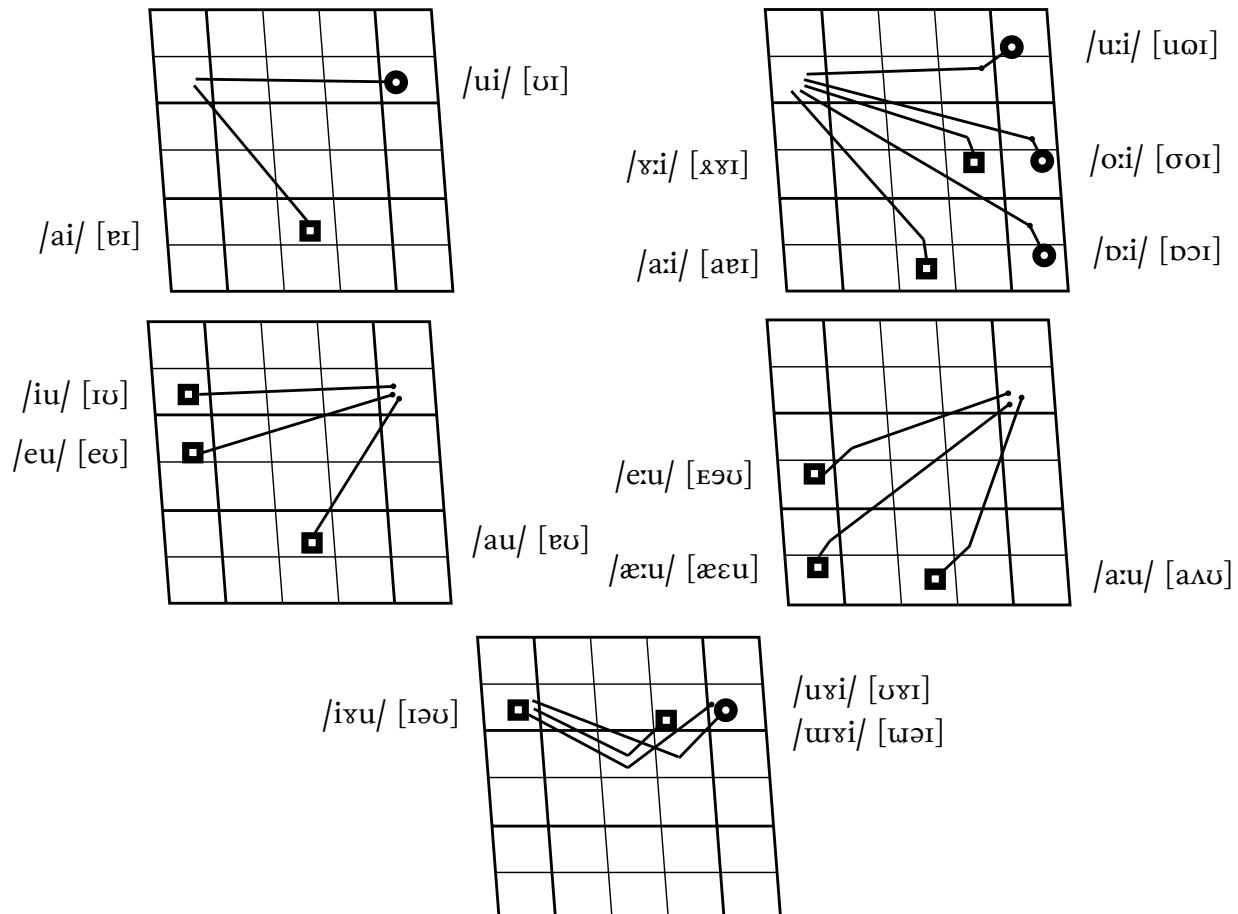


fig 3. Mediatic Thai main vocalic elements: short and long vowels and opening diphthongs.

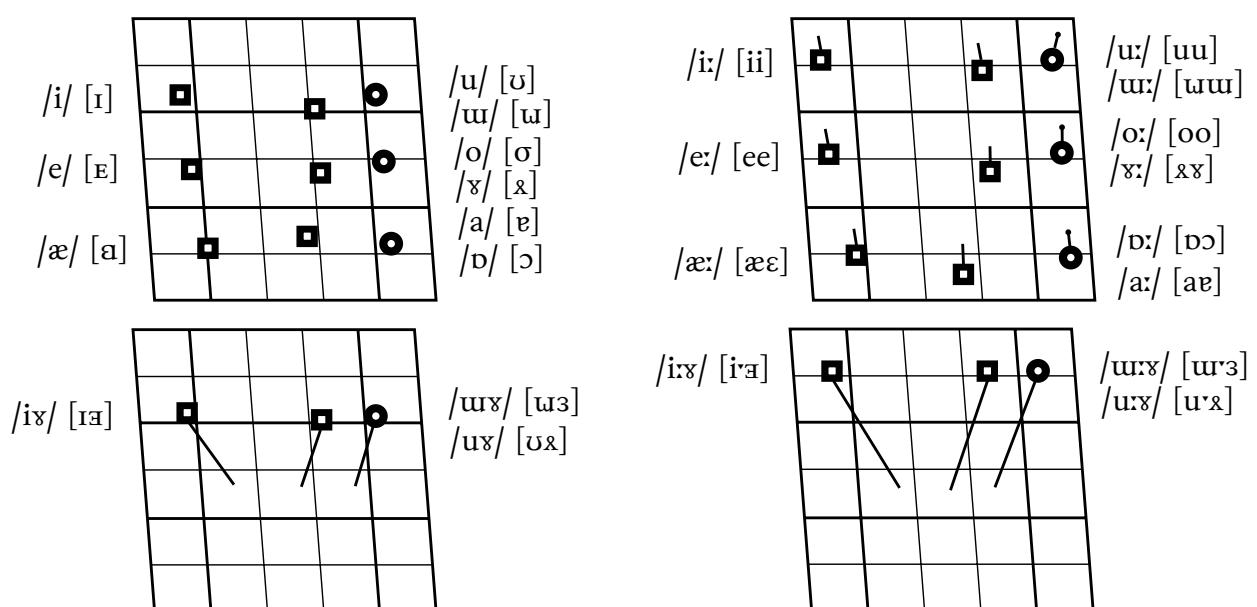


fig 4. *Mediatic* Thai further diphthongs: fronting /Vi/ & backing /Vu/.

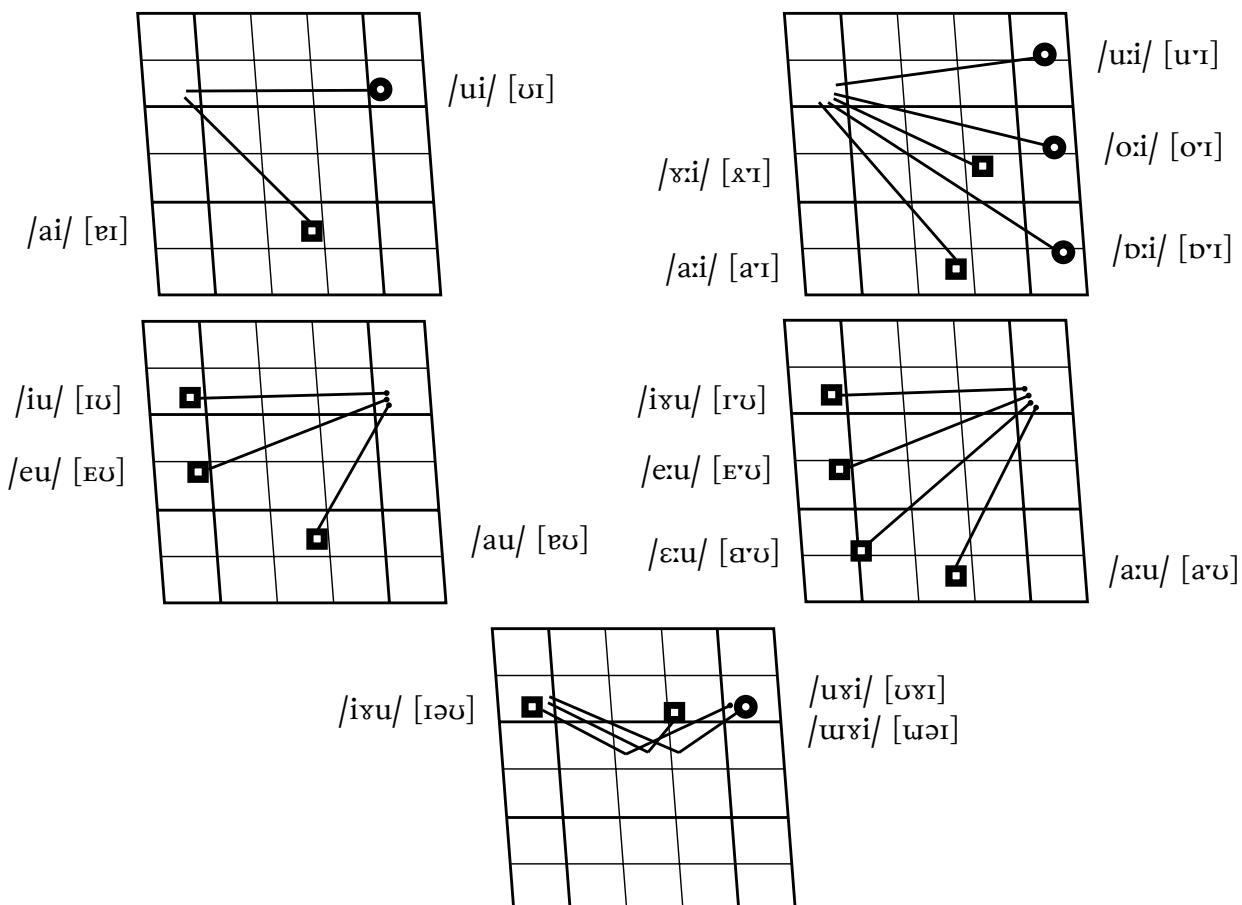


fig 5. Traditional Thai main vocalic elements: short and long vowels and opening diphthongs.

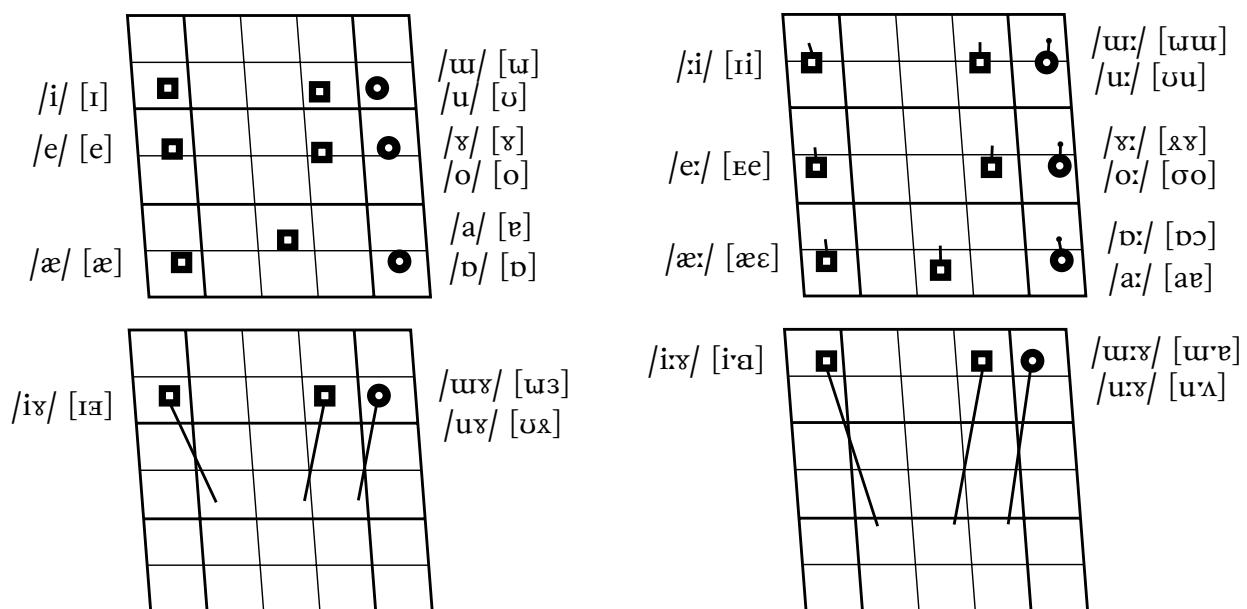
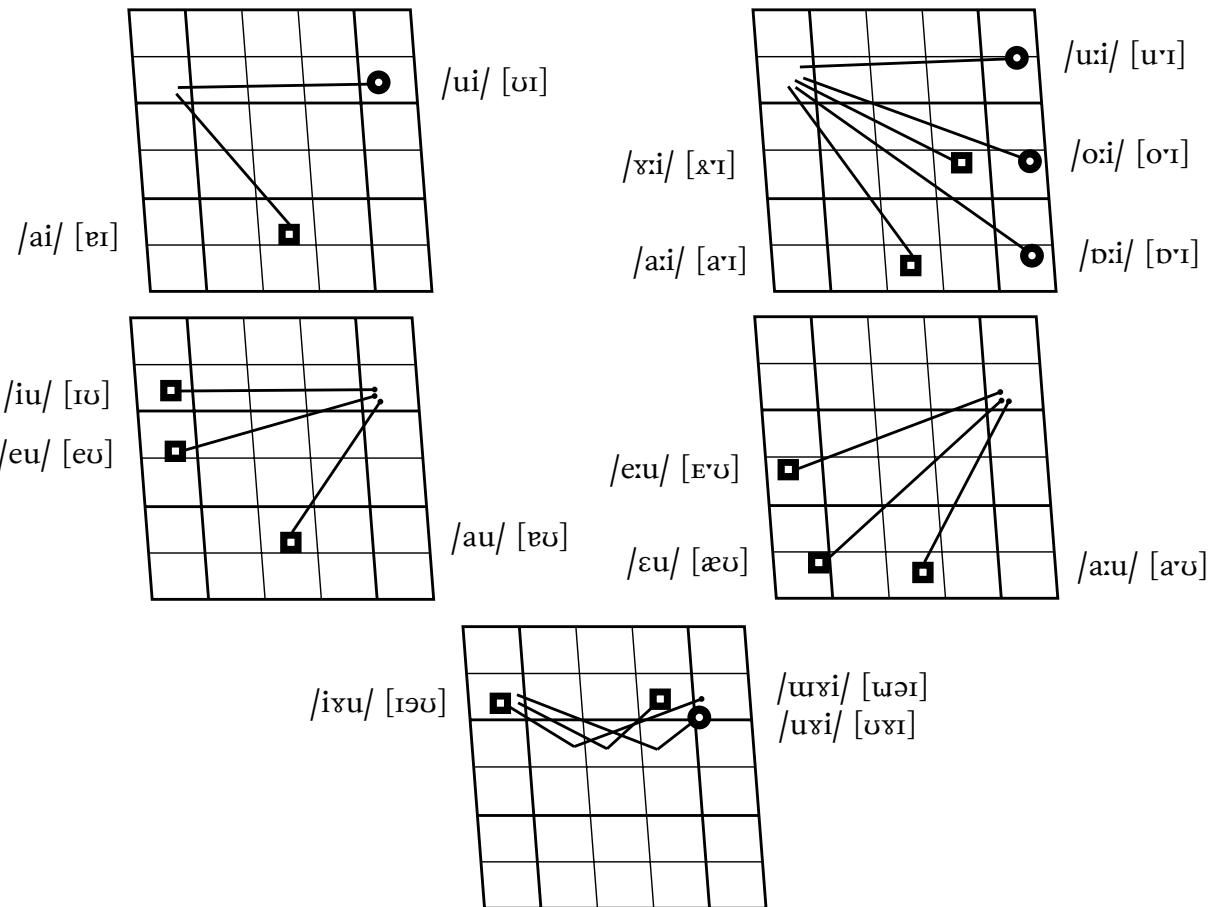


fig 6. Traditional Thai further diphthongs: fronting /Vi/ & backing /Vu/.



3. *Consonants.* fig 7 shows the consonants of neutral Thai. The phoneme /ʔ/ often becomes ‘zero’, in word-internal or utterance-final unstressed syllables.

Thai presents opposition between /C, Ch/ [C, Ch], for stops (/p, t, k/), and the stopstricitive /tʃ/ [tʃ], certainly not *offIPA* [tʂ]). Final /p, t, k, ʔ/ are [C]; /t, d/ are mostly denti-alveolar, [t, d]; in addition, we usually have /r, l/ [r, l].

fig 7. Neutral Thai consonants.

m		n	[ŋ]	ŋ
p b	t d		[k]	k
		tʃ		ʔ
f s		j		w h
	r			
	l			

& /ph, th, kh, tʃh/ (= /C/+/h/, not '/p̚, t̚, k̚, t̚ʃh/' nor '/pʰ, tʰ, kʰ, t̚ʃh/')

4. There are five *tonemes*, as shown in fig 8.1-2: // [], /-/ [], /]/ [], /]/ [-], // [-]. The third and fourth are accompanied by creaky voice, [V], eg *khaa* /kha:/ [khaə] ‘to be dangling’, *khàa* (better: *khaa*) /\_kha:/ [\_khaə] ‘galangal’, *khâa* (*khàa*) /'kha:/ [/khaə/] ‘to kill’, *kháa* (*khàa*) /'kha:/ [-khə̯ə̯] ‘to trade’, *khăa* (*khàa*) /kha:/ [\_khaə] ‘leg’.

In this case, we also show the five words in a widespread, but unsatisfactory, transliteration type, followed by a much more intuitive type, because more simi-

lar to the phonemic transcription, which is certainly an advantage, rather than a drawback.

Besides, in *protunes*, we have the taxotones shown in rows just below those occurring in *tunes*. Let us also consider an average realization of all tonemes, in the *mediatic* and *traditional* accents, indicated together (in fig 8), to facilitate useful (and necessary) comparisons.

fig 8.1. Thai *neutral* tonemes and taxotones, followed by their attenuated forms occurring in *protunes* (including weaker syllables), and in emphatic contexts.

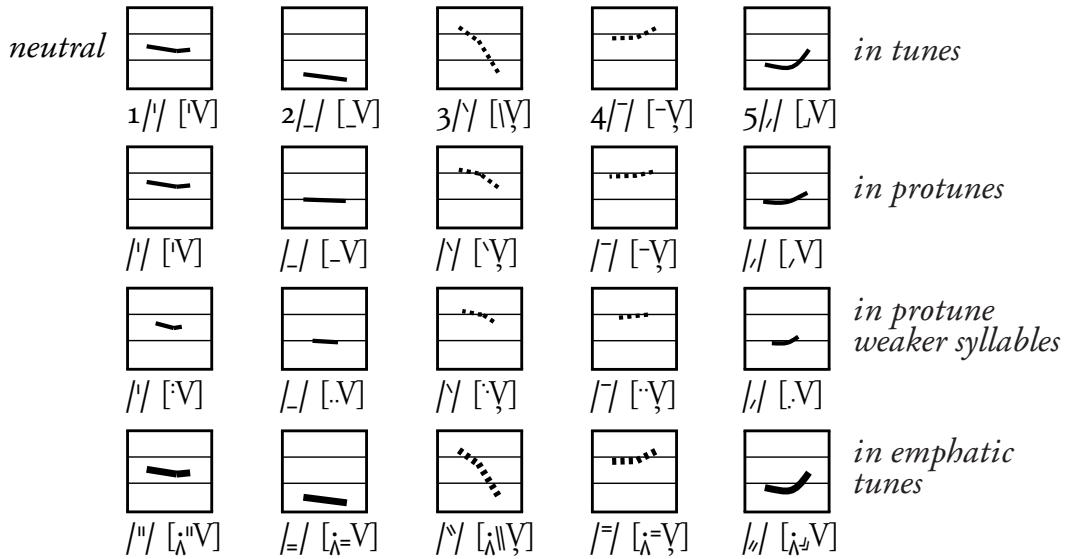
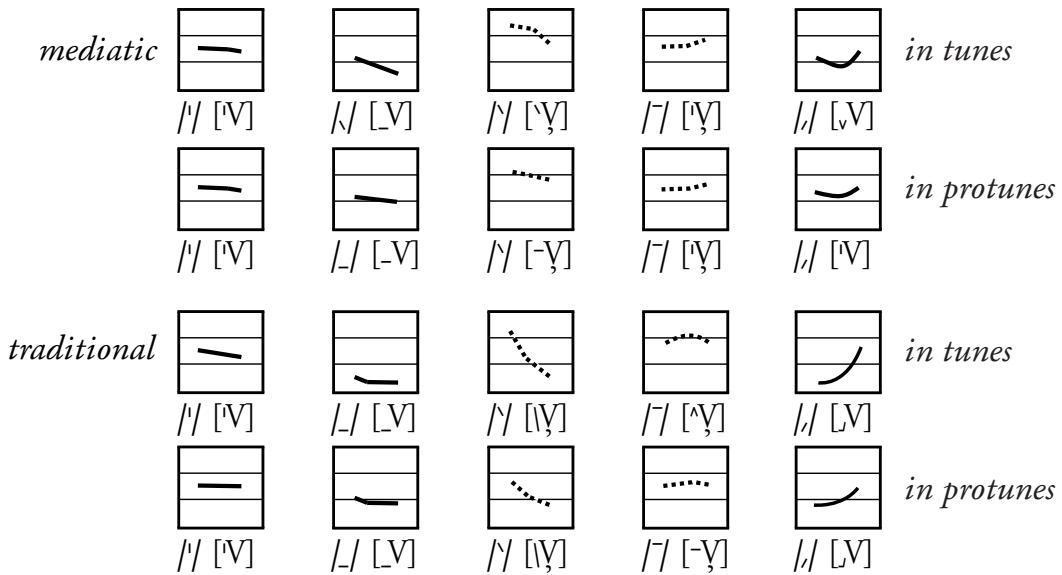


fig 8.2. Thai *mediatic*, and *traditional* tonemes and taxotones, followed by their attenuated forms occurring in *protunes*.



4. Only for the neutral accent, fig 9 shows, more analytically, the behavior of the tonemes, indicating their taxotones inside the four typical protunes.

The first one represents their complete realizations occurring isolated, in citation form, as it happens inside the emphatic protune, /A:/.

In addition, fig 10 shows how the tonemes are reduced when uttered inside the four neutral tunes (including traditional /?/).

Again, the first one corresponds to the emphatic (and citation) forms, not influenced by any of the other tunes.

fig 9. *Neutral* Thai protunes and the taxotones occurring inside them.

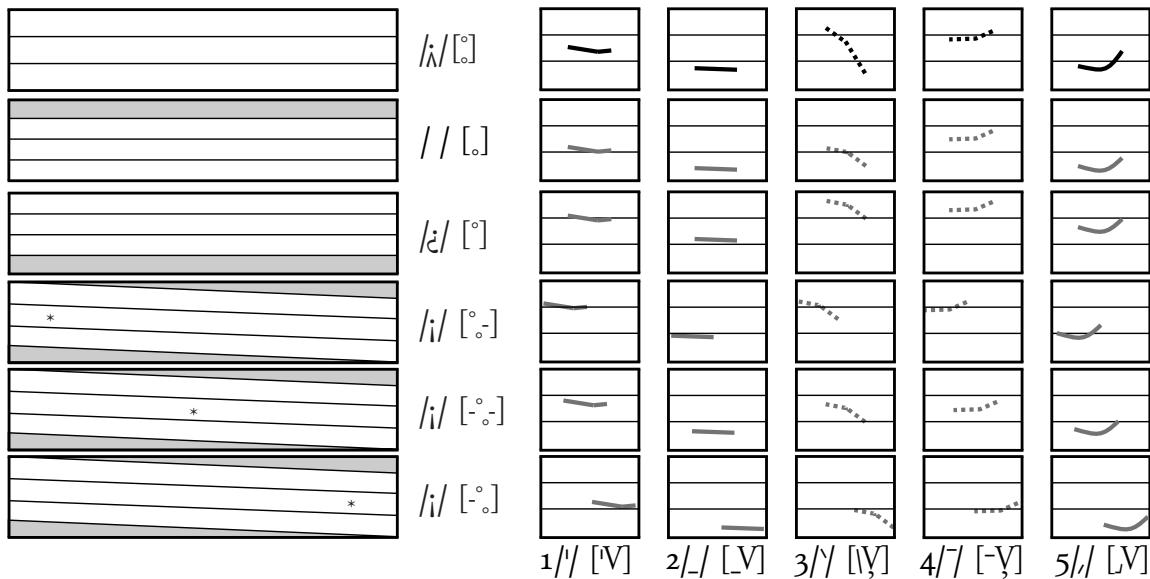
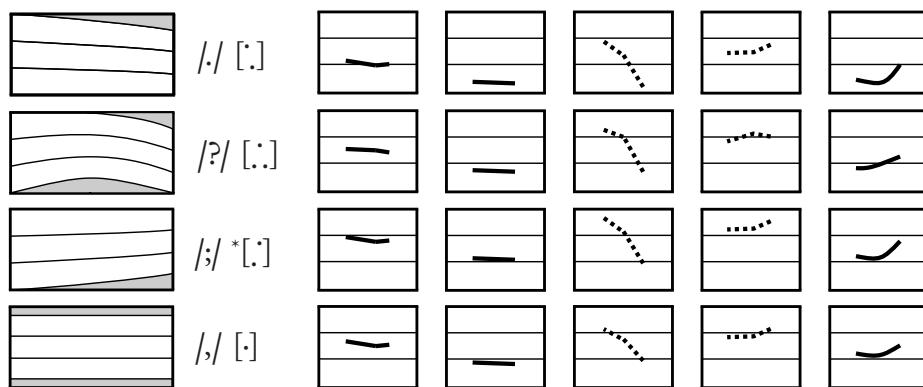
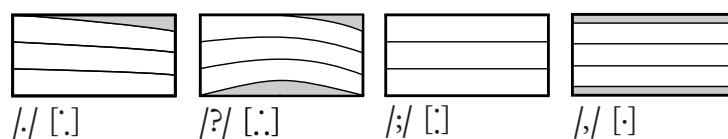


fig 10. *Neutral* Thai tunes and the taxotones occurring inside them.



5. The fundamental *intonation* patterns are also shown (fig 11).

fig 11. Thai fundamental intonation patterns.



6. In this section, we will show examples for the vowels and consonants of neutral Thai pronunciation.

There is no generally accepted transliteration for Thai. In fact, its official spelling uses several different glyphs for what corresponds to a simpler phonemic inventory. The fact is that foreign loans are often not adapted to pronunciation, but kept more like in the languages from which they were drawn.

Particularly Sanskrit and Pali words are a clear indication of this ‘problem’. Also loans from modern languages are generally treated likewise...

Thus, an etymological transliteration would have too many ‘variants’ especially for /Ch/ sequences. On the other hand, a transliteration which hinted at the phonemic elements would present other problems, including the way to show the tonemes above vowel letters.

Therefore, we decided to use the phonemic transcription instead of any sort of Roman transliteration. Of course, that could be almost sufficient, but, as we aim to be fairly accurate in our description of the pronunciation of Thai, we certainly add a *canIPA* phonotonal transcription.

Thus, we will first show examples of the vowels (and some additional diphthongs) and consonants. After those, we will illustrate the intonation patterns, by adding the transcription of a number of sentences, followed by the usual IPA story *The North Wind and the Sun*.

## 7. Vowels

/krít, ɻen, ɻphæɻ, ,fan, \_klɔŋ, ɻkhon, \_sut, ɻkhun, ɻŋxŋ/  
[\_krít, ɻen, ɻphæɻ, ,fən, \_klɔŋ, |khɔn, \_sʊt, |khʊn, ɻŋxŋ]

/kri:t, ɻen, ɻphæ:, ,fa:n, \_klɔ:ŋ, ɻkho:n, \_su:t, ɻkhun:, ɻŋx:n/  
[\_kri:t, ɻen, ɻphæ:, ,fa:n, \_klɔ:ŋ, |khɔ:n, \_sʊt, |khʊ:n, ɻŋx:n].

*Basic and additional diphthongs and triphthongs (others are present in the sentences and text transcribed below)*

/rίvŋ, ɻuvŋ, ɻuvŋ/  
[rίvŋ, ɻuvŋ, ɻuvŋ]

/kίv/, /siv/, /dai, ɻkui/, /kau, ɻniu/, /do:i, ɻlæ:i/, /du:v/  
[-kίv], [siv], [|dæi, |kүi], [|kɛv, -nүv], [|dɔi, -læv], [|dүv].

As the third vocogram of fig 1 shows, in quick colloquial speech, the short vowels occurring in prosodically weaker open syllables before the prominent one, are subject to centralization (in the vocogram, and shortening for /a:/, too), as in: /prá:tu:/ [prá:tuu, ɻrɔ:] (door), or /sa\_du:vk/ [sə\_du:vk, ɻsɔ:] (convenient), /ɻa:hə:n/ [ɻa:hə:n, ɻʌn] (food), /phá:sə:/ [pa:səd, ɻvə:] (language).

## 8. Consonants

/ma:, ɻna:, ɻja:/, /pá:, ɻba:, ɻtam, ɻdam, ɻka:ŋ, ɻŋu:n/, /tʃam/, /fai, ɻsai/, /já:m,  
ɻwan, ɻhai/, /rak, ɻlak/  
[má:, ɻná:, ɻjá:], [|pá:, ɻbá:, ɻtám, ɻdám, ɻká:ŋ, ɻŋú:n], [|tʃá:m], [|fái, ɻsái], [|já:m,  
ɻwán, ɻhái], [|rák, ɻlá:k]

Including the /Ch/ sequences (not any ‘special’, ‘mysterious’, ‘alien’ consonants):  
/pha:, ɻtham, ɻkha:ŋ, ɻtʃa:m/,  
[phæ:, ɻθem, |khæ:ŋ, |tʃa:m].

## 9. Sentences for intonation, too

Let us observe that certain grammemes usually change their tones in normal conversation, from rising to high. Among these are the personal pronouns /tʃan/

[tʃaŋ, -tʃəŋ] (I), /khau/ [kʰəu, -tʃəu] (he, she, they), and the interrogative particle /mai/ [mɛi, -mɛi]. In addition, in order to emphasize a given word like, for instance, /susī/ [sʊsī] (beautiful), by reduplicating it, again, we get /susī susī/ [s̥-sʊsī, sʊsī] (so beautiful!).

Further tone changes regard sequences of two rising tonemes, as in: /naŋ.suː/ [-nəŋ.suː] (book), or /saːŋ.aːm khon/ [-s̥əŋ.s̥aːm khon] (two or three people).

/tʃhan, -ja:k tʃa 'phu:t 'pha;sa:t'hai 'dai:dí:/  
[tʃʰən, -jaɛk tʃa 'phu:t' 'pha;sa:t'hai 'dá:p tʃ̥əi:dí:]  
I'd like to speak Thai well.

/'rau -ru: 'wa: 'khun, ,ma:i,thwəŋ \_a'rai./  
[r̥əu -r̥u: 'wá: 'khun, ,maɛi,thwəŋ \_a'rai.]  
We know what you mean.

/kʰo:p'khun 'ma:k./  
[kʰo:p'khun 'maqɛk'.]  
Thank you very much.

/ɔ:khun -khit \_ja:n'rai, \_ki:su\_kap 'rwa:ŋ -ni:/  
[ɔ:khun -khít' \_jaɛn'rai, \_kiɛsu\_kap' 'rwa:ŋ -ni:]  
What do you think about it?

/ɔ:wən-ni:, 'khun -ru: su:k \_ja:n'rai./  
[ɔ:wən-ni:, 'khun -r̥u: su:k \_jaɛn'rai.]  
How are you feeling today?

/ɔ:rəu \_tʃa 'pai 'thi:,nai./  
[ɔ:r̥əu \_tʃa 'pái 'thí:,nái.]  
Where are we going?

/ɔ:khun ,sa:mət, 'phu:t 'pha;sa:t'hai 'dai ,mai?/  
[ɔ:khun ,sa:mət' 'phu:t' 'pha;sa:t'hai 'dai ,mai?]..  
Can you speak Thai?

/ɔ:phir:tʃai:, ,khə:nj 'khun 'khau:tʃai 'phu:t 'pha;sa:t'hai ,mai?/  
[ɔ:phí:tʃai:, ,khə:nj 'khun 'khau:tʃai 'phu:t' 'pha;sa:t'hai ,mai?]..  
Does your brother understand it?

/ɔ:p'hruŋ-ni:, ,khau \_tʃa 'ma: ,mai?/  
[ɔ:p'hruŋ-ni:, ,khau \_tʃa 'mái ,mai?]..  
Is he coming tomorrow?

/'tha: 'khun 'ma: 'wan, ,sau 'mai'dai 'rau \_tʃa \_dəm -trəm./  
[t̥há:p 'khun 'mái 'wan, ,sau 'mai'dái 'rau \_tʃa \_dəm -trəm.]  
If you can't come on Saturday, we'll be in trouble.

/'tha: 'khun 'ma: 'wan, ,sau 'mai'dai, 'kə: 'mai 'mi:pan,ha:/  
[t̥há:p 'khun 'mái 'wan, ,sau 'mai'dái, 'kə: 'mái 'mí:pán,ha:]  
If you can't come on Saturday, there's no problem.

/'phə: ,thwəŋ 'sa,tha:nii;| ˘rotfai ˘kə: 'pai ˘læε./  
 [phə: ,thwəŋ 'sa,tha:nii;| ˘rotfai ˘kə: 'pai ˘læε.]  
 When I arrived at the station, the train had gone.

/˘rəu \_tʃa 'pai 'do:i ˘rot\_pra'tʃam'tha:ŋ;| ,rəu: 'dʒən-thau./  
 [˘rəu \_tʃa 'pai 'do:i ˘rot\_pra'tʃam'tha:ŋ;| ,rəu: 'dʒən-thau.]  
 Shall we go by bus, or on foot?

/˘khun 'dʒən'tham 'do:i ˘rot\_pra'tʃam'tham, ˘rotfai; ˘rəu: ˘rot'jon./  
 [˘khun 'dʒən'tham 'do:i ˘rot\_pra'tʃam'tham, ˘rotfai; ˘rəu: ˘rot'jon.]  
 Are you going by bus, by train, or by car?

/'mi: \_nuŋ, ,sə:j, ,sa:m, \_si: 'ha; 'an./  
 [mii \_nuŋ, ,sə:j, ,sa:m, \_si: 'ha; 'an.]  
 There are one, two, three, four, five.

/'mi: \_nuŋ, ,sə:j, ,sa:m, \_si: 'ha; 'an,/

[mii \_nuŋ, ,sə:j, ,sa:m, \_si: 'ha; 'an.]  
 There are one, two, three, four, five...

/'ni:, 'pen ˘phot'ʃa'na: \_nu'krom, 'thi: 'mi:\_pra\_jo:t 'ma:k./  
 [-nii: 'pen ˘phot'ʃa'na: \_nu'krom. 'thi: 'mi:\_pra\_jo:t 'ma:k.]  
 This is a very useful dictionary.

/,khau \_kla:u 'wa:;| 'mai ,tʃhan 'jaŋ 'mai'dai 'tham./  
 [,khəu \_kla:u 'wa:;| 'mai ,tʃhan 'jaŋ 'mai'dai 'tham.]  
 'No', he said, 'I haven't done it'.

/næ:t'nɔ:n, 'thi:-rak./  
 [næ:t'nɔ:n. 'thi:-rak.]  
 Of course, my dear.

/næ:t'nɔ:n, 'thi:-rak.| 'phruŋ-ni:, 'khun \_tʃa 'da:i./  
 [næ:t'nɔ:n. 'thi:-rak.| 'phruŋ-ni:, 'khun \_tʃa 'da:i.]  
 Of course, my dear. You'll have it tomorrow.

/næ:t'nɔ:n, 'thi:-rak;| 'phruŋ-ni:, 'khun \_tʃa 'da:i./  
 [næ:t'nɔ:n. 'thi:-rak;| 'phruŋ-ni:, 'khun \_tʃa 'da:i.]  
 Of course, my dear, you'll have it tomorrow.

/,khau \_kla:u 'wa:,| 'ta:m 'khwa:m'pen'tʃiŋ ,tʃhan 'mai'næ:tʃai./  
 [,khəu \_kla:u 'wa:,| 'ta:m 'khwa:m'pen'tʃiŋ ,tʃhan 'mai'næ:tʃai.]  
 As a matter of fact, he said, I'm not at all sure.

/˘'thi:-rak.| 'khun 'tʃam 'mai'dai ,rə: 'wa:;| 'rəu 'daaxi ,hen ,naŋ 'rəwəŋ 'ni: 'məwə\_sap'da: 'thi:-læεu?/  
 [˘'thi:-rak.| 'khun 'tʃam 'mai'dai ,rə: 'wa:;| 'rəu 'daaxi ,hen ,naŋ 'rəwəŋ 'ni: 'məwə\_sap'da: 'thi:-læεu?.]

Don't you remember, dear, we saw that movie last week?

/˘tʃhan ,soŋsai, 'wa: 'tham'mai 'khun ,thwəŋ 'phu:t'wa:;| 'tʃhan 'mai ,raŋ\_ki:t,|  
 'məwə 'troŋ'kan'khəm, \_kap 'khwa:m'pen'tʃiŋ./

I wonder, why did you say 'I don't mind', when the opposite is true?

/'rau̯təŋ'kaən̩ -θhuk\_jaŋ./  
[.].  
We need everything.

/ʌ'fau, | 'təŋ'kaən -thuk\_ja:ŋ./  
/ʌ'rəʊ, | təŋ'kaən -θhük\_-ja:ŋ./  
We need everything.

/ʌ'rəu "təŋ'kaən| -thuk\_jaŋ./  
/rəv. ʌ'təŋ'kaən| -thʊk'-jaŋ:/  
We *need* everything.

/ʌ'rəu 'tθŋ'ka:n ̐thuk\_ ja:n./  
[ʌrəu 'tθŋ'ka:n. ̐θhuk\_ ja:n.]  
We need *everything*.

10. The following *text* is habitually used by the International Phonetic Association (IPA) to illustrate the pronunciation of different languages and accents. Here is its non literal English version.

*The North Wind and the Sun were disputing which was the stronger, when a traveler came along wrapped in a warm cloak. They agreed that the one who first succeeded in making the traveler take his cloak off should be considered stronger than the other.*

Then the North Wind blew as hard as he could, but the more he blew the more closely did the traveler fold his cloak around him; and at last the North Wind gave up the attempt. Then the Sun shone out warmly, and immediately the traveler took off his cloak. And so the North Wind was obliged to confess that the Sun was the stronger of the two.

*Did you like the story? Do you want to hear it again?*

/kha\_nə? 'thi 'lom,nurə,| -læ -phraPa-thit,|| 'kam'laj ,thiŋŋ 'kan 'wa:|| 'khrai 'tʃa  
'mi:| 'phalaŋ 'ma:k,| kwa 'kan|| 'kd 'mi: -nak'dx:n'tha:ŋ,| 'phu: \_nurə 'dvn,| \_pha:n  
'ma:|| \_sai 'surŋ'kan,na:u|| 'lom,nurə -læ,| -phraPa-thit| 'tʃurŋ \_tok'lɔŋ 'kan 'wa:|| 'khrai  
'thi ,sa:'mat 'tham 'hai -nak'dx:n'tha:ŋ 'phu: -ni:;|| \_thɔ:t 'surŋ'kan,na:u;| \_pok 'da:i  
,sam\_ret \_kd:n,|| 'tʃa ,thuŋ 'wa:,|| 'pen 'phu:,| 'thi 'mi:,| 'phalaŋ 'ma:k \_kwa:||

-læp læ:u;| lom,nwʌ,| 'kɒ 'kra'phwər̩ phat,| \_ja:iŋ \_sut 'ræ:ŋ.|| \_tæ 'jɪŋ,| 'phat 'ræ:ŋ  
'mark,| 'khwʌn 'phiɪŋ 'dai;| -nak'dvə:n'tha:iŋ,| 'kɒ 'jɪŋ 'dəŋ 'swʌkan,na:u,| 'hai 'kra-  
-tʃhap \_kap 'tux,| 'mark 'khwʌn 'phiɪŋ 'nan|| -læp 'hai 'thi \_sut,| lom,nwʌ,| 'kɒ lɪ:k  
-lom 'khwʌm 'pha'ja:jəm|| \_tʃə:k 'nan,|| -phra?ə-thit,| 'tʃəŋ \_sə:t ,sæ:ŋ,| ?an -rɔ:n  
'ræ:ŋ,| ?ɒ:k 'ma:;|| -nak'dvə:n'tha:iŋ| 'kɒ \_thə:t 'swʌkan,na:u,| ?ɒ:k 'than 'thi:;|| 'nai 'thi  
\_sut,|| lom,nwʌ,| 'tʃəŋ 'tʃəm 'təŋ,| 'jɒ:m -rap 'wa:;|| -phra?ə-thit 'mi: 'phə'ləŋ 'ma:k,  
\_kwa: 'ton.||/

/χ'khun tʃhɔ:p 'rurxŋ̩ 'rau ,mai?|| χ'khun tʂŋ̩ kən 'thi: \_tʃa 'fan \_pik,| χ'khran ,mai?/

11. The *mediatic* Thai accent, mostly based on Bangkok, has the following peculiarities. Especially, /i, i:/; u, u:/; u, u:/; e, e:/; ɤ, ɤ:/; o, o:/ may be merged for their qualities and length, at least occasionally, although criticizedly (because, doing so, their phonemes are not distinguished). In addition, /NV/ sequences may be [NV̚] (more rarely, we may also find /hV/ [hV̚]).

Instead of a systematic use of /<sup>#</sup>V, V<sup>#</sup>/ (with short vowels), more or less frequently, we may have [<sup>#</sup>V, V<sup>#</sup>].

Initial /p, t, k; tʃ/ may be ejective, [p', p'; t'; k', k'; tʃ'] ([p] is a labiodental stop). Final /p, t, k/, in addition to normal [p', t', k', k'], may become [b', d', ɡ', ɡ']. Between a voiced phone and an unstressed vowel, /p, t, k/ may become [b, d, ɡ, ɡ].

For /kh/, we may quite frequently have [kh, kh̄], or even [k̄h, k̄h̄, h̄, h̄] (stop-semi[con]strictive and semi-constrictive). Also for /khw/ we may have peculiar realizations: [pɸ, φ] (bilabial stop-strictive and constrictive). Also /r/ [r̄, z].

12. Besides, /p(h)r, p(h)l; k(h)r, k(h)l/ may be reduced to simple /p(h), k(h)/, respectively. /r, l/ [r, l] often alternate with [l], or merge into [l]; [z] can even be found for /r/, or [l] (velar) for /l/.

Further additional peculiarities: when /m, n, ɳ; r; l/ are preceded by /ɳ/, they may be reduced [m, n, ɳ; r; l], or completely dropped, becoming ‘zero’, [∅].

Besides, /p, t, k; f/ (not /Ch/) may insert [ɥ] (a provelar semi-approximant) before a following vowel, which gives the impression of a ‘darker’ timbre, especially for front vowels.

We often have /tʃ/ [tʃ, dʒ], and /tʃh/ [tʃh, ʃh]. In addition, rather frequently, /b, d/ become either creaky, [b, d], or injective, [’b, ’d]. Also /j/ [j], frequently [’j]; we also find /w/ [w, w̄, ȫ, ȫ̄], and [’w, ’w̄, ’ȫ, ’ȫ̄].

In addition, loans, with particular consonants, are realized differently by different speakers. While some try to ‘respect’ more the original language phonic structure, others simply realize them according to the typical Thai structure. Thus, for instance, final /b, f/, or /d, s/, become /p/ or /t/, respectively, while final /l/ changes to /n/ or /u/.

Besides, loans with initial /str/, as /s-traik/ ‘(labor) strike’ may become [s-t्र̥ɛɪk'], or, more commonly, [s-ત্ৰ̥েইক'], even [s-ত্ৰ̥েইক'].

13. Notice that, in addition to our own material, we also used parts of J. Moore & Saowalak Rodchue’s *Colloquial Thai* (1999) and M.R. Kalaya Tingsabdh & A.S. Abramson’s *Thai* (JIPA 1993), necessarily retranscribing some of their examples, for better results.



14. Let us end with a series of useful articulatory illustrations for the consonants and contoids, that we introduced in this article, including similar (but not identical to) ones occurring in other languages, for necessary comparisons.

fig 12. Thai consonants: nasals.

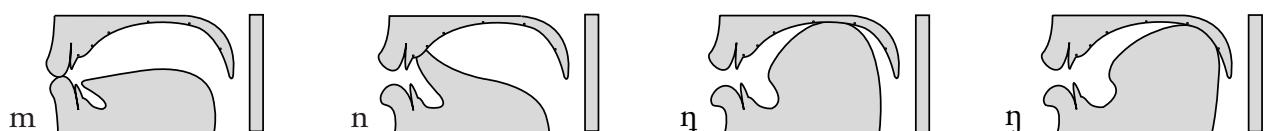


fig 13. Thai consonants (including mediatic ones and others for comparisons): stops.

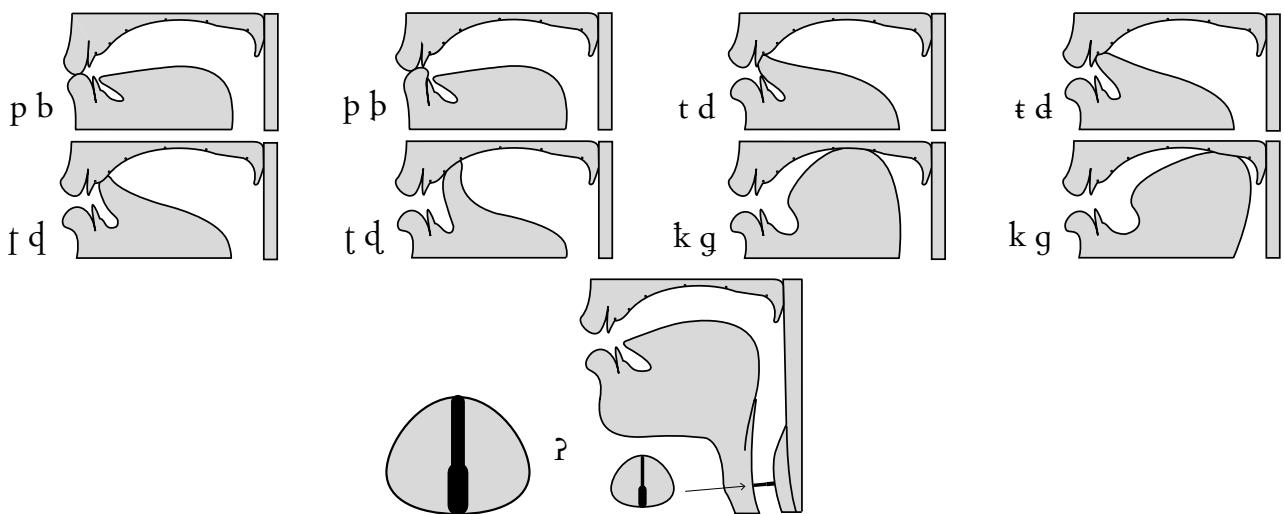


fig 14. Thai consonants (including mediatic ones and others for comparisons): stop-strictives.

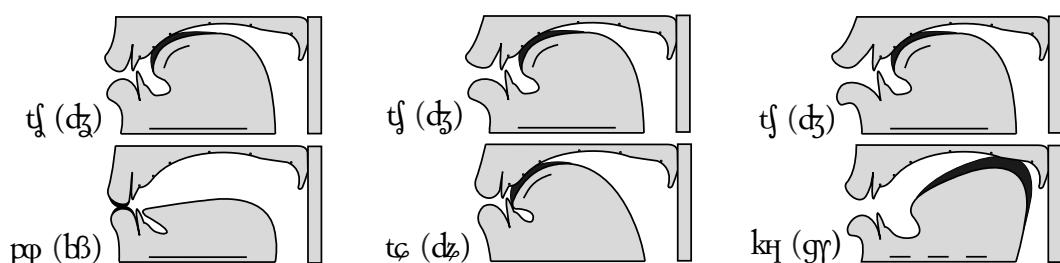


fig 15. Thai consonants (including mediatic ones and others for comparisons): constrictives.

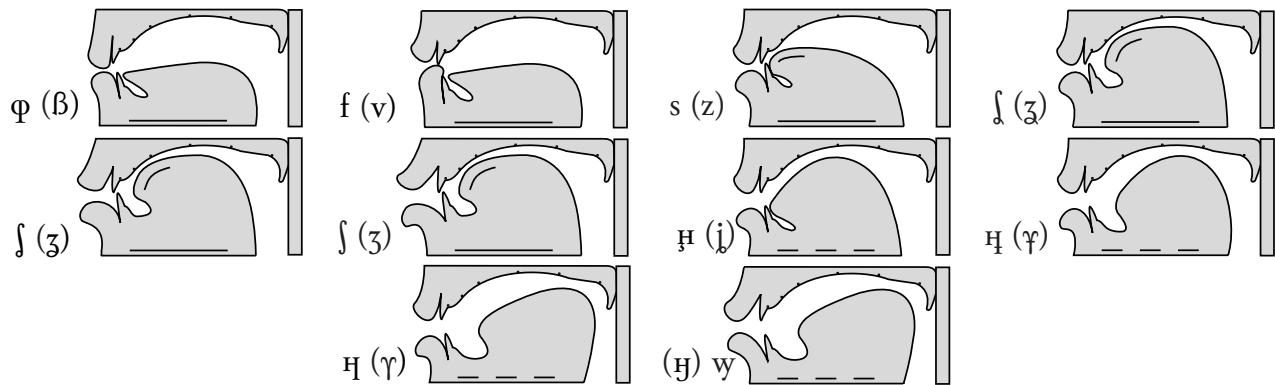


fig 16. Thai consonants (including mediatic ones for comparisons): approximants.

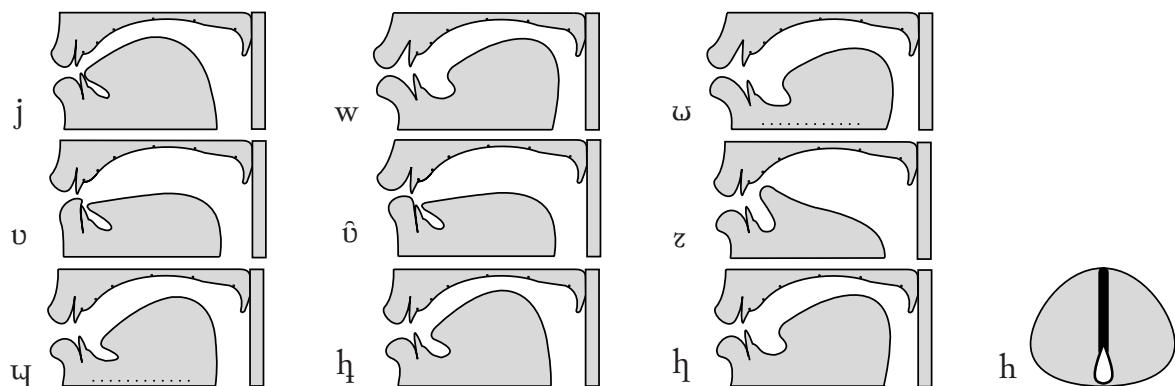


fig 17. Thai consonants: rhotics (including and others for comparisons, especially British [ɹ] and American [r], unfortunately still absurdly confused by too many even native ‘experts’).

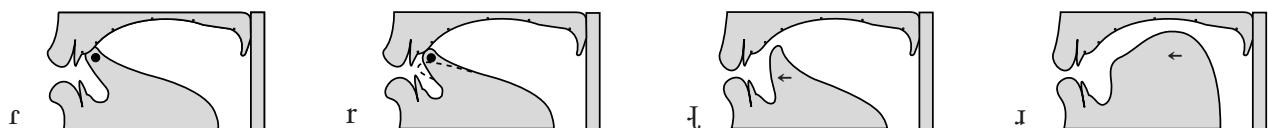
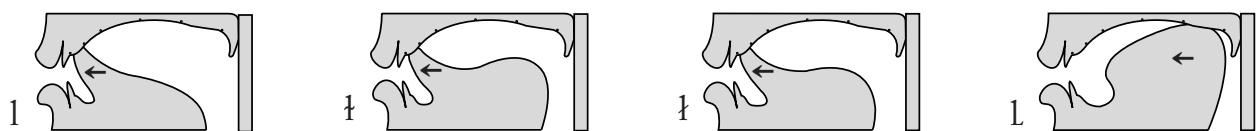


fig 18. Thai consonants (including and others for comparisons): laterals.



15. Let us also see the mechanism of ejective and injective contoids, by simply considering a general set of frequent elements. Oral and nasalized vocoids follow.

fig 19. Some ejective consonants.

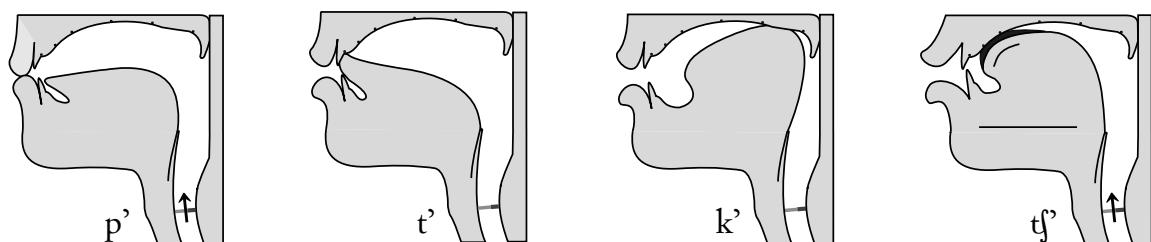


fig 19. Some injective (or ‘implosive’) consonants.

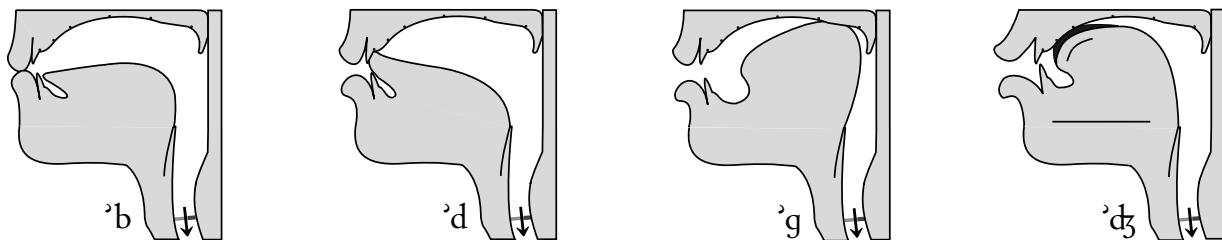


fig 20. Comparisons between *oral* vocoids (top), seminasalized (middle) and nasalized vocoids. The extreme vocoid positions in the vocogram are shown for more useful identifications.

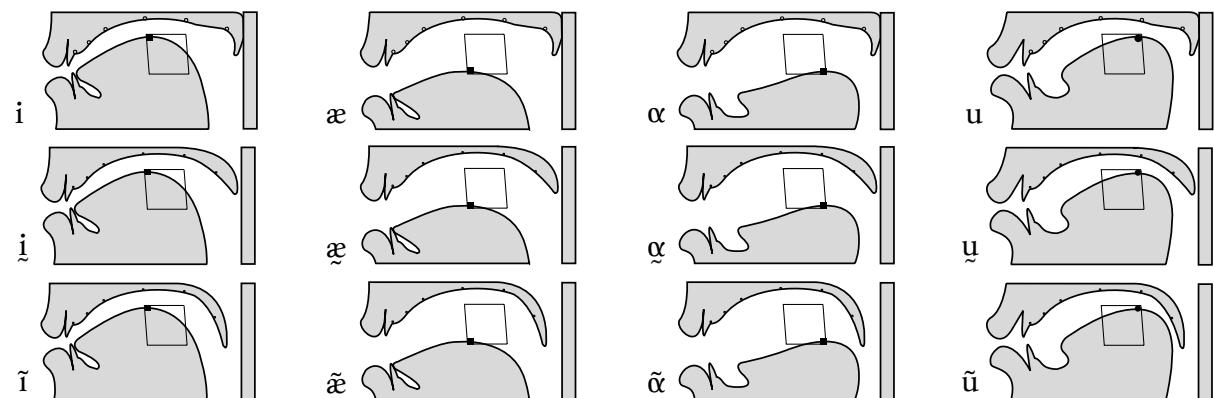


fig 21. Phonation types and positions of the glottis (and their laryngoids).

