# Engl. 236 – Introduction to Linguistics Ch.5 – Phonetics

August 2024 – Summer session

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- So far, we've discussed features of speech sounds by looking at how they're articulated; that is, how they are produced.
- We said that this process starts by pushing air from the lungs up through the larynx, which contains the vocal folds or vocal cords.
- Then, airflow travels from the larynx into the oral cavity or the nasal cavity, from which it exits.





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- We've also discussed how the vocal folds have an effect on the quality of the speech sounds that we produce.
- Remember that the vocal folds are two bands of ligaments that can be closed and opened.





- When they are closed while airflow is pushed from the lungs, they open due to the pressure, and then they close again because of the tension within them.
- This rapid opening and closing produces vibrations.
- Sounds produced with these vibrations are known as "voiced."

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- Examples of voiced speech sounds in English include:
- /b/
- /d/
- /s/
- /z/

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- Examples of voiceless speech sounds in English include:
- /p/
- /t/
- /k/

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- We've also discussed that speech sounds can be classified into two broad categories:
  - Consonants, which are produced by obstructing airflow somewhere within the vocal tract.
  - Vowels, which are produced with a relatively free airflow.

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- Consonants can be described based on three different features:
  - The place of articulation: the place where the airflow is manipulated, obstructed, or stopped.
  - Manner of articulation: How airflow is manipulated.
  - Voicing: Whether the sound is voiced or voiceless.

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- Let's begin with the place of articulation:
  - Bilabial sounds: those produced with the upper and lower lips.
    - In English, these include: /b/, /p/, /m/.
    - Some authors, like that of our textbook, include /w/.
    - We'll discuss this more once we get to manner of articulation.







- Let's begin with the place of articulation:
  - Labio-dental sounds:
    - These are produced by bringing the lower lip in contact with the upper front teeth.
    - These include /f/ and /v/.

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- Let's begin with the place of articulation:
  - Dental sounds:
    - These are produced by having the tip of the tongue make contact with the back of the upper front teeth.
    - These include /ð/ as in fa**ther or they.**
    - [θ] as in *th*ree or *th*in.

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- Let's begin with the place of articulation:
  - Interdentals:
    - These are the same as dental sounds, except when producing them, speakers place the tongue between the upper and lower teeth.

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- Let's begin with the place of articulation:
  - Alveolars:
    - Made with the tip or blade of the tongue touching or approaching the alveolar ridge.
    - /t/ as in tap
    - /d/ as in door
    - /s/ as is star
    - /z/ as in Zoo
    - /n/ as in normal
    - /l/ as in light
    - /r/ as in right.

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- Let's begin with the place of articulation:
  - Palatals:
    - These are made with the tip or blade of the tongue making contact or approaching the hard palate.
    - These include:
    - /ʃ/ as in shine
    - /ʒ/ as in treasure or pleasure
    - /t∫/ as in church
    - /dʒ/ as in joke or jump
    - /j/ as in yes

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- Let's begin with the place of articulation:
  - Velars
    - These are produced by the back of the tongue touching the velum (also known as the soft palate).
    - These include: /k/, /g/, /ŋ/
    - Remember that /ŋ/ appears at the end of items like "ring" or "thing."
    - Even though in writing these are two letters, <n> and <g>, it's just one sound, /ŋ/.

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- Bilabial: /p/; /b/; /m/
- Labiodental: /f/; /v/
- Dental: /ð/; /θ/
- Alveolar: /t/; /d/; /s/; /z/; /n/; /l/; /r/
- Palatal: /ʃ/; /ʒ/; /tʃ/; /dʒ/; /j/
- Velar: /k/; /g/; /ŋ/
- Glottals: /h/ /?/

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- We can now begin to discuss the second main feature of speech sounds: the manner of articulation.
- Manner of articulation refers to how airflow is manipulated or shaped within the vocal tract to produce distinct speech sounds.

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- Manner of articulation:
  - Stops
    - Also known as plosives
  - immediately.
  - This immediate release is why some authors refer to stops as plosives.
    - In English, these include: /p/, /t/, /k/ and /b/, /d/, /g/.

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Producing stops involves obstructing the airflow completely and then releasing it

The first set includes voiceless stops and the second includes voiced stops.



- Manner of articulation:
  - Nasals

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 The plosives that we've just discussed are produced by blocking airflow somewhere in the oral cavity (the mouth) while keeping the velum or the soft palate raised to block airflow from exiting through the nasal cavity.





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- When we produce an oral stop, a fricative, or an approximant, the velum is raised, blocking off airflow from reaching the nasal cavity.
- When the velum is lowered, airflow can exit through the nasal cavity.





- In English, we have three sounds produced by blocking airflow in the oral cavity while lowering the velum.
- /m/
- /n/
- /ŋ/

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- /m/ is a bilabial nasal.
- That is, airflow is blocked in the oral cavity by the lips.
- While the velum is lowered.

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- /n/ is an alveolar nasal
- That is, airflow is blocked in the oral cavity by the front of the tongue touching the alveolar ridge.
- While the velum is lowered.

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### alveolar tongue & alveolar ridge





- /ŋ/ is a velar nasal
- That is, airflow is blocked in the oral cavity by the back of the tongue touching the velum.
- The velum is lowered.

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- /n/, /m/, /ŋ/ are the nasals of English.
- They are all voiced.
- We'll discuss more of their features in the next chapter.

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- Manner of articulation:
  - Fricatives
    - becomes turbulent; that is, airflow becomes chaotic.
    - called as such.
    - The fricatives of English include: /f/; /v/; /θ/; /ð/; /s/; /z/
    - /∫/ as in shy and /ʒ/ as in television
    - /h/ as in heart

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• These are produced by bringing the articulators close together such that the airflow

• As airflow becomes turbulent, friction noise is generated, and this is why fricatives are



- Manner of articulation:
  - Affricates
    - These are produced by releasing a stop into a fricative.
    - English has two clear affricates:
      - /tf/ as in "church"
      - /dʒ/ as in "judge"

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- Manner of articulation:
  - Approximants:
    - generated.
    - produced with a relatively free airflow.

• In the production of approximants, the articulators are relatively far apart, at least more than in the case of fricatives such that no friction noise is

In fact, approximants are similar to vowels in the fact that both are



- Manner of articulation:
  - Approximants:
    - Liquids: /l/ and /r/; so named because of the free-flowing nature of airflow.
    - Glides: /w/ and /j/; so named because they glide into a following vowel.
    - Glides are also known as semi-vowels because they are phonetically related to them.
    - In the case of /w/, it is doubly articulated: the lips are rounded, and the back of the tongue approaches the velum.

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- Manner of articulation:
  - We also have what are known as flaps and trills.
    - Flaps, also known as taps, are produced when one articulator, the tongue, strikes another articulator very briefly.
    - We have the alveolar tap /r/ in English, evident in how some U.S. speakers pronounce water: /warer/.



- Manner of articulation:

  - The glottal stop is evident in the speech of some U.K. speakers.
    - /wo?ə/

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• We also have glottal stops, which are produced by blocking airflow at the glottis (the space between the vocal folds) and then quickly releasing it.



• Next up: Vowels!

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- Vowels are speech sounds that are produced with a relatively free airflow.
- That is, there is no complete or partial obstruction of airflow in the production of vowels.
  - Similar to the approximants /w/ and /j/.

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- Since there isn't any obstruction of airflow, we have no "manner of articulation" or "place of articulation" to speak of.
- So how can we identify the different vowels that we have?
- "hit" and "heat"?

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For instance, how can we determine the difference between the vowels of



- If we look at MRI images of speakers producing vowels, we can see a difference in a specific part of the vocal tract.
- Can you spot the difference?







- This is an MRI scan of a speaker producing the /i/ vowel.
- It's the vowel found in words such as "heat" or "seat"
- Note how the surface of the tongue is very close to the roof of the mouth.
- Note too how the tongue is raised near the front of the mouth.











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- This is an MRI scan of a speaker producing the  $/\alpha$ /vowel.
- It's the vowel found in words such as "hot" or "caught"
- Note how the surface of the tongue is relatively far from the roof of the mouth.
- Note too how the tongue is raised near the back of the mouth.





- We can start describing vowels based on these two qualities:
  - How close the surface of the tongue is to the roof of the mouth.
  - Where the highest point of the tongue is relative to the oral cavity (front, middle, back).



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- For example, /i/ is a high front vowel
- High since the surface of the tongue is close to the roof of the mouth.
- Front since the highest point or part of the tongue is relatively found at the front of the oral cavity.
- So, we can describe /i/ as a high front vowel.







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•  $/\alpha$ , on the other hand, is a low back vowel.

• Low because the surface of the tongue is relatively far away from the roof of the mouth.

 Back because the highest point or part of the tongue is relatively at the back of the mouth.





### Let's see two more vowels



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- /æ/ is a low front vowel.
- Low because the surface of the tongue is relatively far away from the roof of the mouth.
- Front because the highest point or part of the tongue is relatively at the front of the mouth.



### Let's see two more vowels



- /u/ is a high back vowel.
- High because the surface of the tongue is relatively close from the roof of the mouth.
- Back because the highest point or part of the tongue is relatively at the front of the mouth.





















- This is the vowel chart that we're dealing with.
- It is found in our textbook (p.201).
- The chart is based on the two characteristics in the producing of vowels that we discussed earlier:
  - Tongue height relative to the roof of the mouth (high, mid, low).
  - Tongue position relative to the oral cavity (front, central, back).





- The chart provides us with an easy reference to the vowels of (in this case) General American English.
- From left to right, we can trace the tongue position (more specifically, the position of the highest part of the tongue) across the oral cavity.
- From top to bottom, we can trace the position of the tongue relative to the roof of the mouth.

#### Part of the Tongue Involved





- Before we begin: a note about vowels.
- Vowels vary by language, dialect, variety, and even by speaker.
- In fact, the fact that you can pinpoint where a speaker is from can be traced back mainly to the vowels that speaker produces.
- This is why you'll find different vowel charts in different books.
- It depends on the language "variety" that the author is trying to describe.















- The /i/ vowel.
- It is a high-front vowel.
- Meaning that the tongue is near the front of the mouth and the highest part of the tongue is near the roof of the mouth.
- It is found in words like "seat" or "heat."





- The /I/ vowel.
- It is a mid-high front vowel.
- Meaning that the tongue is near the front of the mouth and the highest part of the tongue is lower than the articulation of /i/.
- It is found in words like "fill," "list," and "kit."



#### Part of the Tongue Involved





- The  $\epsilon$  vowel.
- It is a mid-low front vowel.
- It is found in words like "dress," "set," "ten", and "net."







- The /æ/ vowel.
- It is a low front vowel.
- It is found in words like "trap," "bad," "cat," and "hat."





- Note how the lower the front vowels are, the "less" front they are.
- In other words, the highest part of the tongue becomes more "central," more to the back of the oral cavity the lower the vowel becomes.



Part of the Tongue Involved



- The /u/ vowel.
- It is a high back vowel.
- Meaning that the highest part of the tongue is at the back of the mouth and that the tongue is close to the roof of the mouth.
- Found in words like "goose," "blue," "boot," and "move."



Part of the Tongue Involved



- The /ʊ/ vowel.
- It is a mid-high back vowel.
  - Note that it is a bit more "central" than the /u/ vowel.
- Found in words like "full," "wood," "could," "would," and "foot."





- The /ɔ/ vowel.
- It's a mid-low back vowel.
- Found in words like "thought," "north," "war," and "born."
- Cot vs caught





- The /α/ vowel.
- It's a low back vowel.
- Found in words like "father," "bot," "bought," and "palm," "thought."

Front	Front	Central	
High	i I		ζ
Mid	е	ə	
	3	Λ	
Low	æ	a	







- The /ə/ vowel.
  - Also known as schwa.
- It's a mid-central vowel.
- It's also known as the unstressed vowel because it appears in unstressed syllables.
- The schwa vowel is the most common in English.
- It can be hard to identify, since it is colored by the consonants around it.





- <u>A</u>bove
- <u>A</u>ccept
- B<u>u</u>t ●
- Pl<u>u</u>ck
- /plək/
- Mother
- /məðər/
- Gentlem<u>a</u>n •
  - /dʒɛntəlmən/
- Teach<u>er</u>
- Fath<u>er</u>





#### Battered $\bullet$

- Razor  $\bullet$
- Grocer  $\bullet$
- То lacksquare
- The  $\bullet$
- Woman
- Suppose
- Color

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- The /n/ vowel.
- Also known as the strut vowel.
- It's very difficult to identify phonetically the difference between the schwa and the strut vowels (in General American).
- Pluck
- /plək/
- Once we get to chapter 4, we will discuss this more in-depth.





- You might have noticed that we didn't discuss some of the symbols on the chart (highlighted in blue).
- This is because, at least as far as our textbook is concerned, these are used as the starting point of diphthongs.
- To which we will now turn...





- Put simply, a diphthong is a vowel where the tongue moves from one point to another within the articulation of the sound.
- In other words, a diphthong is a vowel where the starting point and ending point are different.
- So, for instance, in the production of the / er/vowel, the tongue starts at about the mid front position and then glides in the direction of /1/.
- "Play": /plei/
- Heat: /hit/
- Diphthongs vs. monophthongs





- One thing to remember about diphthongs is that they are not to consecutive vowel sounds; they represent one sound segment.
- So /ei/ represents one sound; a diphthong rather than a monophthong.
- We can find the vowel /ei/ in words such as "day," "made," "game," "play," and "sail."





- The vowel /ai/.
- The tongue starts nearly at the low central position and glides towards the mid-high front position.
- Found in words such as "fly," "mine," "hide," "eyes," and "tie."





- The vowel /ɔɪ/.
- The tongue starts at approximately the mid-low back position and glides towards a mid-high front position.
- Found in words such as "boy," "oil," "noise," "coin," and "choice."





- The vowel /au/.
- The tongue starts at a low central position and glides towards a midhigh back position.
- Found in words such as "cow," "house," "loud," "town," "mouse," and "shout."





- The vowel /oʊ/.
- The tongue starts at a mid back position and glides towards a midhigh back position.
- Found in words such as "home," "road," "toe," "pose," "grow," and "SO."





- Summary of diphthongs:
- /eɪ/
- /aʊ/  $\bullet$
- /୦೮/
- /JI/  $\bullet$
- /aɪ/ lacksquare





- Tense and lax vowels:
  - sets of vowels.
    - Lax vowel: [I, ε, σ, Λ/θ, æ]
    - Tense vowels: [i, ei, u, ou, ou, oi, ai, α, au, oi]
    - The differences you need to know for now is that:
    - the muscles are.
      - Just think of them as labels.

• For many in phonetics and phonology, there is a difference between these two

• First, labels "tense" and "lax" don't necessarily refer to how tense or relaxed


- Tense and lax vowels:
  - - Lax vowel: [I, ε, σ, Λ/ə, æ]
    - Tense vowels: [i, eɪ, u, oʊ, ɔ, aɪ, α, aʊ, ɔɪ]
    - The differences you need to know for now is that:
    - vowel.
      - [i, I]
      - [eI, ɛ]
      - [U, ʊ]

• For many in phonetics and phonology, there is a difference between these two sets of vowels.

• Second, a lax vowel is shorter, lower, and more centralized than the corresponding tense







- Tense and lax vowels:
  - For many in phonetics and phonology, there is a difference between these two sets of vowels.
    - Lax vowel: [Ι, ε, ʊ, ʌ/ə, æ]
    - Tense vowels: [i, eɪ, u, oʊ, ɔ, aɪ, α, aʊ, ɔɪ]
    - The differences you need to know for now is that:
    - Third, lax vowels can't appear in an open syllable:
      - Open syllables are those that end in a vowel
      - Open syllables, so no lax vowels are allowed at the end:
        - "Bee" -> /bi/
        - "Paw" -> /pα/
        - "Few" -> /fju/
      - Closed syllabus, so both tense and lax vowels are allowed:
        - "Bit" -> /bɪt/
        - "Pad" -> /pæd/
        - "Fed" -> /fɛd/
      - Note that tense vowels can appear in both closed and open syllables:
        - "Bee" and "Beet"
        - "Paw" and "Pawed"
        - "Few" and "Feud"



- So, this is our inventory of vowels in a General American variety.
- We'll now move to the IPA transcription.
- through the IPA symbols.
- So, an IPA transcription of "phonetics" would be /foonetiks/.
- Now, some people would pronounce "phonetics" as /fanctiks/.

  - Of course, at an extreme level of detail, everyone pronounces words differently.
    - But we're looking at a more general level of transcription.

• Essentially, IPA transcription means representing the sounds used in producing speech

• And this tells us something about transcription: some words are pronounced differently by different people; as such we would have different, yet accurate, transcriptions.





- For instance, the word "interesting" could be transcribed as both:
  - /intristin/
  - **OR**
  - /intrestin/
  - **OR**
  - /intrəstiŋ/
    - Certain pronunciations might be more frequent in different contexts.
    - We'll discuss more of that once we get to chapter 4.



- Let's transcribe:
  - London: /landan/
  - Grab: /græb/
  - Pluck: /plək/
  - Cap: /kæp/
  - Test: /tɛst/
  - Annoy: /ənɔɪ/
  - School: /skul/





- Let's transcribe: ullet
  - Bank: /bæŋk/ ullet
  - Frank: /fræŋk/
  - Anger:/æŋgər/
  - Safe: /seif/ lacksquare
  - Proof: /pruf/
  - Then: /ðɛn/ ullet
  - Through: /ðru/
  - Though: /ðoʊ/
  - Thought: /0at/ ullet

OR

Thought: /θot/

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- You might be wondering about the transcription of "anger."
  - Especially since "singer," which sounds very close to "anger," is transcribed /sıŋər/. as
  - Without going into the complex history behind this and the  $/\eta$  sound, we can say that "singer" is made up of two parts — two morphemes:
    - "Sing"+"er"
  - But "anger" is made up of one part one morpheme.
  - Thus, we can say that in words with "ng," if it appears at the end of a morpheme, then it's pronounced as  $/\eta$  without the following /q sound.
    - As in "singer."







- middle.
  - As such, "ng" here is pronounced with a following /g/, as in:
    - /æŋgər/.
  - A few more examples:
    - "Finger":
    - "Long":
    - "Banger":
    - "Jungle":
    - "Among":

• In the case of "anger" however, it's made up of one morpheme, with "ng" appearing in the



- middle.
  - As such, "ng" here is pronounced with a following /g/, as in:
    - /æŋgər/.
  - A few more examples:
    - "Finger": /fɪŋgər/
    - "Long": /laŋ/
    - "Banger": /bæŋər/
    - "Jungle": /dʒəŋgəl/ (We'll get to this later!)
    - "Among": /əmʌŋ/

• In the case of "anger" however, it's made up of one morpheme, with "ng" appearing in the



- - Sing: /sɪŋ/
  - Singer: /sɪŋər/
  - Hang: /hæŋ/
  - Hanger: /hæŋər/
  - BUT
  - Strong: /stran/
  - Stronger: /stranger/
  - Long: /laŋ/
  - Longer:/langer/
  - Longest: /laŋgəst/
  - Banger: /bæŋər/

• But note that comparative and superlative forms are treated as if they are made up of one morpheme (mono-morphemic):

