

BBN-ANG-141 Foundations of phonology

2. Pronouncing vowels

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outline

articulatory properties of vowels

Jones and his experiment

tongue position

lip position

vowel chart

cardinal vowels

tense/lax

an acoustic analysis

further vowel contrasts

vowel quantity

diphthongs

sample exam questions

articulatory properties of vowels

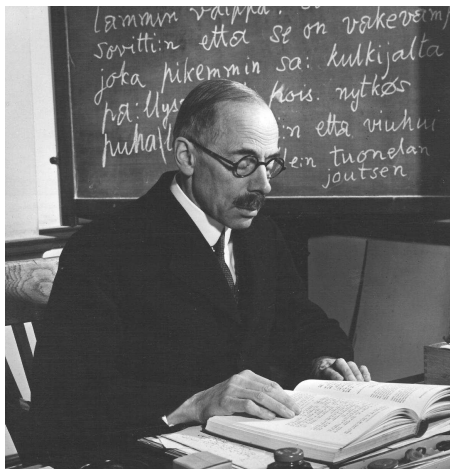
place of articulation

- ▶ palatal (usually called **front** in vowels)
- ▶ velar (usually called **back** in vowels)

manner of articulation

- ▶ “vowel” is a manner of articulation
- ▶ the boundary between vowels and approximants is fuzzy: the more closed the mouth is in a vowel, the more approximant-like it is
- ▶ ⇒ the vowel vs consonant difference is not categorical
- ▶ ⇒ the openness of the mouth is an important property of vowels

a phonetician...



Daniel Jones (1881–1967)

... and his experiment

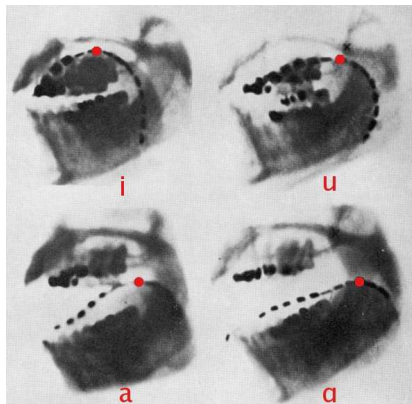


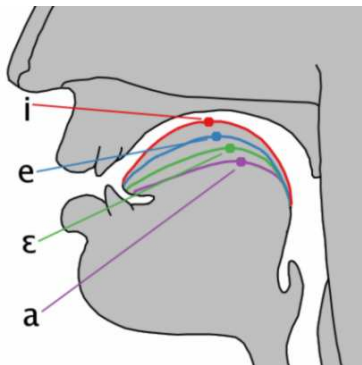
Figure: X-ray pictures of Jones' mouth

Frontispiece in Jones (1972)

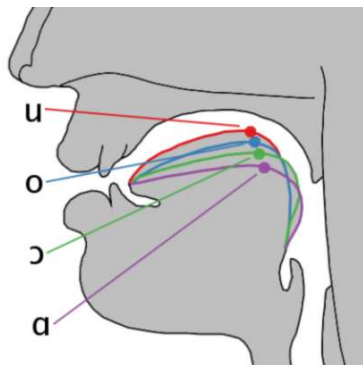
“A chain of small lead plates strung together was placed on the tongue to show its outline. The large dot added on each photograph marks the highest point of the tongue. The cross is a point of reference (near the end of the hard palate)... The photographs were taken by Dr. H. Trevelyan George in St. Bartholomew's Hospital, London, in January, 1917.”

Daniel Jones. 1972. *An outline of English phonetics (9th ed.)*. Cambridge: W. Heffer & Sons Ltd.

highest tongue positions

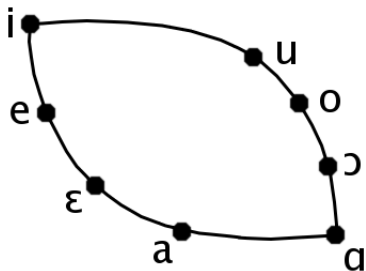


in the front part of the mouth

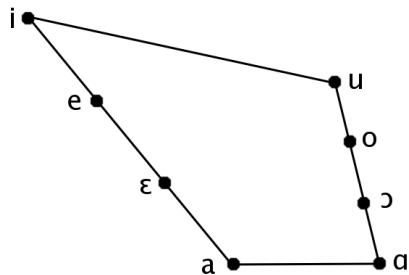


in the back part of the mouth

diagrammes of highest tongue positions



quite accurate representation



more schematic representation

lip position

dichotomy

unrounded/spread vs rounded

correlations

- ▶ front vowels are unrounded, back vowels are rounded
- ▶ rounded front and unrounded back vowels are rarer, and only occur if the language has unrounded front and/or rounded back vowels, too:
 - ▶ front rounded $V \supset$ front unrounded V
 - ▶ back unrounded $V \supset$ back rounded V

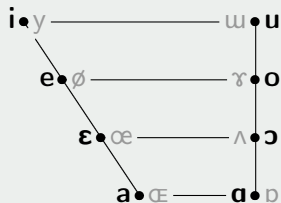
nb “ \supset ” reads as “implies”, $A \supset B$ means ‘if A then B’

cardinal vowels

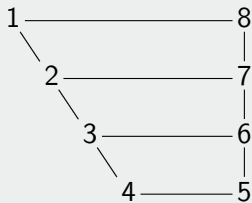
cardinal vowels

are arbitrarily chosen points in the vowel chart, to which vowels of specific languages can be compared

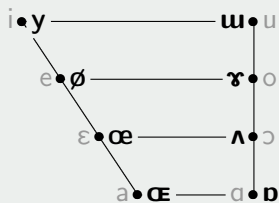
primary cardinal Vs



cardinal V positions



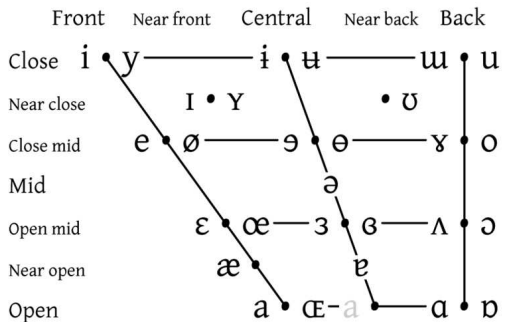
secondary cardinal Vs



eg i is primary cardinal vowel number 1; o is primary cardinal vowel number 7; ø is secondary cardinal vowel number 2; etc

the Jones vowel chart

VOWELS



Vowels at right & left of bullets are rounded & unrounded.

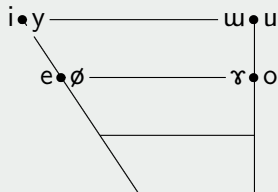
notes

- ▶ close = high (\neq Hung. *magas*)
- ▶ open = low
- ▶ front = palatal (= Hung. *magas*)
- ▶ back = velar (= Hung. *mély*)
- ▶ the vowel ə is called schwa
- ▶ the vowel æ is called ash

an alternative analysis for vowel height

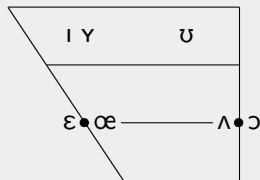
tense vowels

close and close mid vowels



lax vowels

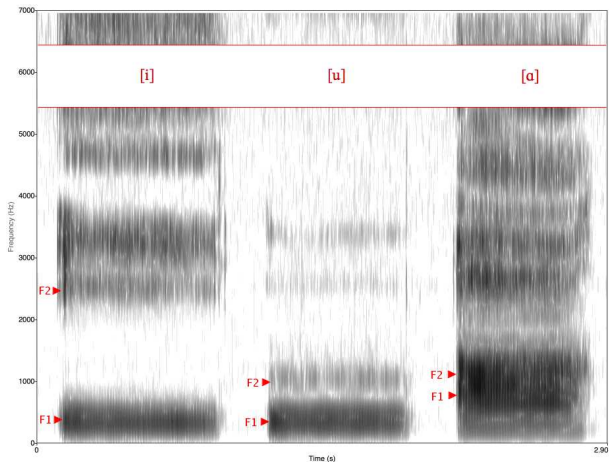
near close and open mid vowels



distinguishing tense and lax vowels

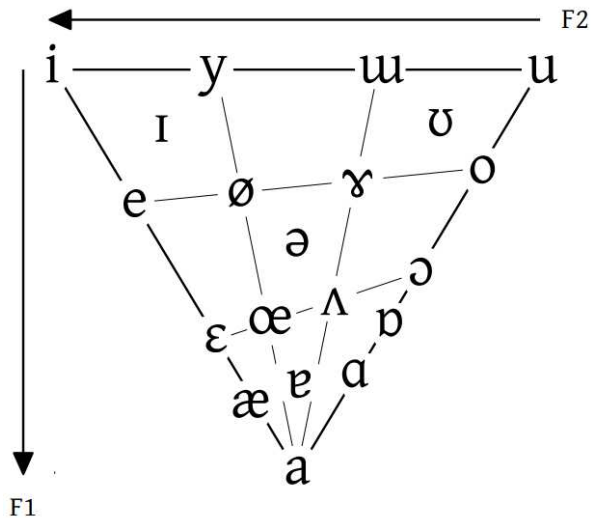
lets us reduce the five vowel heights (close, near close, close mid, open mid, open) to three (close, mid, open): close is now **close tense**; near close is **close lax**; close mid is **mid tense**; open mid is **mid lax**

formants



- ▶ low F1 = high vowel, high F1 = low vowel
- ▶ low F2 = back vowel, high F2 = front vowel

alternative vowel chart



nasalization

- ▶ the velum is lowered, air flows out both through the oral and the nasal tract (mouth and nose)
- ▶ contrasts in French
 - ▶ *fait* [fɛ̃] 'fact' vs *fin* [fɛ̃̃] 'end'
 - ▶ *sept* [sɛ̃t] 'seven' vs *sainte* [sɛ̃̃t] 'saint (fem)'
 - ▶ *beau* [bɔ̃] 'nice' vs *bon* [bɔ̃̃] 'good'
- ▶ no perfect contrast in English
 - ▶ *set* [sɛt] vs *sent* [sɛ̃nt]
 - ▶ *pod* [pɒd] vs *pond* [pɒ̃nd]
 - ▶ *hut* [hət] vs *hunt* [hɛ̃nt]

r-colouring

- ▶ the tongue tip is curled back behind the upper alveolar ridge
- ▶ r-coloured (retroflex or rhotic) vowels are quite rare, but some varieties of English have them, eg
 - ▶ *merger* [mɚːdʒə]
 - ▶ *parlor* [pɑːlɚ]
 - ▶ *order* [ɔːdɚ]
- ▶ contrasts
 - ▶ *bud* [bəd] vs *bird* [bɚːd]
 - ▶ *pa* [pɑ] vs *par* [pɑː]
 - ▶ *paw* [pɔ] vs *pour* [pɔː]

quantity

vowel length

- ▶ is marked by two triangles facing each other: eg *bar* [bɑː] or (less commonly) by doubling the vowel [baa]
- ▶ contrasts in British English
 - ▶ *ferry* [fɛrɪj] vs *fairy* [fɛːrɪj]
 - ▶ *Sirius* [sɪrɪjəs] vs *serious* [sɪːrɪjəs]
- ▶ is often accompanied by some quality difference too
 - ▶ *hat* [hæt] vs *heart* [hɑːt]
 - ▶ *pot* [pɒt] vs *port* [pɔːt]
 - cf
 - ▶ Hu *hat* [hæt] 'six' vs *hát* [hɑːt] 'back'
 - ▶ Hu *log* [lɔg] 'log' vs *lóg* [loːg] 'hang'

diphthongs

the quality of a vowel

- ▶ may be stable \Rightarrow monophthong
- ▶ may change \Rightarrow diphthong

types of diphthong

- ▶ closing: a_i, a_u (second half closer than first), eg *hi* [hai], *how* [hau]
- ▶ centring: a_e, i_e, u_e (second half central)
- ▶ opening: u_a, i_a (second half more open than first), eg *wax* [uaks], *yank* [iɔŋk]
- ▶ falling: u_i, a_u (syllabic first half: vowel+offglide), eg Hu *paszuly* [pasui] 'bean'
- ▶ rising: u_i, i_a (syllabic second half: onglide+vowel), eg *wit* [uit]

transcribing diphthongs

inconsistency in the transcription of diphthongs

wax	—	ʊ̯aks	waks
cow	kau	kau̯	kaw
yes	—	j̯es	jes
say	sei	sei̯	sej

- ▶ the common convention is to transcribe onglides with a consonant symbol, offglides with a vowel symbol
- ▶ in this course we will transcribe both onglides and offglides as consonants
- ▶ for pedagogical reasons, we will take falling diphthongs to be vowels (but note that they could be taken to be vowel + consonant sequences too, also recall the the difference between the vowels [i], [u] and the consonants [j], [w] is not obvious)

sample exam questions

which vowel is articulated with the lowest tongue position?

1. i
2. u
3. e
4. ɔ

which implication holds in natural languages?

1. back rounded vowels imply back unrounded vowels
2. front unrounded vowels imply front rounded vowels
3. front rounded vowels imply front unrounded vowels
4. front unrounded vowels imply back unrounded vowels