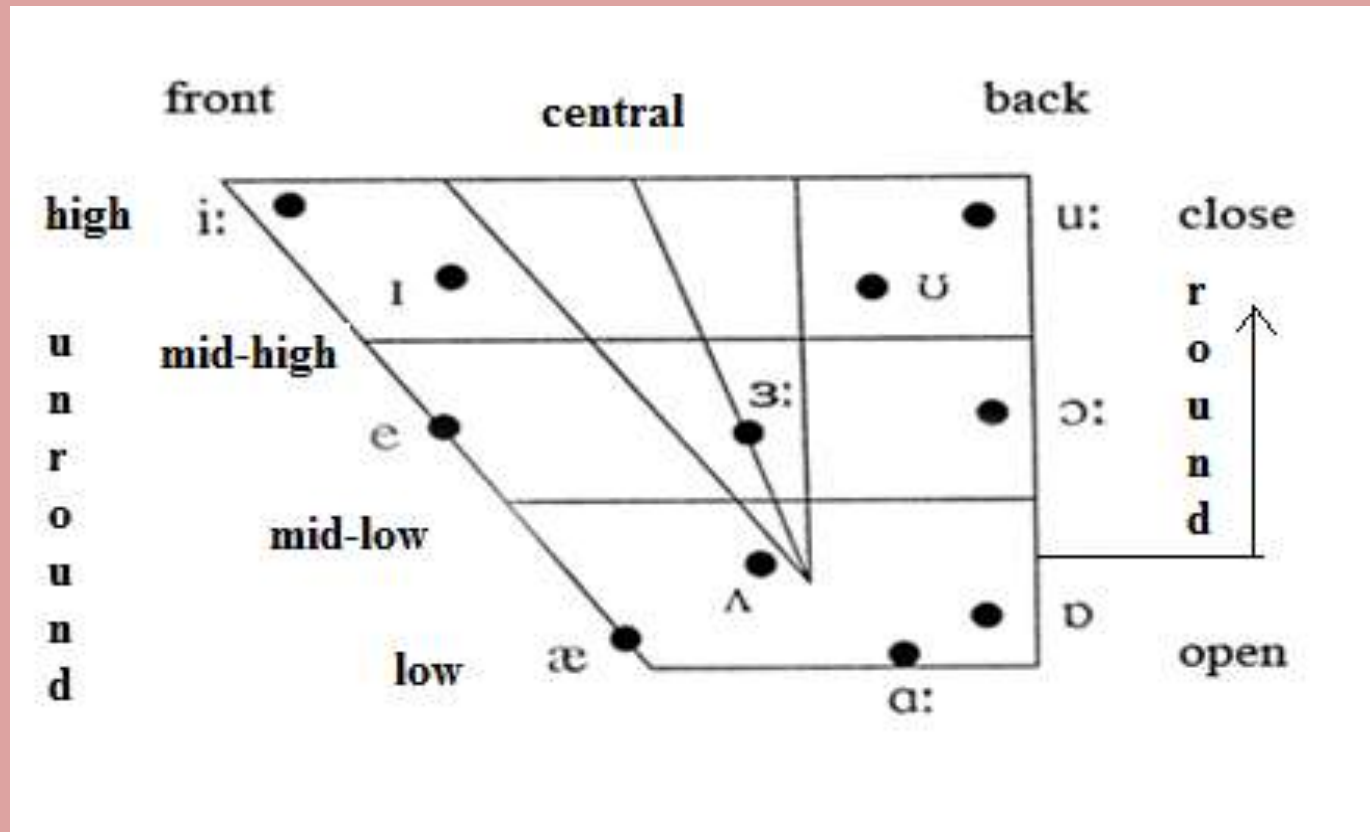


Vowel Sounds in human languages

The vowel sounds are called sounds with NO constrictions.

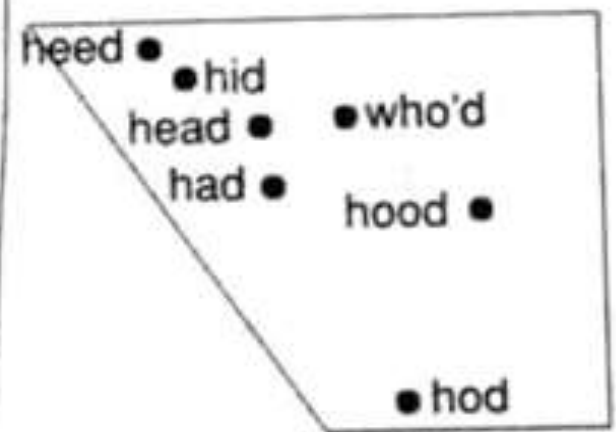
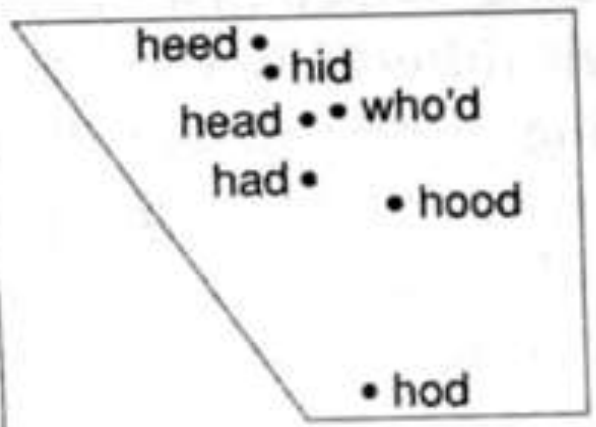
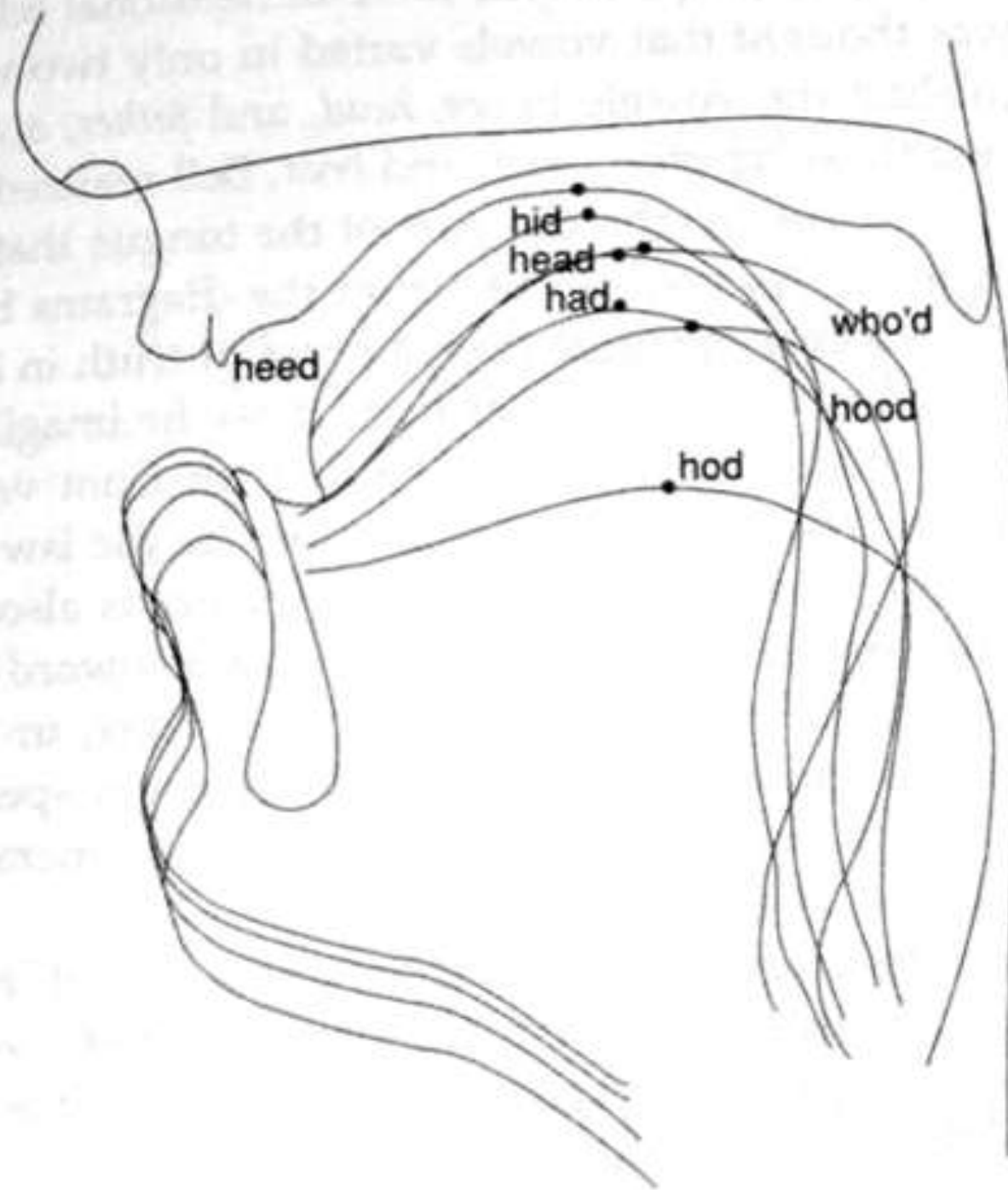
This is so because there is no obstruction of the air that comes from the lungs for the production of the vowel sounds.

The following diagram outlines the single vowel sounds (diphthong vowels are different)



Vowels

/ɪ i: e æ ɑ: ʌ ɒ ɔ: ʊ u: ɜ: [ə]=
schwa/



Vowels

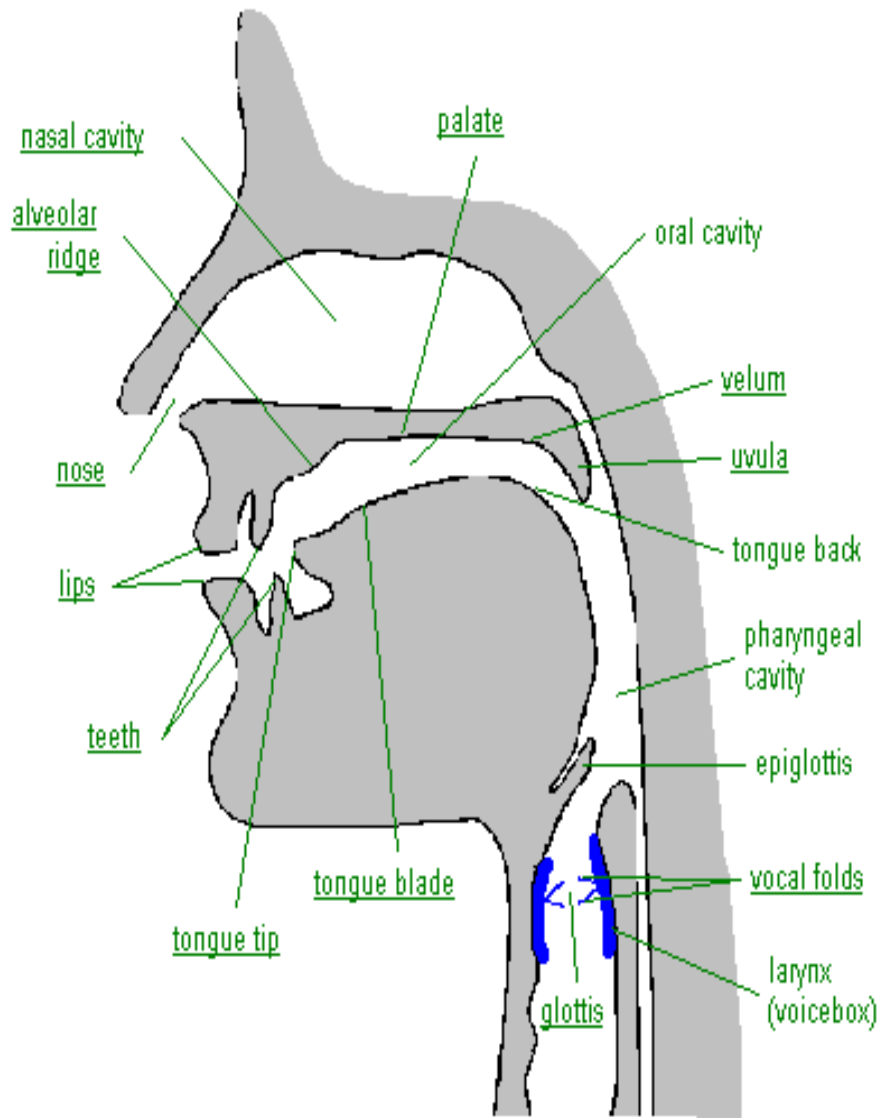
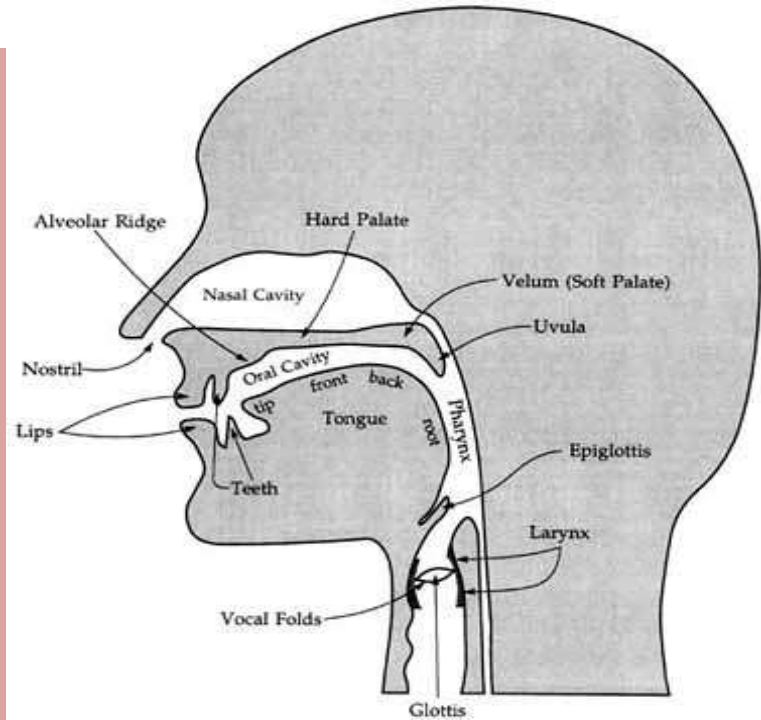
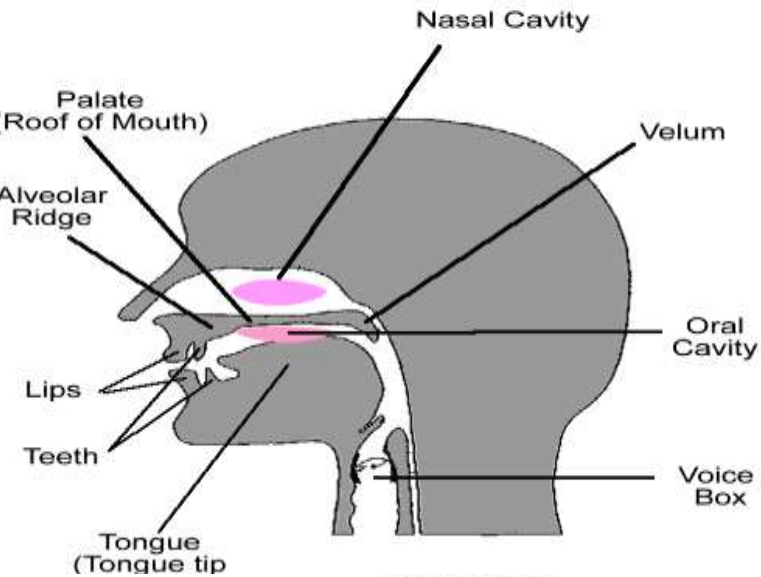
Main source: www.csub.edu/~ecase/Vowels.ppt

- **Vowels** are the most sonorant (or intense) and the most audible sounds in human speech.
- They usually function as the nucleus of a syllable.
- The consonants that surround vowels often depend on them for their audibility.
- Take the word *pop* for example.
- The [p]'s are heard mainly because of the effect that the vowel brings to the speech

- If you ask someone to tell you where the tongue is when s/he pronounces a consonant sound, you may /will get a concrete answer.
- However, if you ask the same person to tell you the position of tongue while producing a vowel sound, you will get a variety of responses.
- Therefore, it is much more difficult to give a satisfactory **articulatory** description of vowels.
- Vowels are sounds produced with a relatively open vocal-tracts,
- So, the vowels do not have the point of articulation or the manner of articulation like consonants.
- Instead, the ‘vocal-tracts/folds/cords’ above the glottis act as a **resonator** affecting the sound made by the vocal organ system.

Vocal Tract

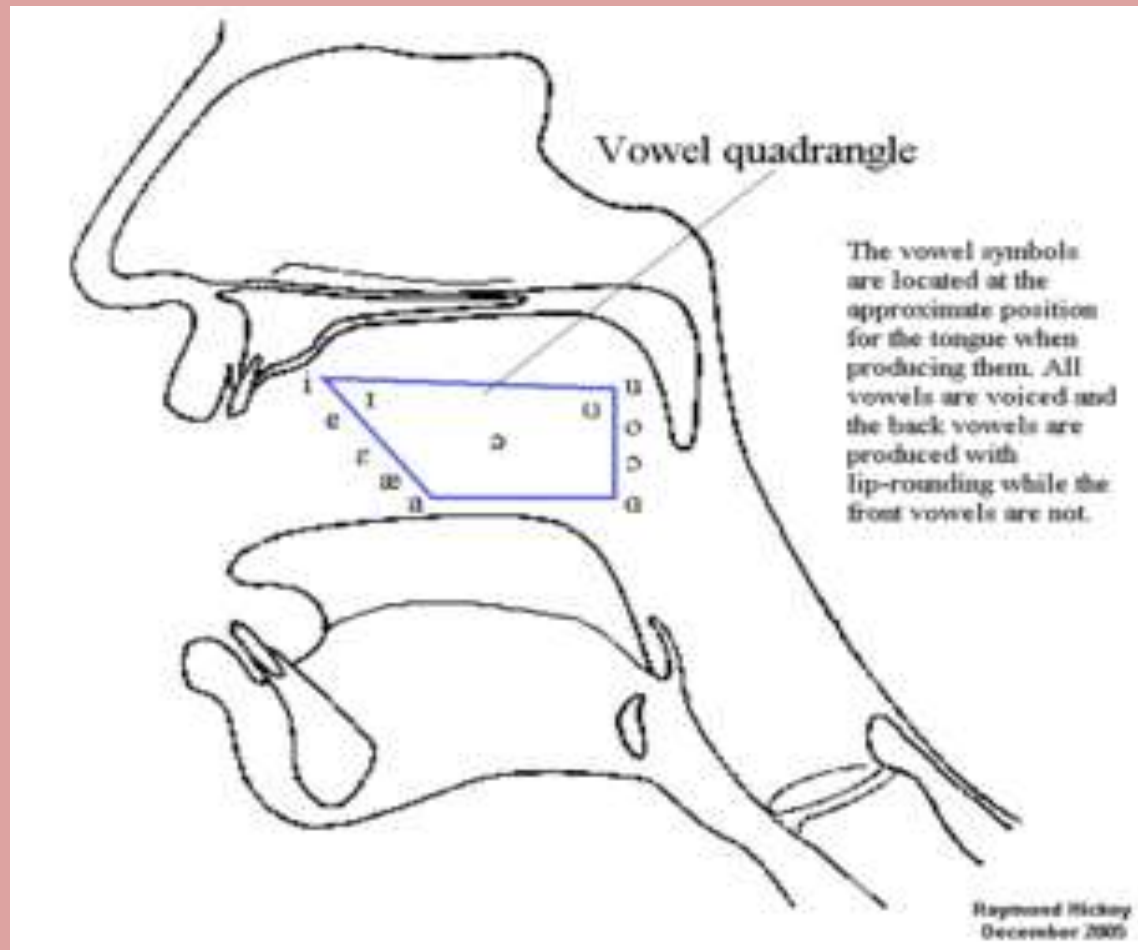
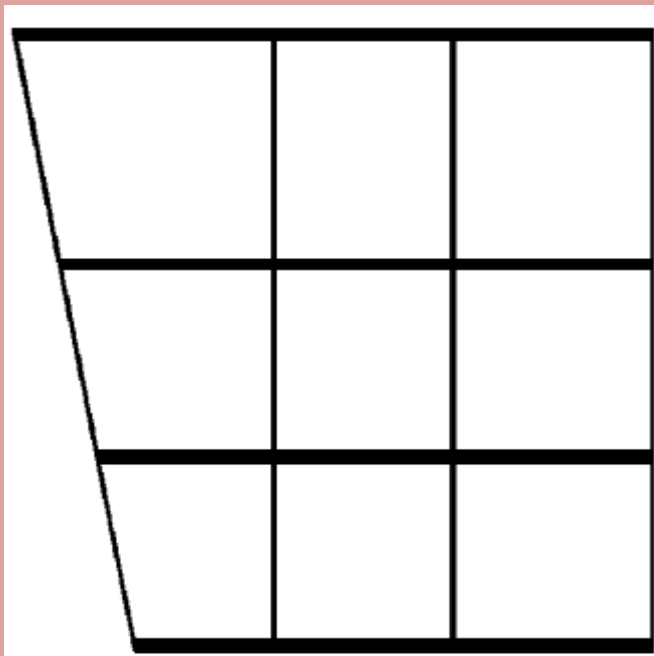
Articulators and Places of Articulation

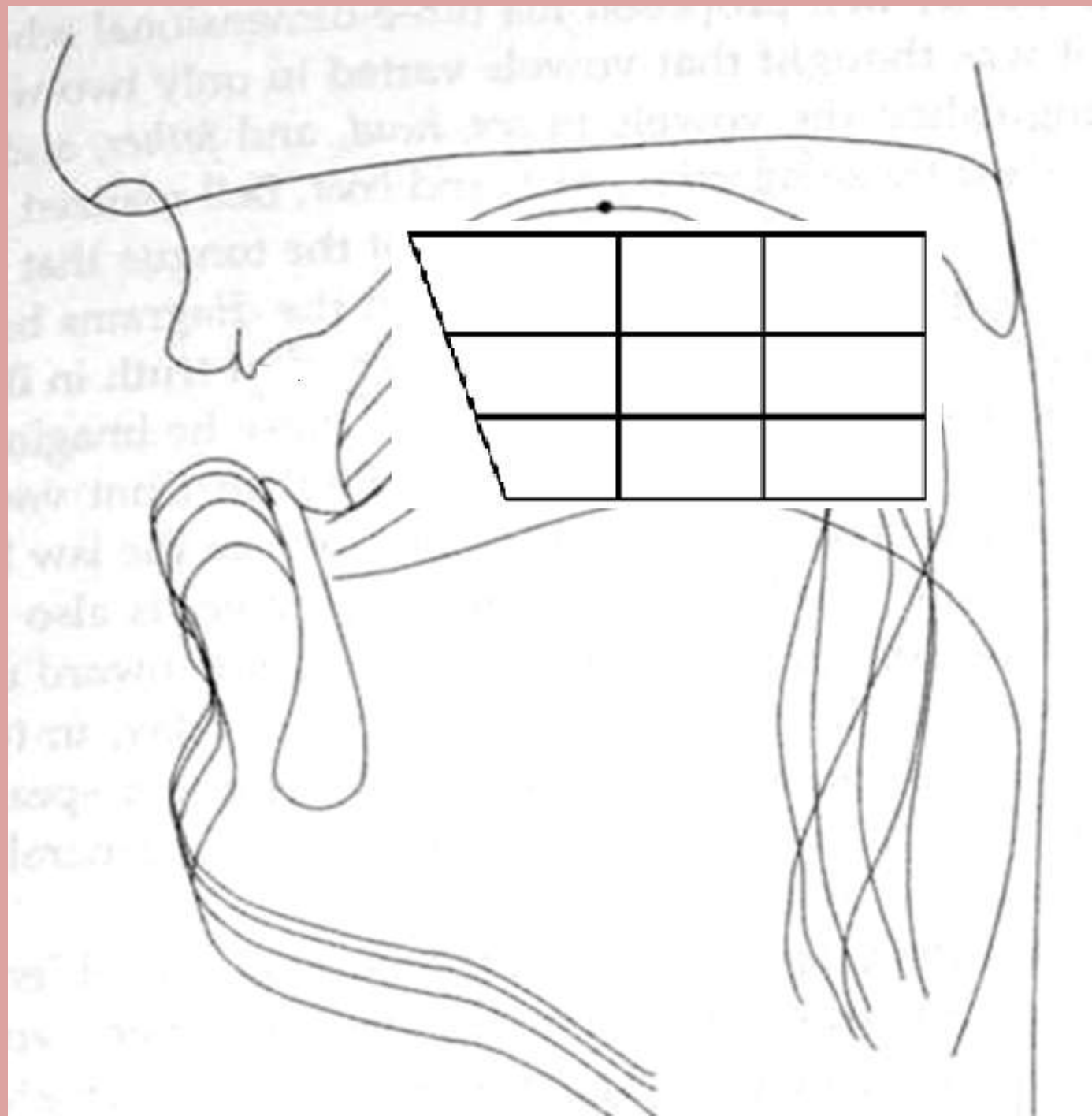


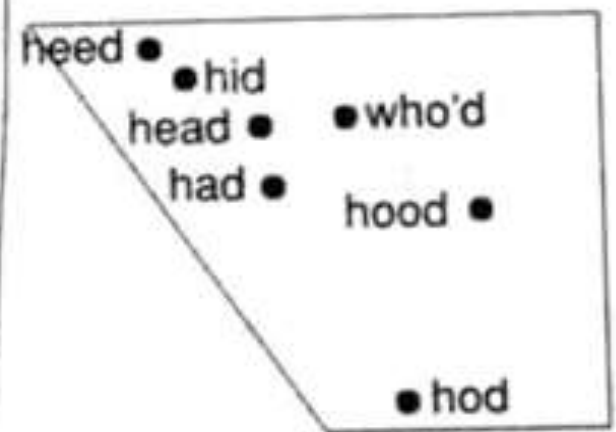
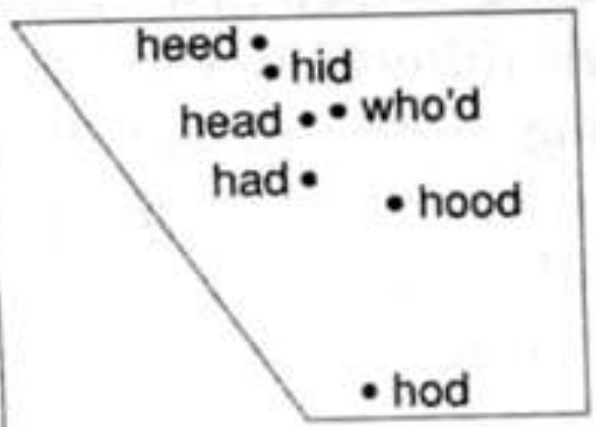
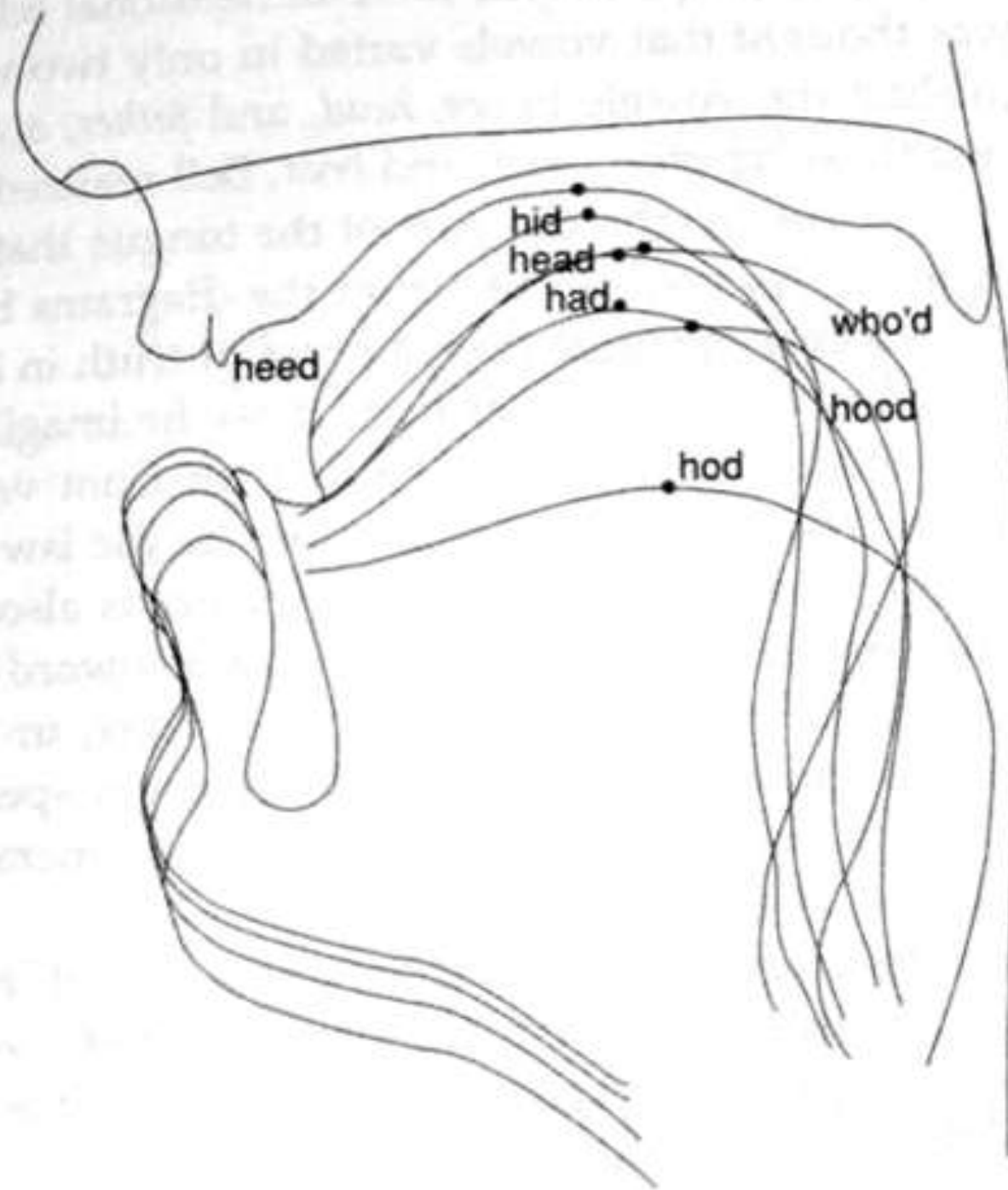
- The shape of this resonator determines the quality of the vowel.
- Since vowels are so different from consonants, we have to use *different features* than those used to describe consonants.
- There are several ways in which speakers can change the shape of the vocal-tracts, and thus can also change vowel quality.
- Using a set of new feature systems, we can create a chart to describe vowels.

-

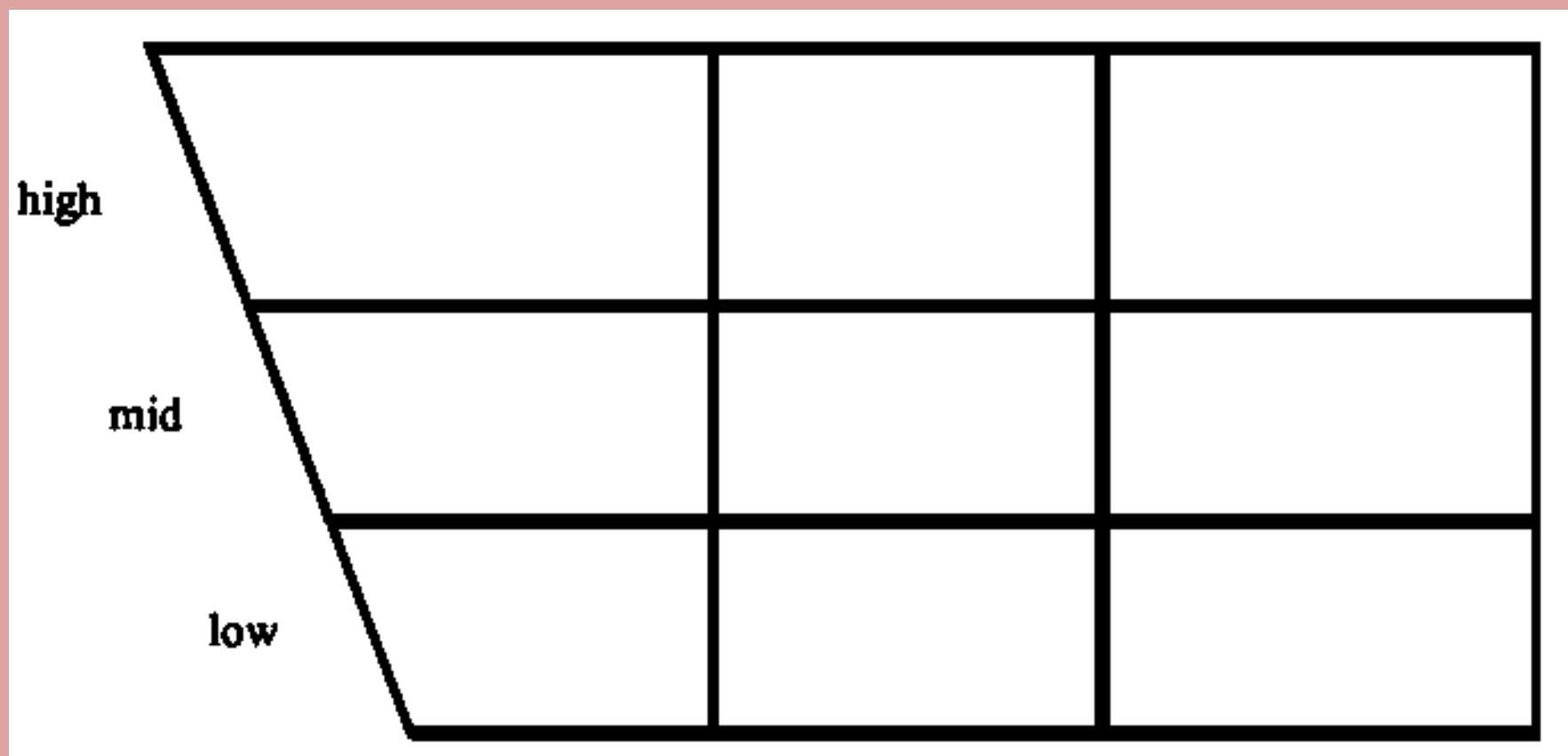
- Let's begin by constructing a basic representation of the mouth.
- However, we should keep in mind that this is only an abstract representation of the mouth.







- **Tongue Height**
- If you repeat to yourself the vowel sounds in *seat*, *set*, *sat*, you will find that you open your mouth in three different shapes
- These varying degrees of openness correspond to different degrees of tongue height: **high, mid, low.**
- **High vowels** are made by keeping the front of the mouth less open and the tongue body is raised.
- **Mid vowels** are produced with an intermediate tongue height.
- **Low vowels** are pronounced by keeping the front of the mouth open and the tongue lowered.



- **Tongue Advancement**
- Besides being held high, mid or low, the tongue can also be pushed forward or pulled backward in the oral cavity.
- For example, in *beat*, the body of the tongue is raised and pushed forward and it remains under the hard palate.
- In *boot*, however, the body of the tongue is in the back of the mouth i.e. toward the velum.
- The tongue is advanced or pushed forward for all the front vowels, and retracted or pulled back for the back vowels.

front

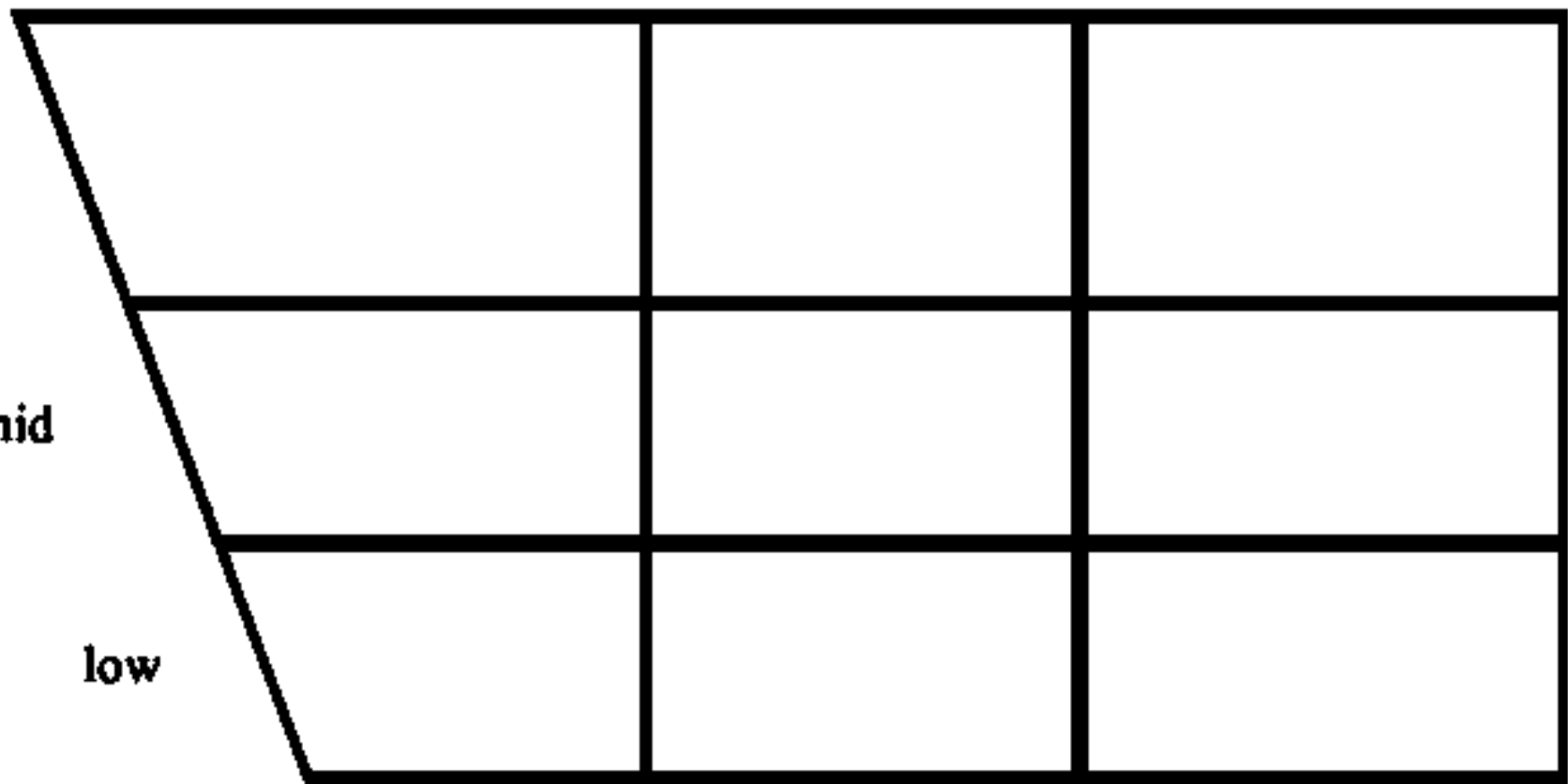
central

back

high

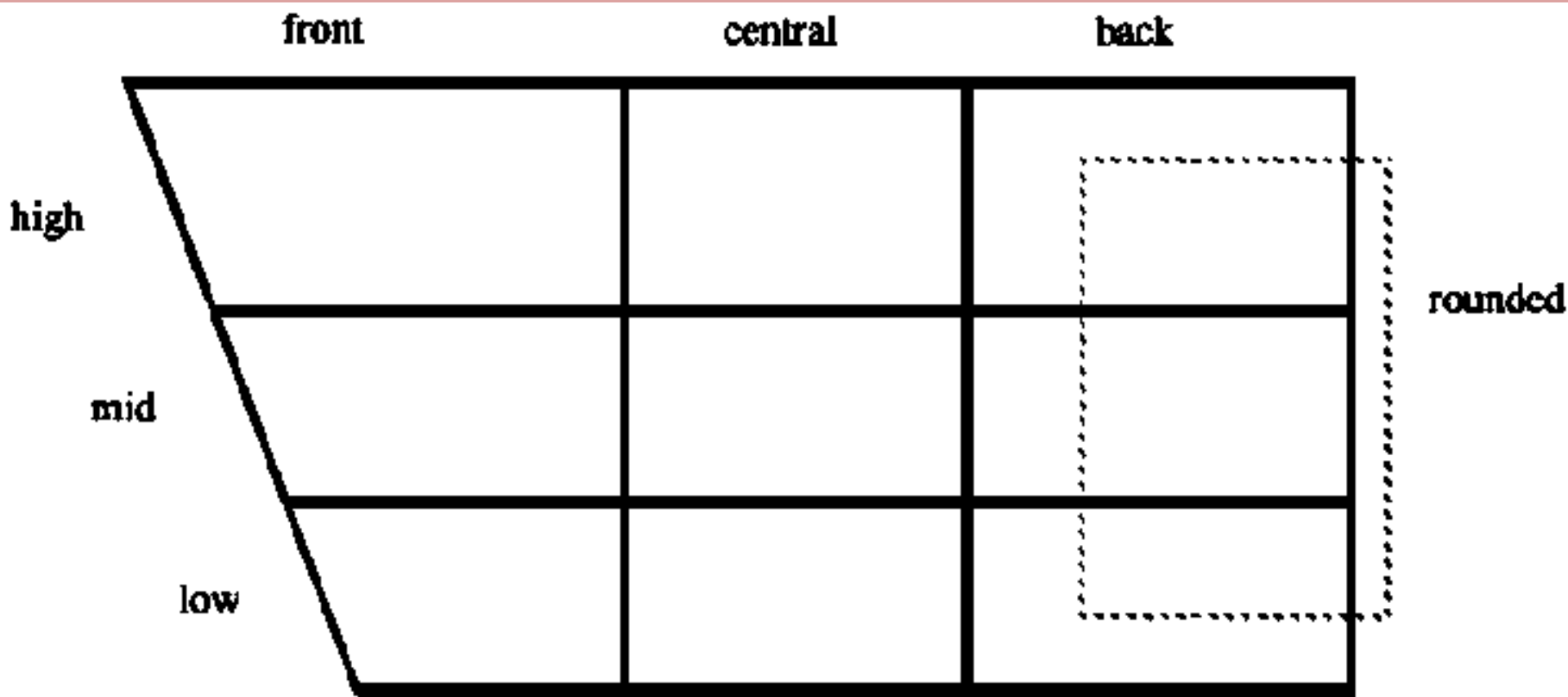
mid

low



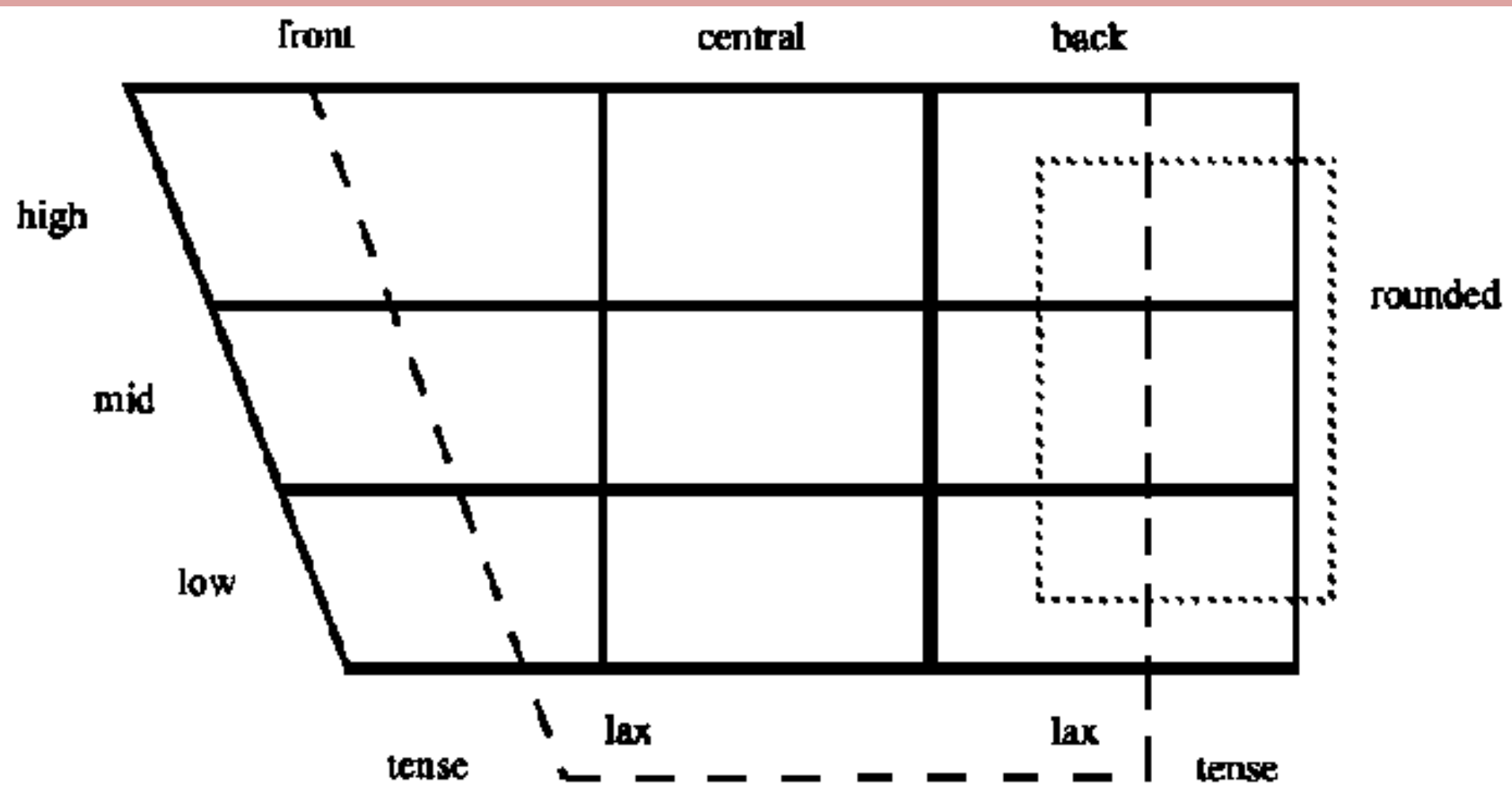
Rounding and unrounding

- **Lip Rounding**
- Vowel sounds are also classified into type on the basis of the rounding of the lips.
- When we say *two*, *you* and *go*, our lips are rounded.
- For *tea*, *he*, *zee* however, they are unrounded.

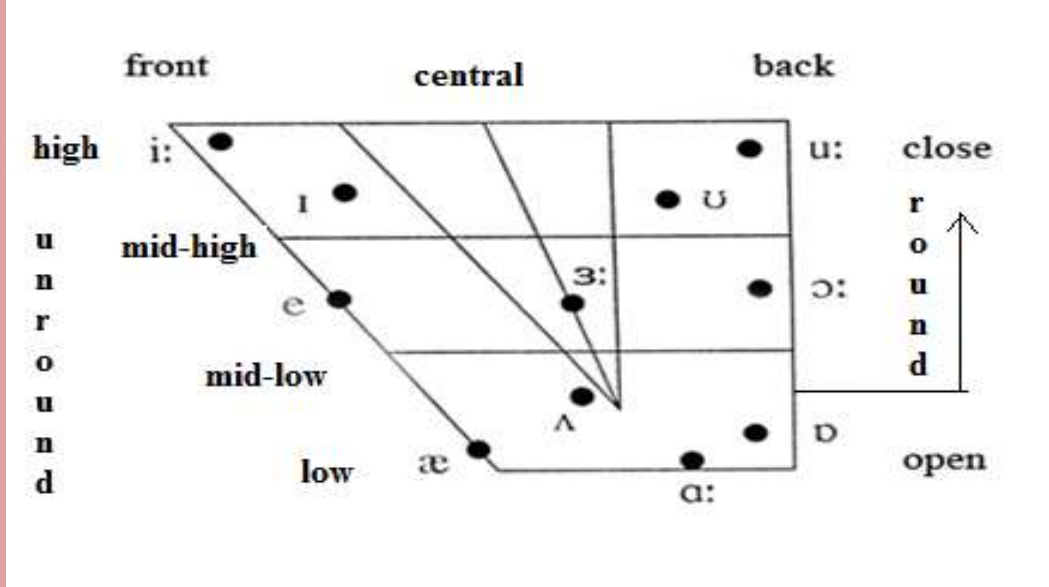


Tense and Lax vowels

- The feature of tense and lax for vowel sounds will make our chart complete.
- **Tense vowels:** Vowel sounds that are called **tense** are produced with an extra degree of muscular effort.
- Whichever vowel needs the raising or lowering of the tongue to produce the vowel sound is called tense-vowel.
- **Lax vowels:** the vowels that lack this extra effort of the tongue are called lax-vowel.
- All the tense front unrounded vowels are made with a stronger (i.e. longer and more extreme) tongue fronting or retracting gestures than lax front vowels, which are produced with a weaker fronting movement.
- Tense back rounded vowels are also made with stronger or tighter lip rounding than their lax counterparts.



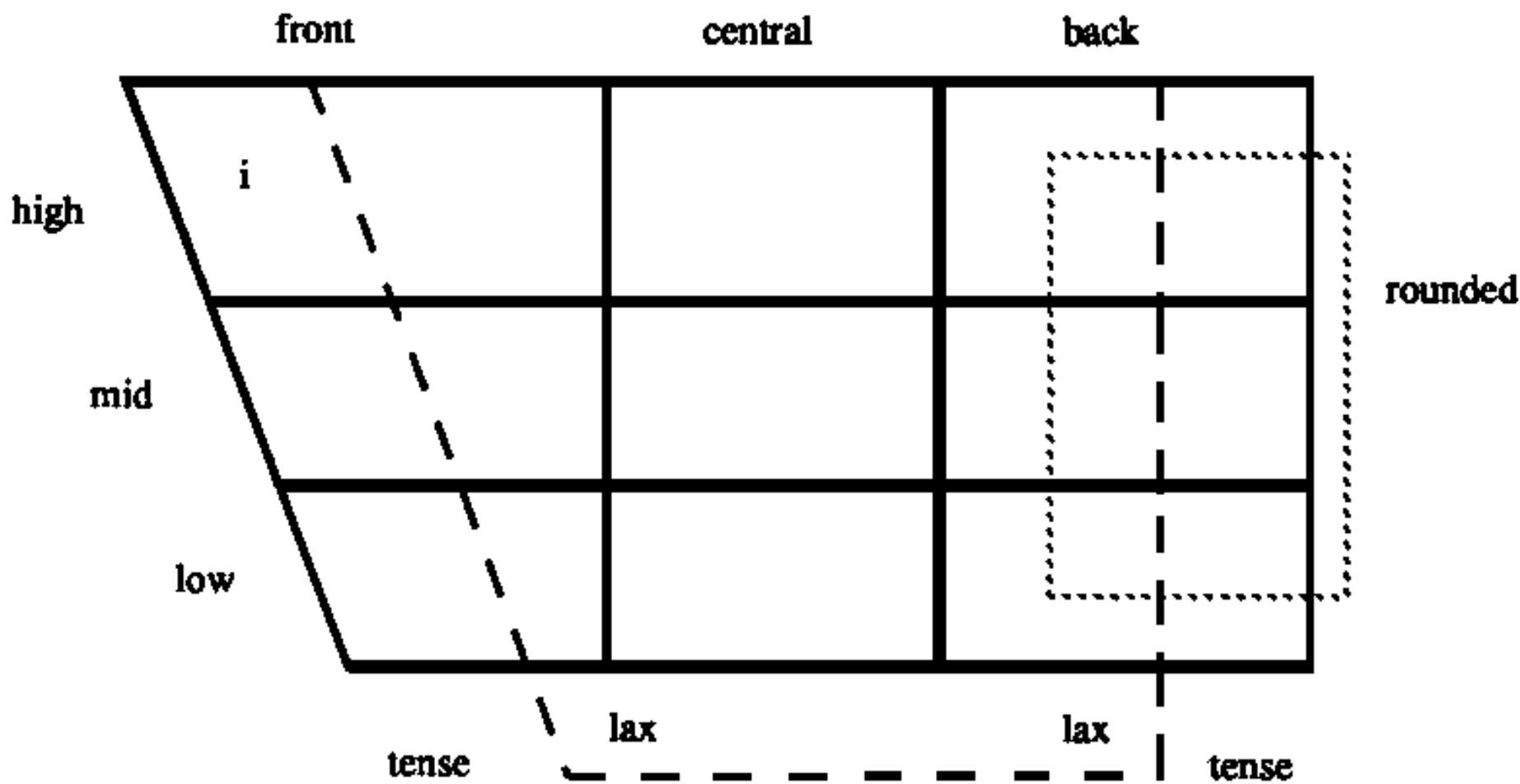
- **Plotting the Vowels on the given diagram:**
- With the abovementioned theoretical explanation, let us plot/chart-out the vowels from the left top most to right top-most vowels.
- We will do this by taking one vowel at a time and explain the features that describe the so called internal structure of the vowel-sounds.
- Let me also explain the procedural steps that we follow to explain the vowel sounds.



Instead of ‘front’ ‘central’ and ‘back’, we use a mathematical notation of $[+/- \text{ or } \pm]$ and chose just one feature of the vowel to indicate all three places.

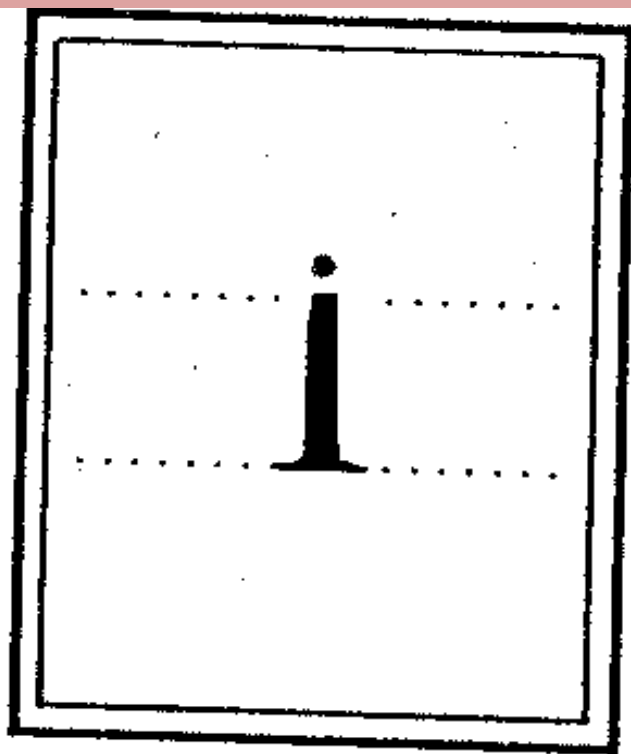
For example:

1. $+back = \text{back}$, $-back = \text{front}$, and $\pm back = \text{central}$
2. $+high = \text{high}$, $\pm high = \text{mid-high}$, $+low = \text{low}$, $\pm low = \text{mid-low}$ (isn't this smart way of doing things 😊)



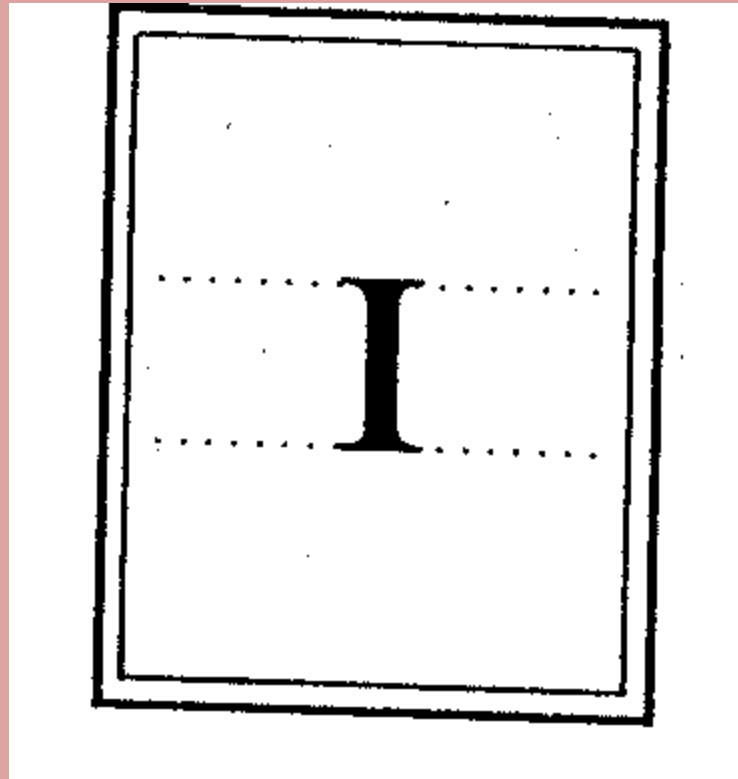
[i] = -back, +high, -round, -lax

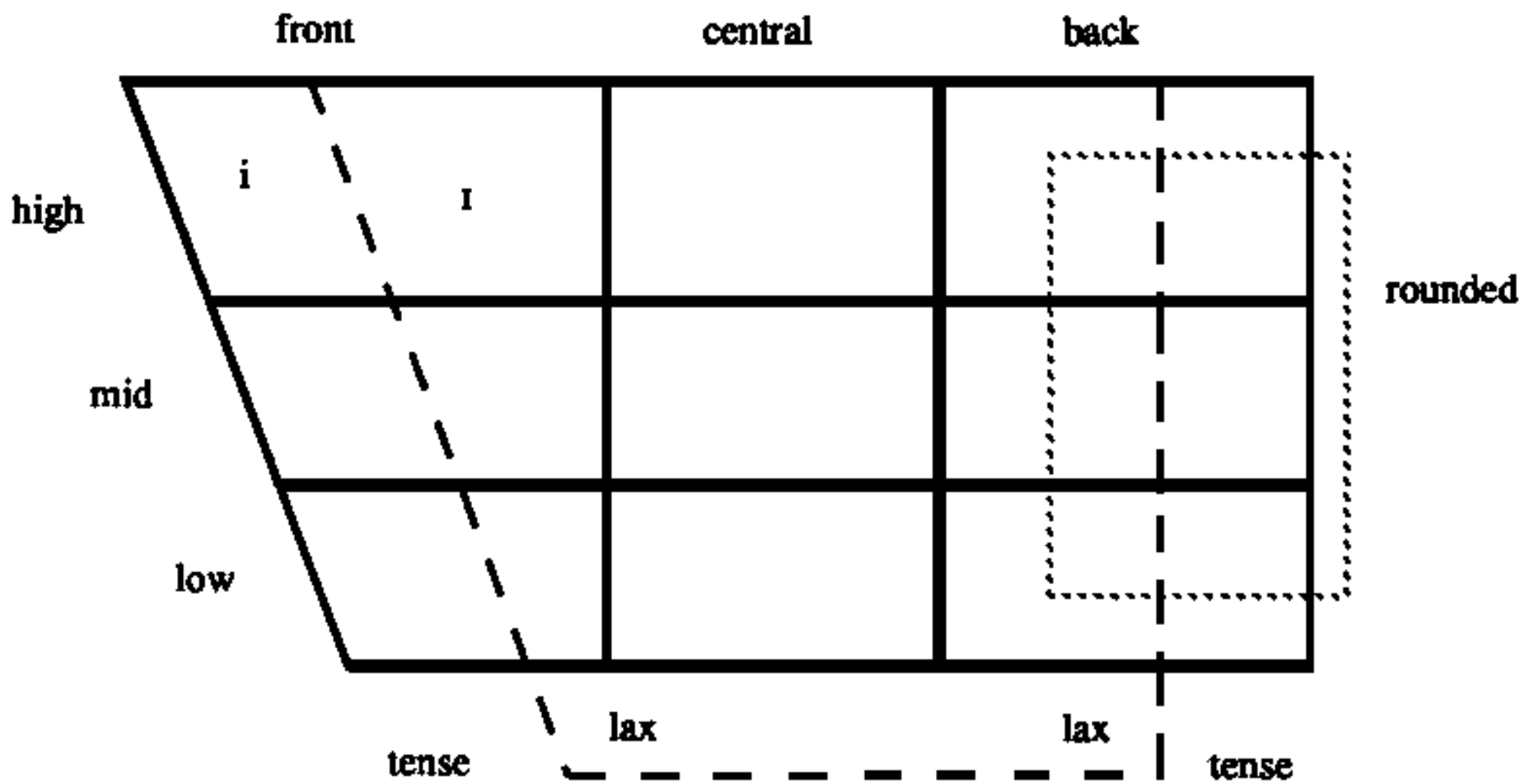
- If we start from the upper left corner of the diagram, the first vowel that we encounter can be read like: a *front, high, tense, unrounded* vowel that is described in linguistics as **-back, +high, -round, -lax**
- This is the sound in the word *beat, seat*.
- The symbol on vowel-diagram looks like this:



[ɪ] = -back, +high, -round, +lax

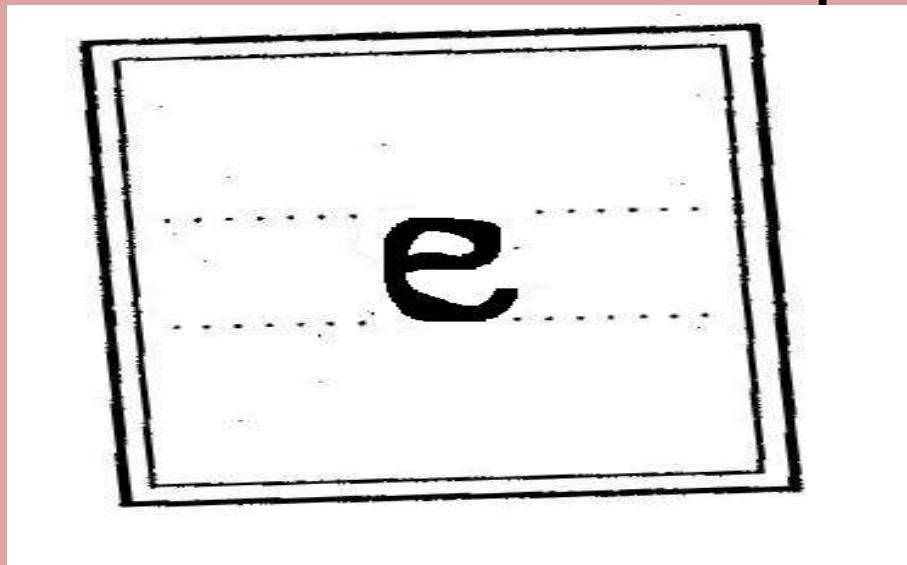
- The next vowel in the diagram is the vowel that shows up with the following place on it: a *front, high, unrounded, lax* vowel,
- This is represented by the symbol / **ɪ**/ in linguistics:
- This is the sound in the word *bit, sit*
- Here is what it looks like:

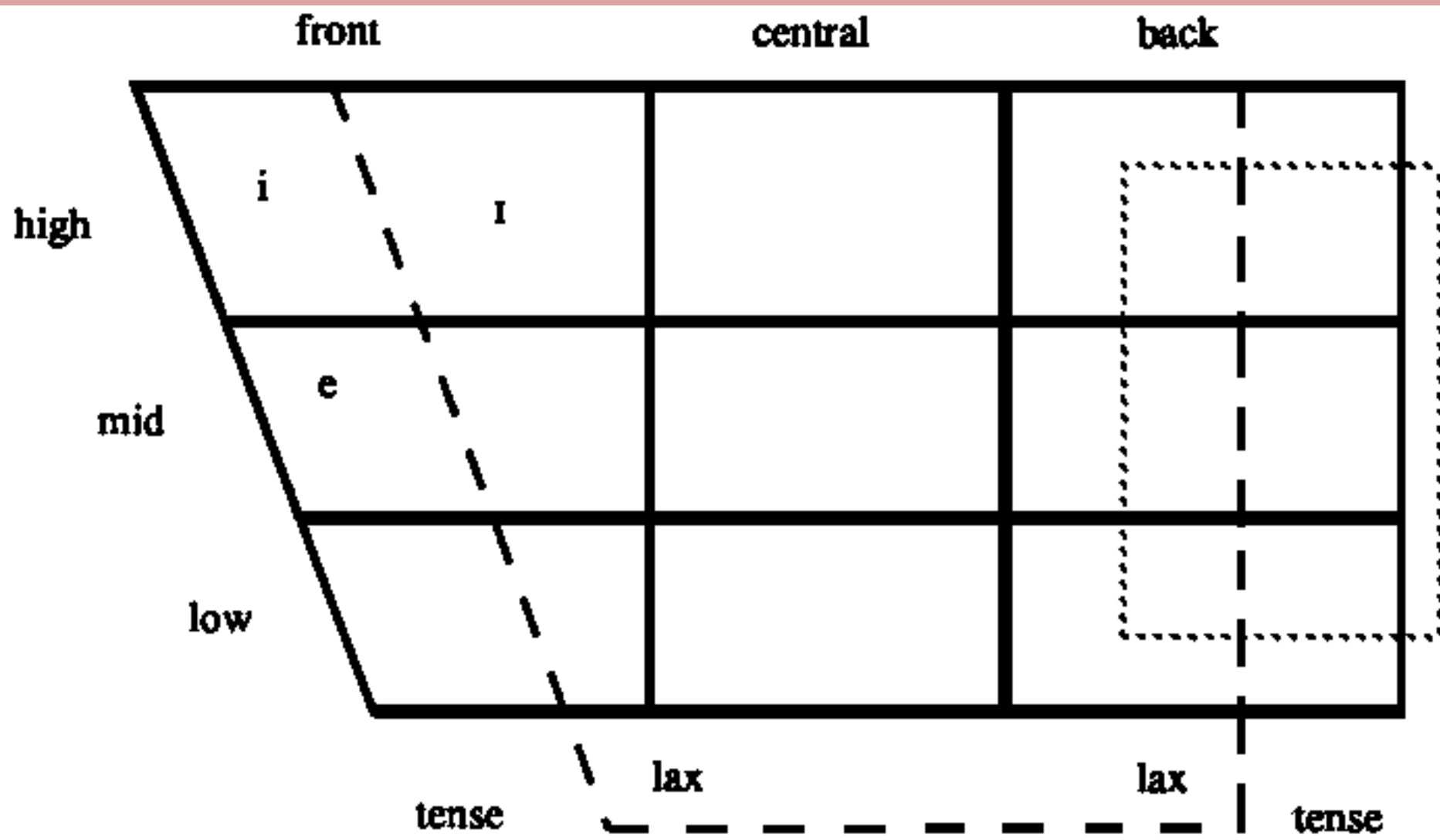




[e]= -back, \pm high, -round and -lax

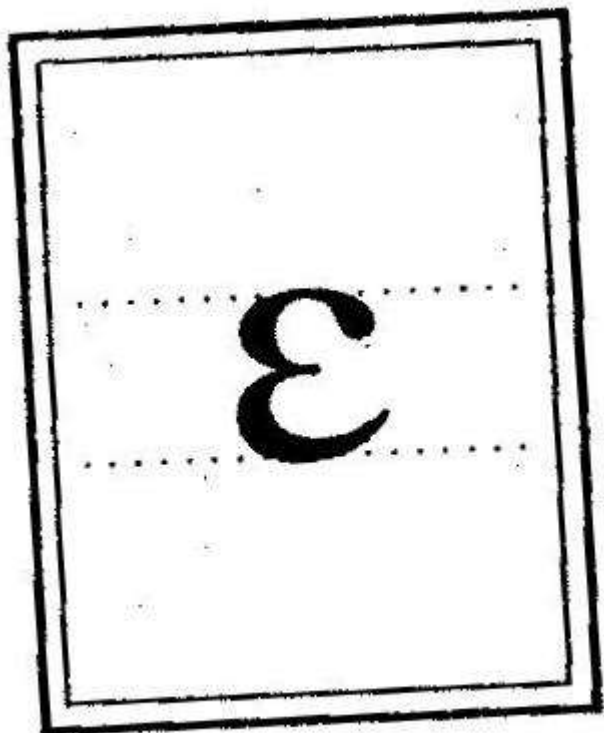
- If we moving downward on the left-side of the diagram, we find the next vowel which is /e/
- This vowel is shown with the following features *front, mid-high, unrounded, tense* vowel.
- This is the sound in the word *bet, set, pet*
- The symbol is as shown in the picture:

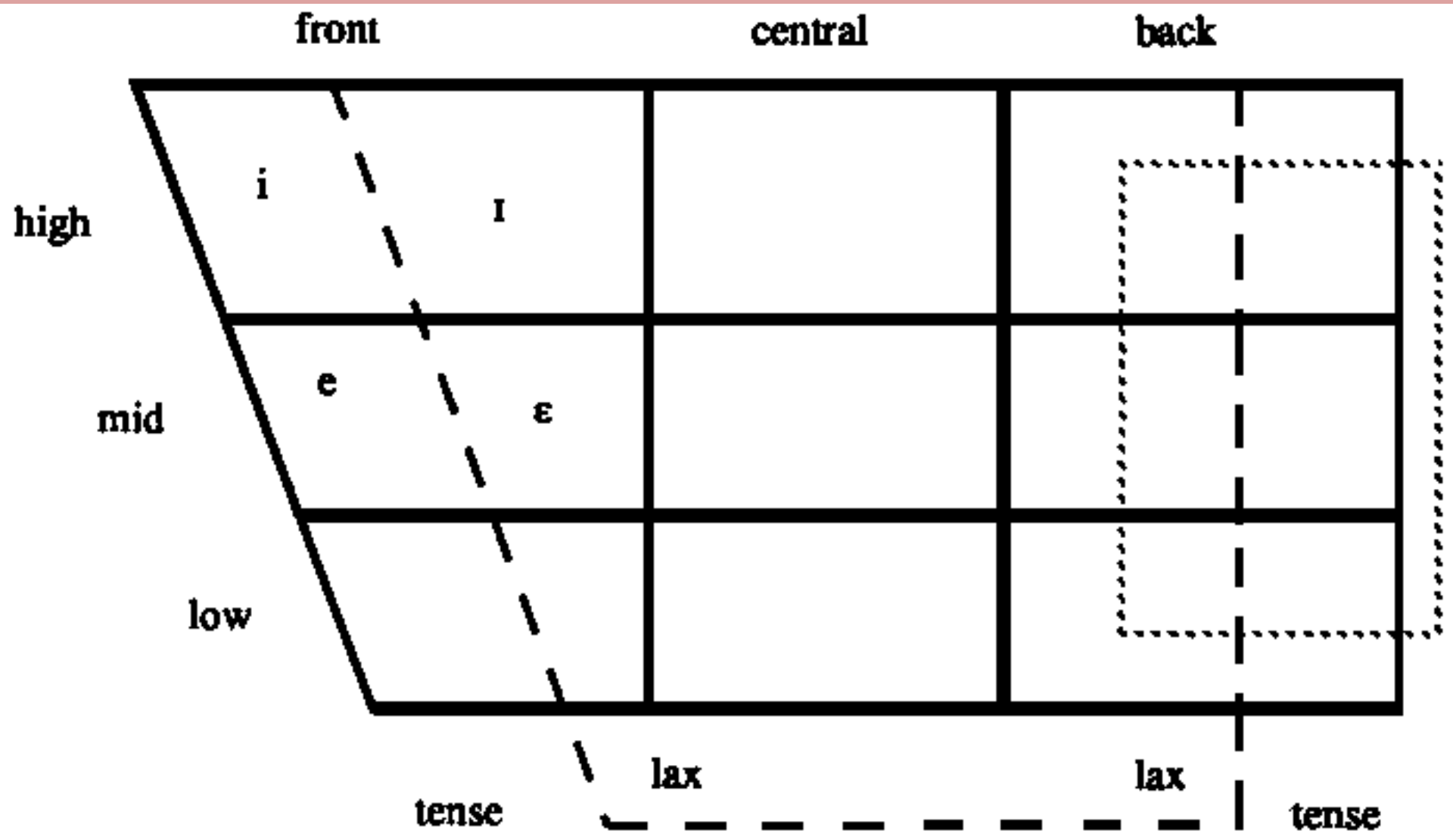




/ɛ/= -back, ±low, -round, +lax

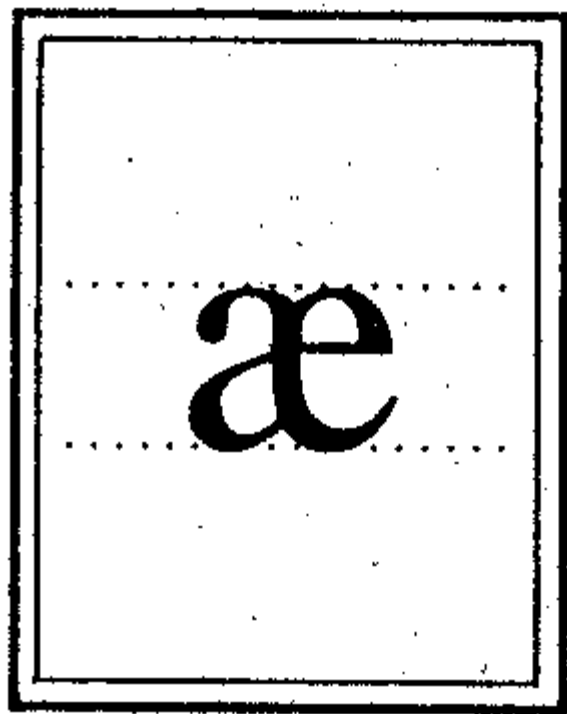
- The next vowel on the diagram is / ɛ/ which can be read like a *front, mid-low, unrounded, lax* vowel sound.
- This is the sound in the word *bait*.
- The symbol that represents this vowel is known in linguistics as *epsilon*:
- Here is what it looks like:





/ æ/ = -back, +low, -round, +lax

- This is a variant vowel sound of earlier discussed 'epsilon' sound
- This vowel sound is found in English and other European languages
- This is symbolized as : / æ/
- On the diagram, this shows up as *front, low, unrounded, lax* vowel,
- In linguistics, we call this symbol as ***ash***.
- This is the sound in the word *bat*, cat, rat.
- On the diagram the sound is represented as:



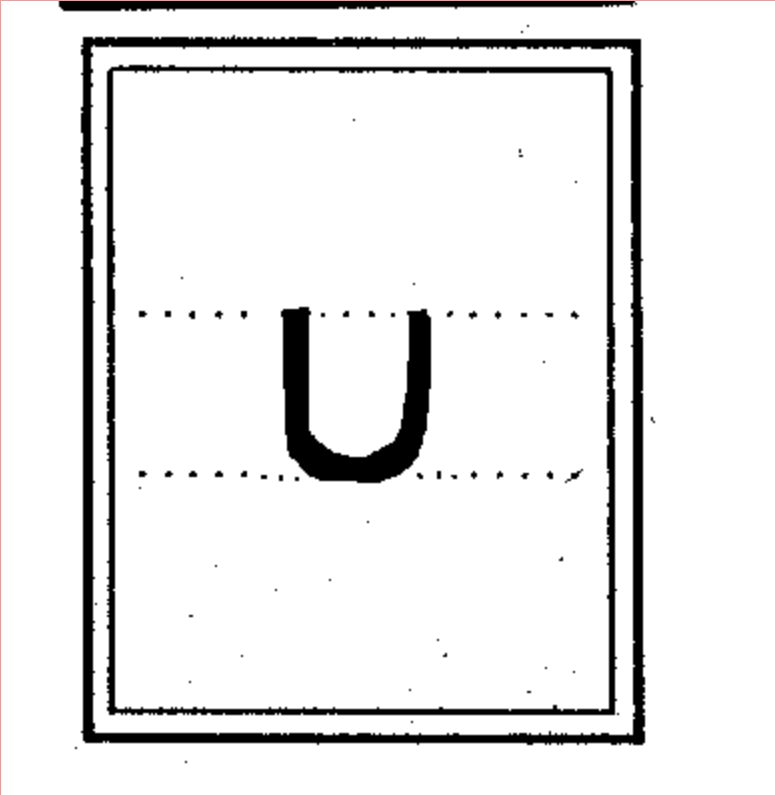
/u/= +back, +high, -lax, +round

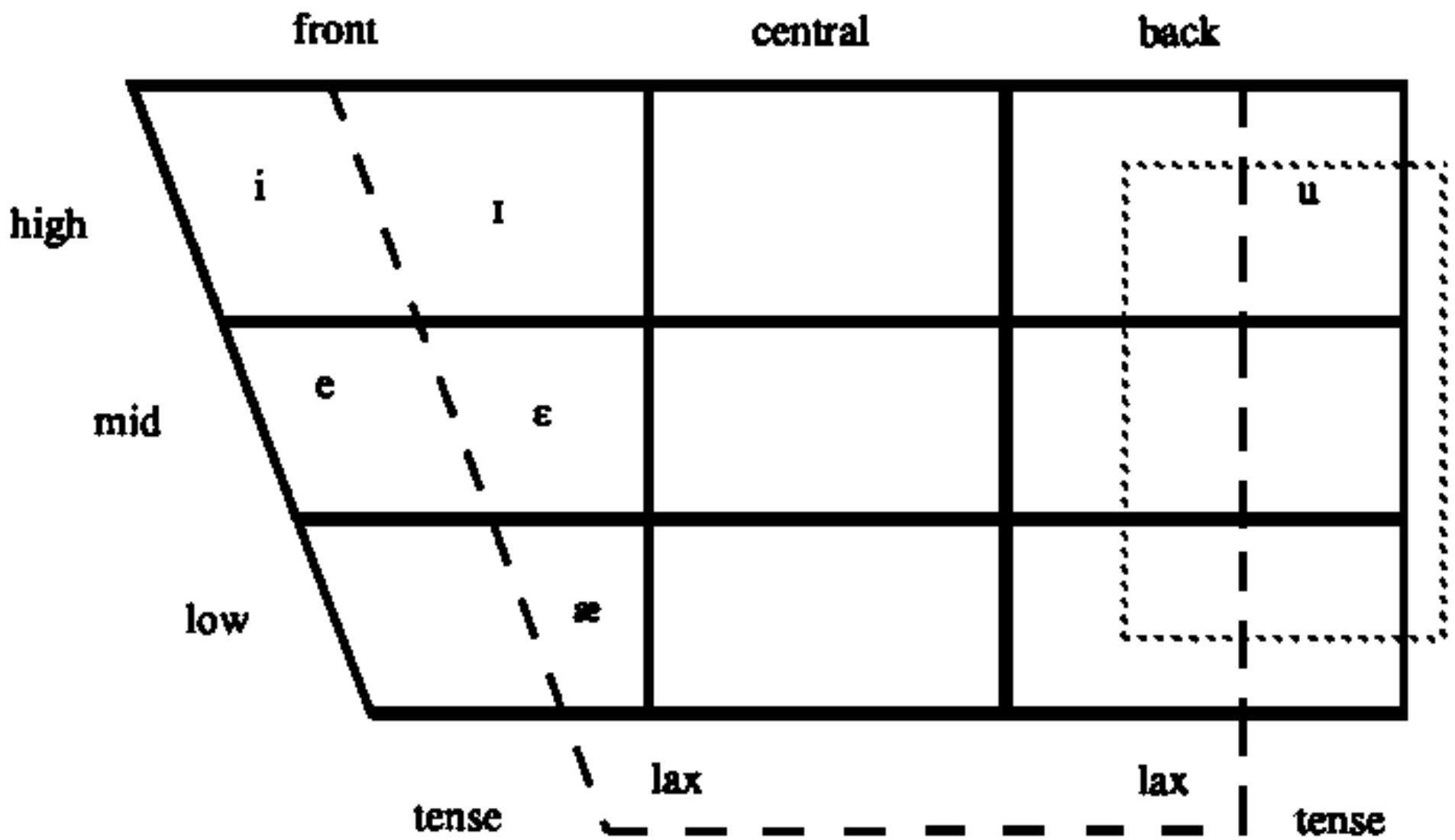
Now let us take the other side of vowel diagram and start from the top most upper right side of it.

This represents the upper right corner of our abstract mouth.

If we read the diagram, it shows the features as a *high, back, tense, rounded* vowel.

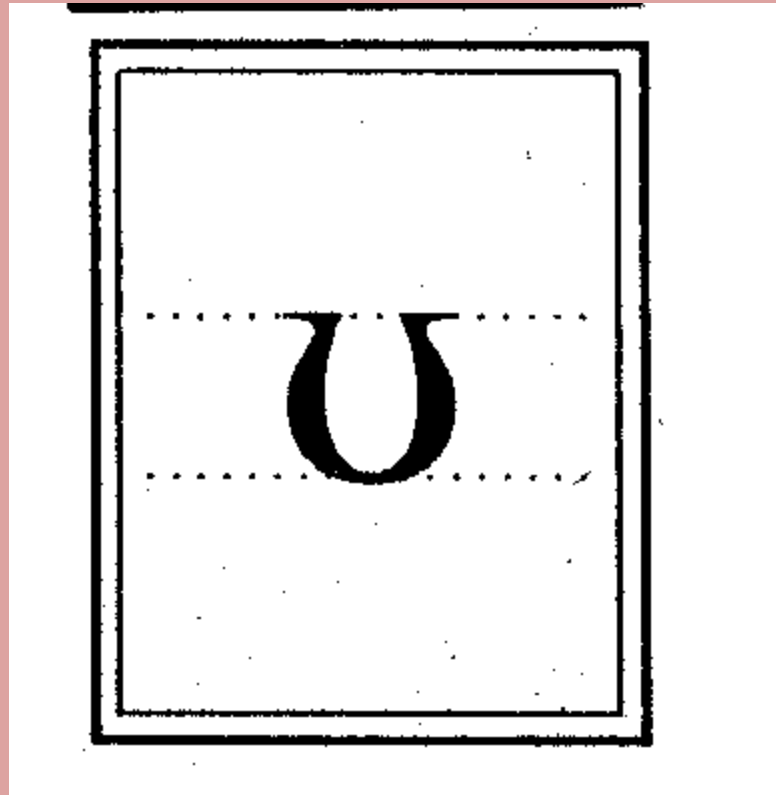
- This is the sound in the word *boot*.
- The symbol that we find in the diagram is:

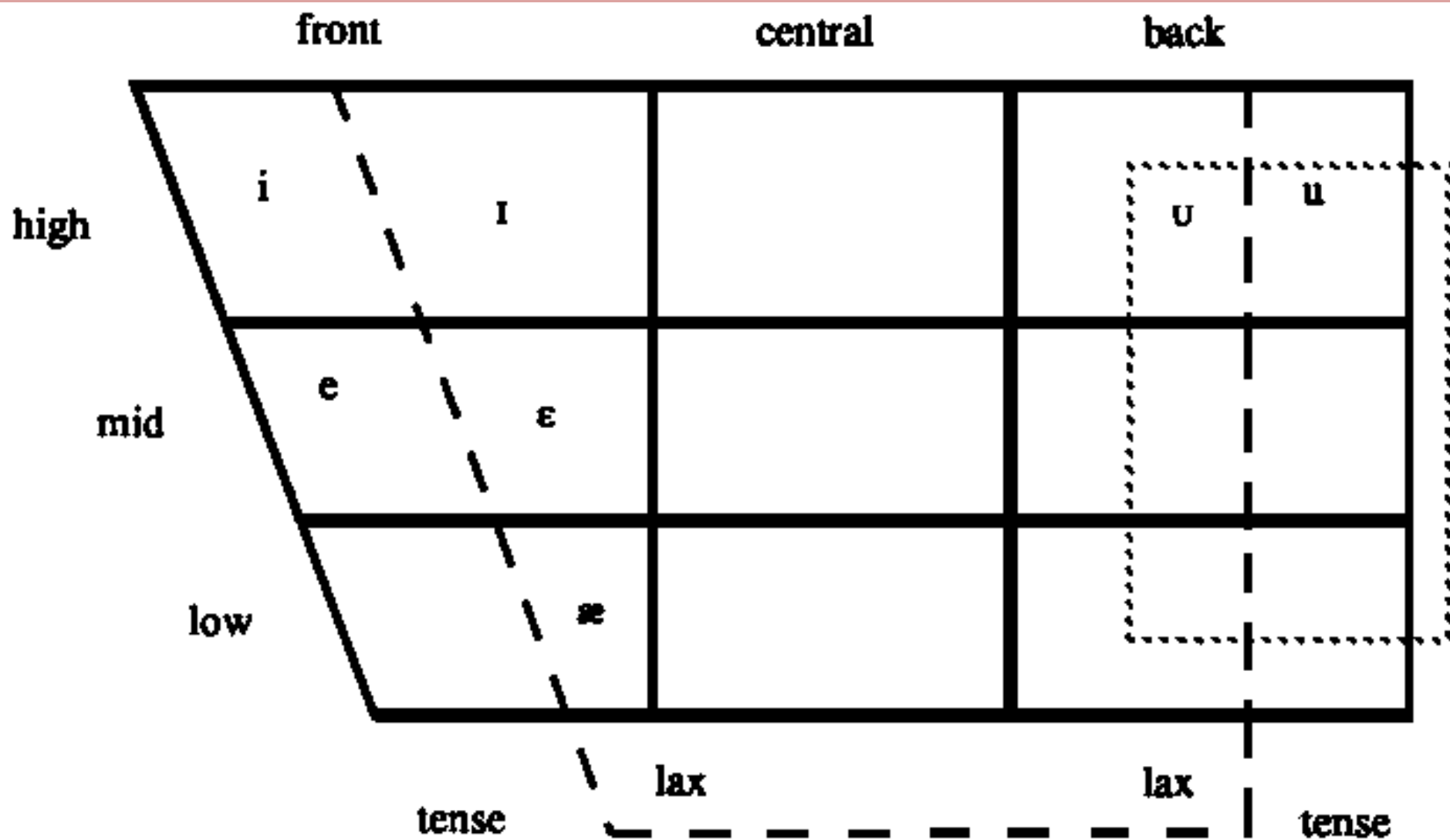




/ʊ/= +high, +back, +lax, +round

- The next vowel sound on the diagram that shows up can be read as a *high, back, lax, rounded* vowel
- This is represented by the symbol called *upsilon*:
- This is the sound in the word *foot*.
- Here is what it looks like:





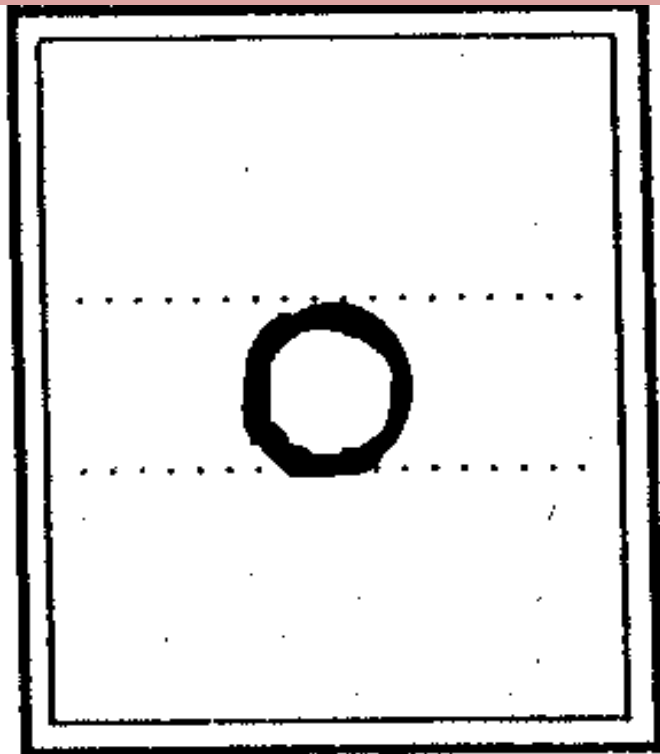
/o/= +back, ±high, +round, -lax

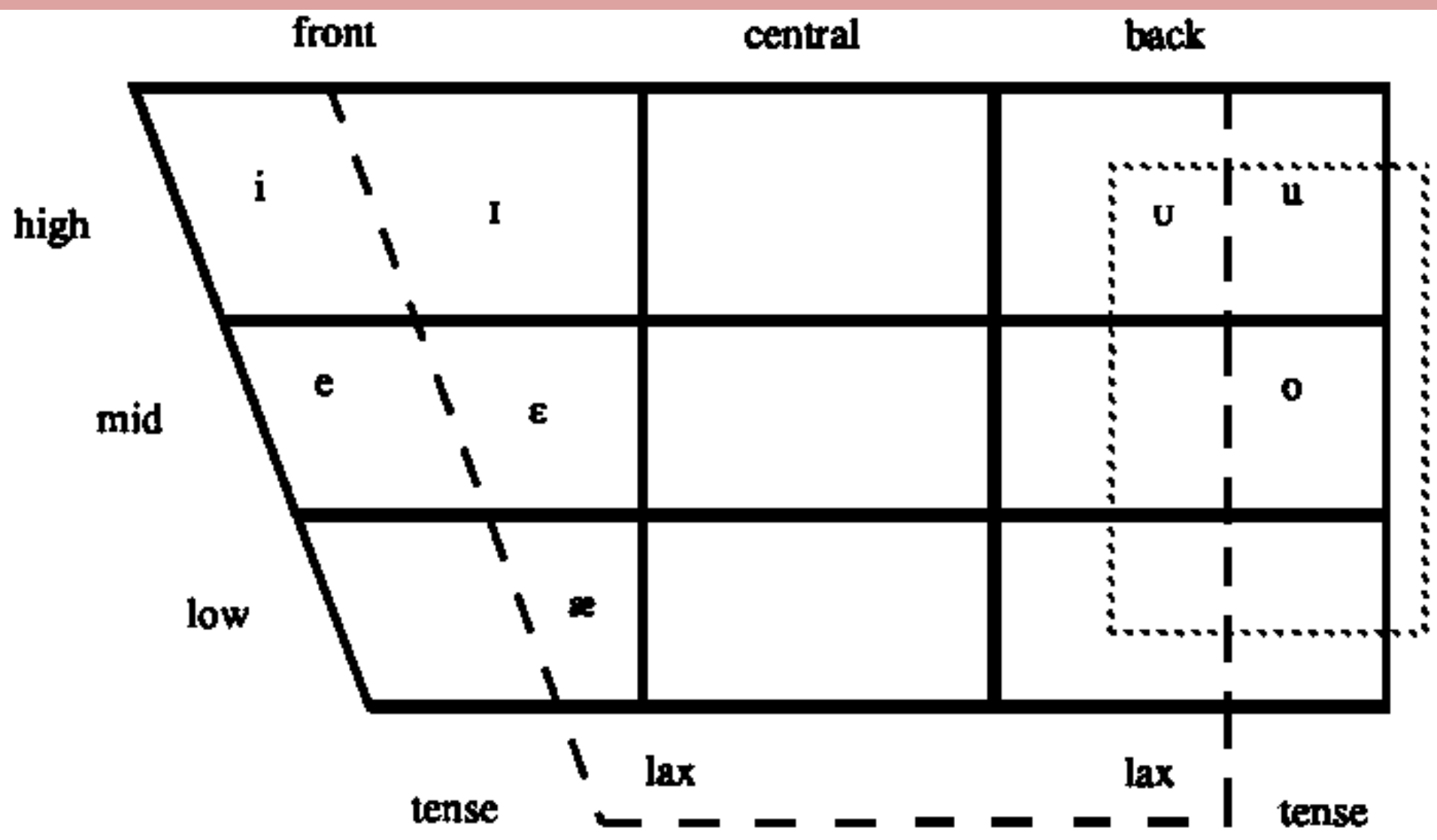
If we move downward on the right side of the diagram, we will come across the next vowel that is represented as a *back, mid, tense, rounded* vowel

The symbol used for this vowel is [o]

This is the sound in the word *boat*.

This vowel sound looks like:



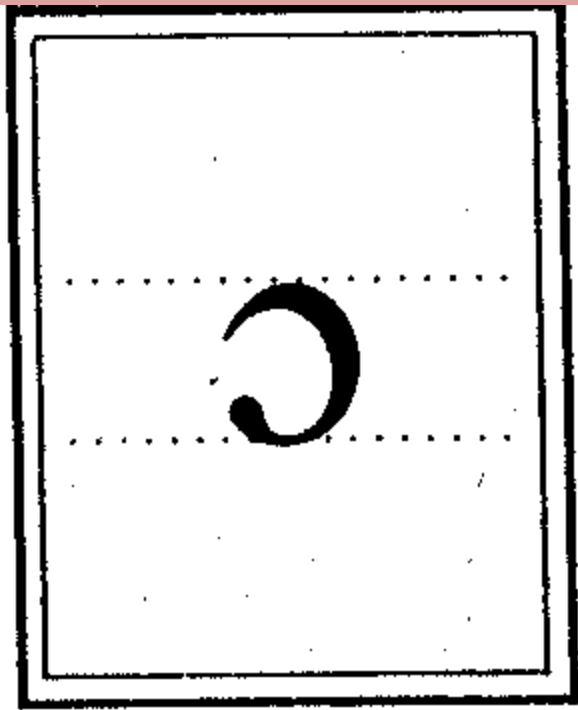


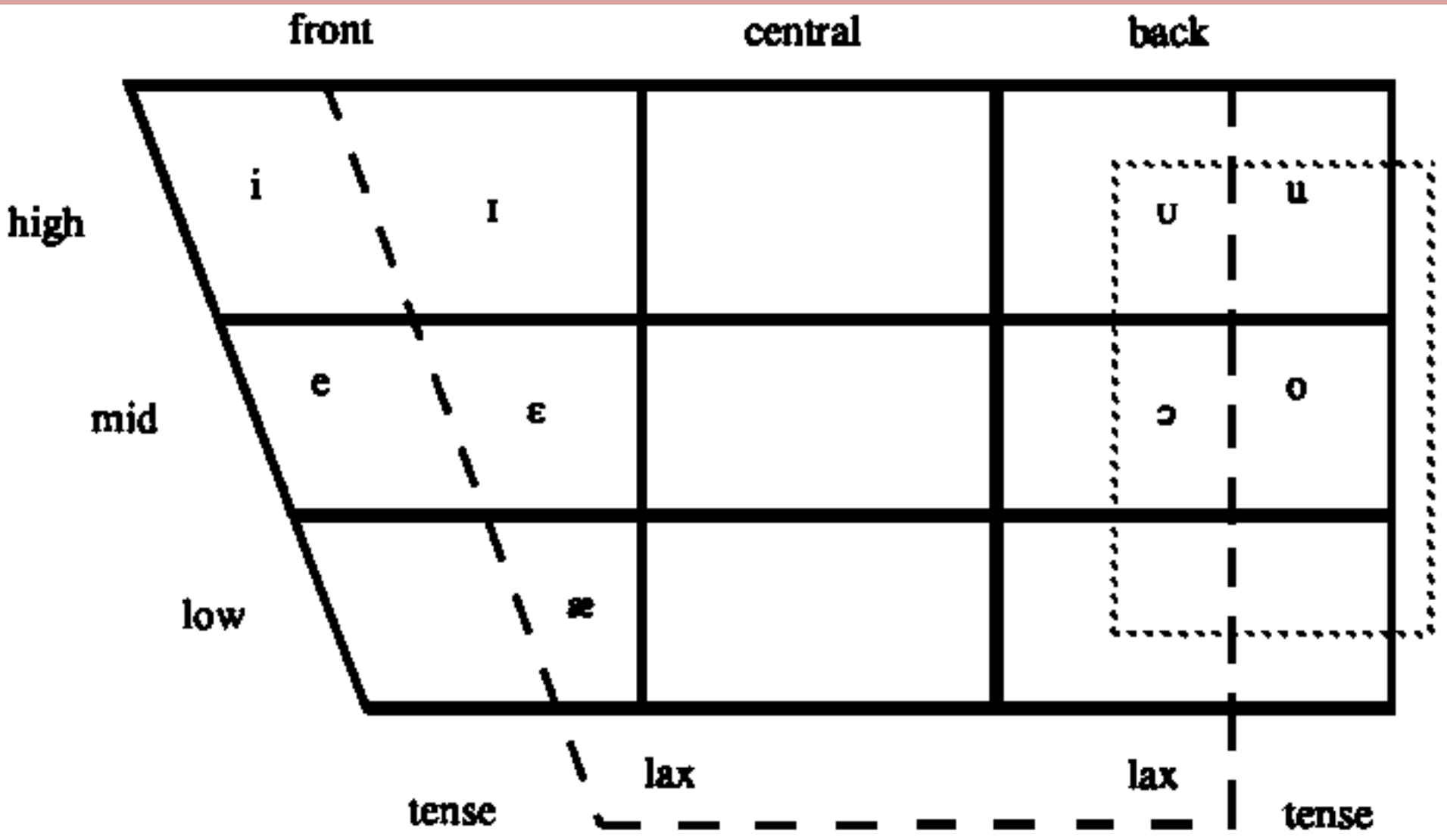
/ɔ/= +back, ±high, +lax, +round

The next vowel sound on the vowel chart shows up as a *back, mid, lax, rounded* vowel.

This is represented by the symbol called *open or broken* and this reflects the opening of the mouth in producing the vowel sound, $o = \text{ɔ}$

- This is the sound in the word *long*, $go = /g\text{ɔ}/$
- Or maybe the first sound in “aw gosh”
- Here is what it looks like:





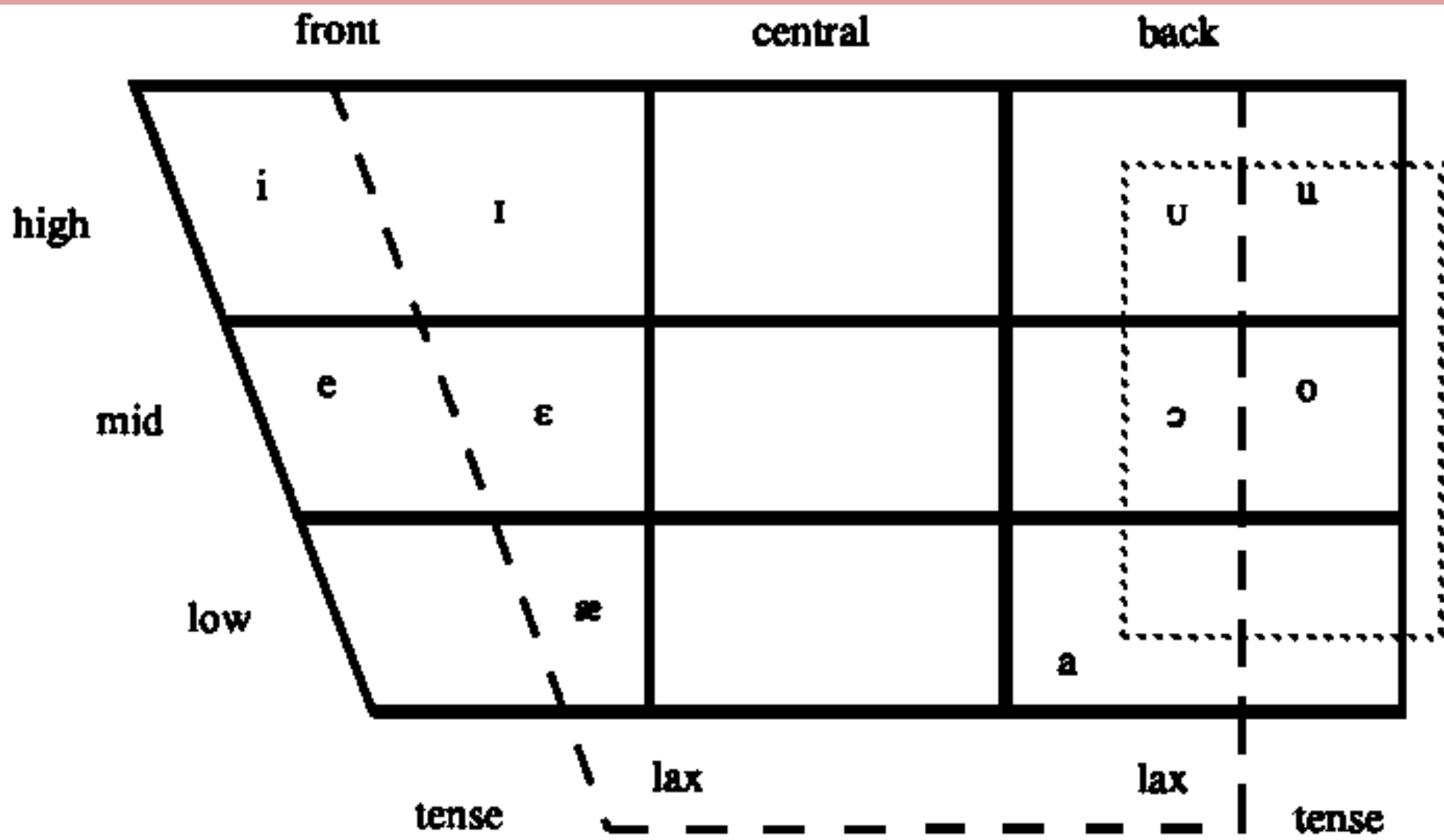
/a/= +back, +low, +lax, -round

If we move downward on the right hand side wall of the diagram, we find a vowel that shows up as a *back, low, lax, unrounded* vowel.

This is represented by the symbol [a].

- This is the sound in the word *father*
- This shows up in the diagram like this:



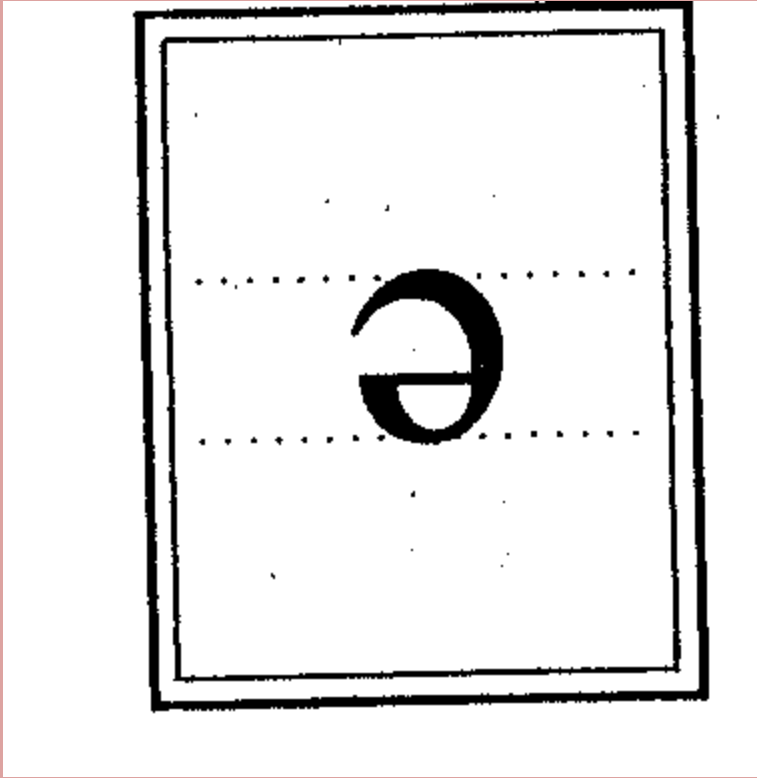


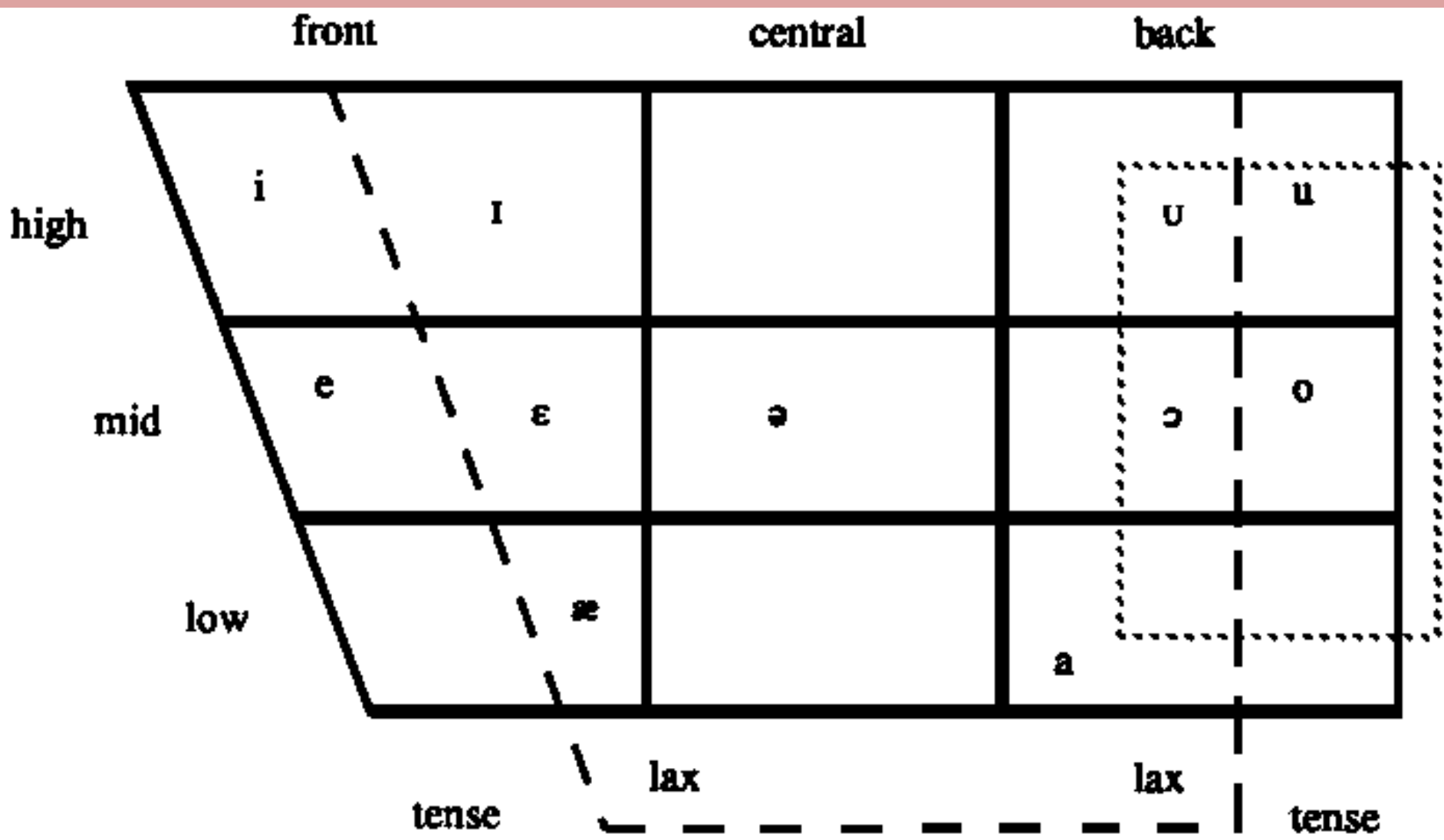
/ə/ ±back, +lax, -round, ±high

The middle position in the diagram shows up a vowel sound as a *central, mid, lax, unrounded* vowel.

This is represented by the symbol called a *schwa* = /ə/

- This is the first sound in the word *upset*.
- Here is what it looks like:





/ʌ/ = ±back, +lax, -round, ±high, +stress

- *Schwa* has a **stressed** counterpart shown as inverted v = / ʌ / and is known as wedge
- This is the vowel sound in the words ***but*** and ***cup***.
- It looks like this:

