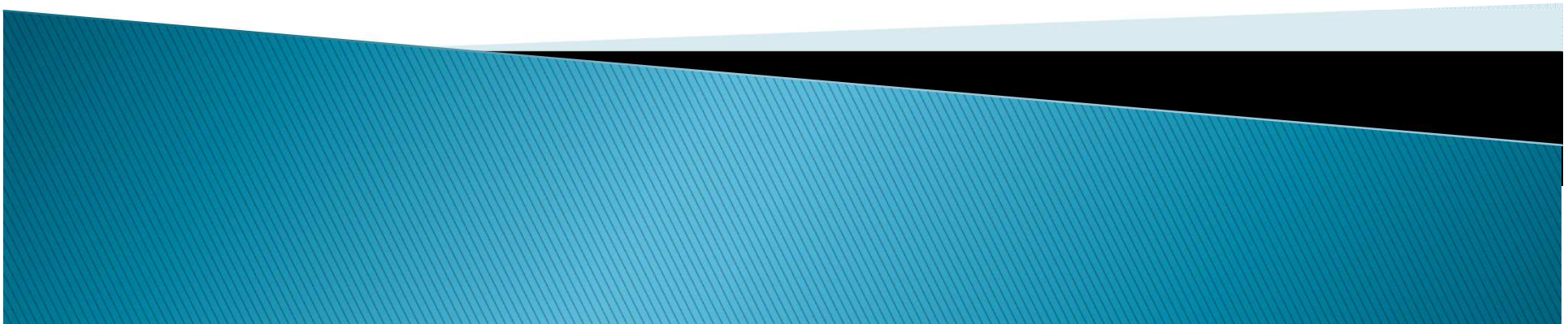


PHONETICS AND PHONOLOGY

LECTURE 1: OVERVIEW

1. PHONETICS AND PHONOLOGY
2. THE PRODUCTION OF SPEECH SOUNDS
3. IPA




▶ Levels of Linguistic Analysis

- Pragmatics
- Semantics
- Syntax
- Morphology
- Phonology
- Phonetics



1. PHONETICS & PHONOLOGY

a. What is Phonetics ?

- from the Greek word *phone* = *sound/voice*
 - study of speech sounds – to determine what the sounds are, how they vary, and how to describe them
 - the study of the sounds made in the production of human languages
 - ▶ The main activities of phoneticians are
 - the description of sounds
 - the classification of sounds
 - the transcription of sounds
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Branches of Phonetics

3 principal branches in phonetics.

- ▶ **Articulatory phonetics** –
- ▶ describes how vowels and consonants are produced or “articulated” in various parts of the mouth and throat
- ▶ focuses on the human vocal apparatus and describes sounds in terms of their articulation in the vocal tract



Branches of Phonetics

- ▶ Study of how speech sounds are produced by human vocal apparatus
 - Anatomy of vocal organs
 - Air stream Mechanism
 - Voicing / Phonation
 - Articulation



Branches of Phonetics

- ▶ Acoustic phonetics
- ▶ uses the tools of physics to study the nature of sound waves produced in human language
- ▶ a study of how speech sounds are transmitted: when sound travels through the air from the speaker's mouth to the hearer's ear it does so in the form of vibrations in the air



Branches of Phonetics

- ▶ **Auditory Phonetics**
- ▶ a study of how speech sounds are perceived: looks at the way in which the hearer's brain decodes the sound waves back into the vowels and consonants originally intended by the speaker.



- Phonetics is a system of written symbols representing the speech sounds of any language ; each symbol represents only a single sound.

English phonetic system is full of inconsistencies. Example:

1. When words are misspelled –


bags – bagz Pushed – pusht

2. Same sound spelled using a variety of letter combinations – ‘ee’ sound

plea, tee, deceive, tangy, key, ski, people



Importance of Phonetics?

- For Teachers – to teach reading and spelling effectively because of the complexity of the English spelling system – not wholly phonetic
 - For Speech pathologists and speech therapists – to help better those who have various language delays and disabilities, including loss of speech abilities due to injury or stroke
 - For Forensic linguists – to better identify speech or to authenticate recordings in legal cases.
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Phonology

b. What is phonology ?

- ▶ the study of the sound systems of languages
- ▶ The study of how speech sounds form patterns – the patterns could be simple as the fact that the velar nasal cannot begin a syllable in English, or as complex as why *g* is silent in *sign* but is pronounced in the related word *signature*.



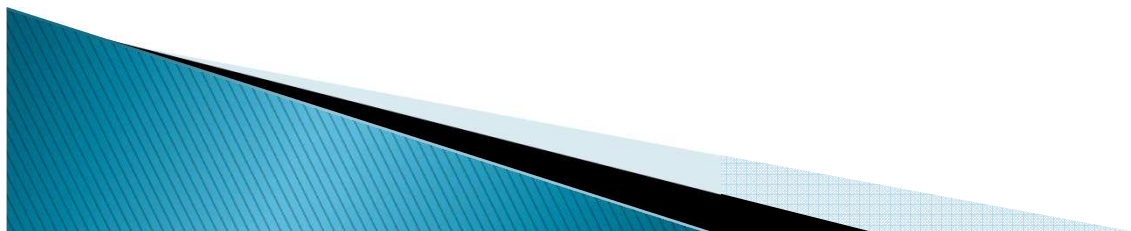
- Phonology deals with the way speech sounds behave in particular languages or in languages generally. This focuses on the way languages use differences between sounds in order to convey differences of meaning between words.
- refers both to the linguistic knowledge that speakers have about the sound patterns of their language and to the description of that knowledge that linguists try to produce



- ▶ There are two branches of phonology:
 - segmental phonology (which analyses discrete segments – phonemes)
 - suprasegmental phonology (which analyses those features which extend over more than one segment – it means, rhythm, stress placement etc.)
- ▶ Another classification of phonology is the classification into
 - diachronic phonology (the historical development of sounds)
 - synchronic phonology (the present systems of various languages)



- ▶ Study of how sounds interact in various languages
- ▶ Segmental phenomena
 - Phonemic Inventory and Allophony
 - Sound-change rules and ordering
- ▶ Supra-segmental phenomena
 - Syllabification
 - Prominence
 - Tones
 - Intonation



The importance of phonology

- ▶ Tells what sounds are in your lg. and which ones are foreign
- ▶ Tells what combinations of sounds could be an actual word or otherwise. E.g. no English word begins with the consonant sequence zbf and no words end with the sequence aeh
- ▶ Explains why certain phonetic features are important to identifying a word
- ▶ Allows us to adjust our pronunciation of a morpheme to suit the different phonological contexts that it occurs in.




Some important terms

- ▶ The actual sound produced, such as a simple vowel or consonant sound is called **phone**.
- ▶ A speech segment that possesses distinct physical or perceptual properties
- ▶ A particular occurrence of a speech segment
- ▶ The basic unit revealed via phonetic speech analysis



Some important terms

- ▶ All theories of phonology hold that spoken language can be broken down into a string of sound units (phonemes)
 - ▶ A phoneme is the smallest 'distinctive unit sound' of a language. It distinguishes one word from another in a given language. This means changing a phoneme in a word, produces another word, that has a different meaning. In the pair of words (minimal pairs) 'cat' and 'bat', the distinguishing sounds /c/ and /b/ are both phonemes. The phoneme is an abstract term (a speech sound as it exists in the mind of the speaker) and it is specific to a particular language.
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Some important terms

- ▶ Phoneme?
- ▶ Mental concept representing a physical sound
- ▶ Many to many mapping between phoneme and a phone within a language
- ▶ English /t/
 - aspirated in “tunafish”
 - unaspirated in “starfish”
 - dental before labio-dental
 - flapped in “buttercup”



Some important terms

- ▶ A phoneme may have several allophones, related sounds that are distinct but do not change the meaning of a word when they are interchanged. The sounds corresponding to the letter "t" in the English words 'tea' and 'trip' are not in fact quite the same. The position of the tongue is slightly different, which causes a difference in sound detectable by an instrument such as a speech spectrograph. Thus the [t] in 'tea' and the [t] in 'trip' are allophones of the phoneme /t/.
- ▶ Phonology is the link between Phonetics and the rest of Linguistics. Only by studying both the phonetics and the phonology of English is it possible to acquire a full understanding of the use of sounds in English speech.



- ▶ Orthography and Sounds
- ▶ The English language is not *phonetic*.
- ▶ Words are not spelled as they are pronounced
- ▶ There is no one to one correspondence between the *letters and the sounds or phonemes*.
- ▶ Did he believe that Caesar could see the people seize the seas.
- ▶ Mark Twain offered a phonetic alphabet for English.
 - Fish → ghoti
 - the gh = f as in rouGH
 - the o = i as in wOmen
 - the ti = sh as in naTion

2. THE PRODUCTION OF SPEECH SOUNDS

- ▶ Most sounds in the world's languages are produced by manipulating air coming into the vocal tract as it is being exhaled by the lungs.
- ▶ Known as **pulmonic egressive airstream mechanism**.
- ▶ Sounds made by manipulating air as it is exhaled from the lungs are called **pulmonic egressive sounds**.
- ▶ Virtually all sounds in English and other European languages are produced by manipulating exhaled air.



- ▶ **Grapheme** – The symbols (letters) used in a writing system such as our alphabet
- ▶ **Digraph** – A single sound represented by two letters (e.g., th, sh, ea)
- ▶ **Phonetic Alphabet** – a collection of symbols used for writing words phonetically
- ▶ **Minimal Pair** – Two words that are pronounced the same except for one sound (e.g., Sue, zoo)
- ▶ **Voiced Sound** – A sound produced with the vocal folds (cords) vibrating (e.g. voiced /z/ as opposed to voiceless /s/)
- ▶ **Diphthong** – “a double vowel sound” – two vowels appearing together as the nucleus of a syllable



Phonetics: Introduction

Phonology:

A description of the systems and patterns of sounds that occur in a language (abstract), often involving comparisons between languages and/or evolution of a language over time.

Phonetics:

A branch of phonology that deals with individual speech sounds, their production, and their written representation.

Phoneme:

- A unit of speech that can be used to differentiate words (e.g. “cat” /k æ t/ vs. “bat” /b æ t/).
- Phonemes identify *minimal pairs* in a language.
- The set of phonemes in a language subject to interpretation; most languages have 20 to 40 phonemes.

Phonetics: Introduction

Allophone:

A speech sound constituting one of the systematic phonetic variants of a given phoneme. Different allophones are predictable from environment (e.g. “toe”, “caught”, “fitness”, “writer”; “sill”, “still”, “spill”)

Phone:

An acoustic realization of a phoneme. (Many different phones may represent the same phoneme.)

“The phoneme /s/ consists of more than 100 allophones”

– Pickett, *The Acoustics of Speech Communication*, p. 7.

Phonemes indicated by / /; phones (allophones) indicated by [].

Phonetics: Introduction

Syllable:

- Unit of speech containing one or more phonemes.
- A vowel in a syllable is called the *syllable nucleus*.
- Most syllables contain one vowel (or diphthong); some contain only a lateral (“bott/le”) or nasal (“butt/on”) as the most intense sound.
- Syllable boundaries sometimes ambiguous (“tas/ty” vs. “tast/y” vs. “ta/sty”)

Coarticulation:

The “blending” of two or more adjacent phones, causing a non-distinct boundary between them. Coarticulation is caused by smooth changes in the articulators (lips, tongue, jaw) over time.

How are speech sounds made?

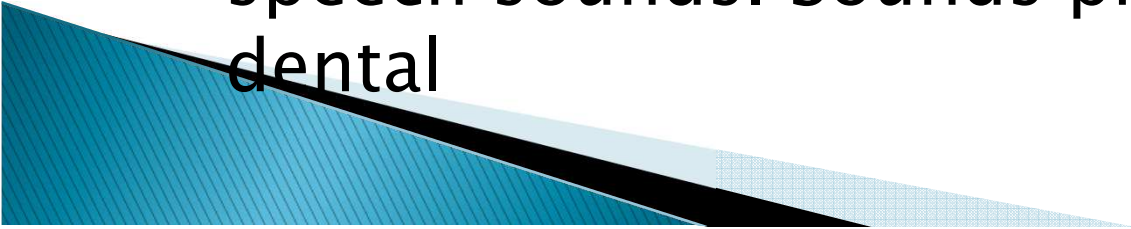
- ▶ Air coming from the lungs passes through the vocal tract, which shapes it into different speech sounds. The air then exits the vocal tract through the mouth or nose or both.
- ▶ The vocal tract is made up of upper surface and lower surface
- ▶ The upper surface is made up of upper lip, upper teeth, alveolar ridge, hard palate, soft palate(velum), and uvula.
- ▶ The lower surface is made up of lower lip, tongue and epiglottis



- ▶ Speech sounds can be identified in terms of their articulatory properties – that is, where in the mouth and how they are produced
- ▶ All English consonants can be described in terms of three properties:
 - Voicing (whether the vocal cords are vibrating or not)
 - Place of articulation
 - where the airstream is most obstructed
 - Manner of articulation
 - the particular way the airstream is obstructed



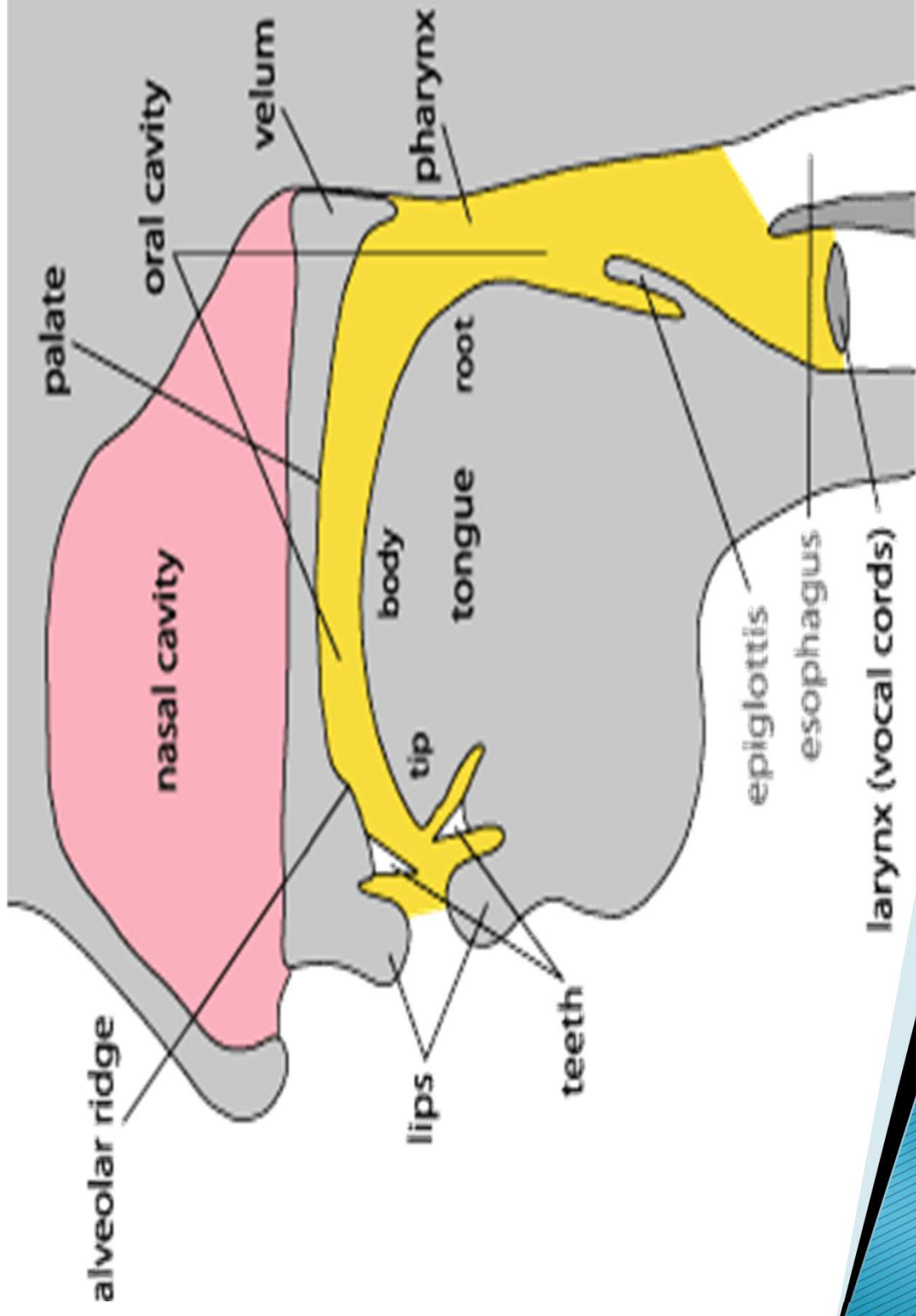
Articulators

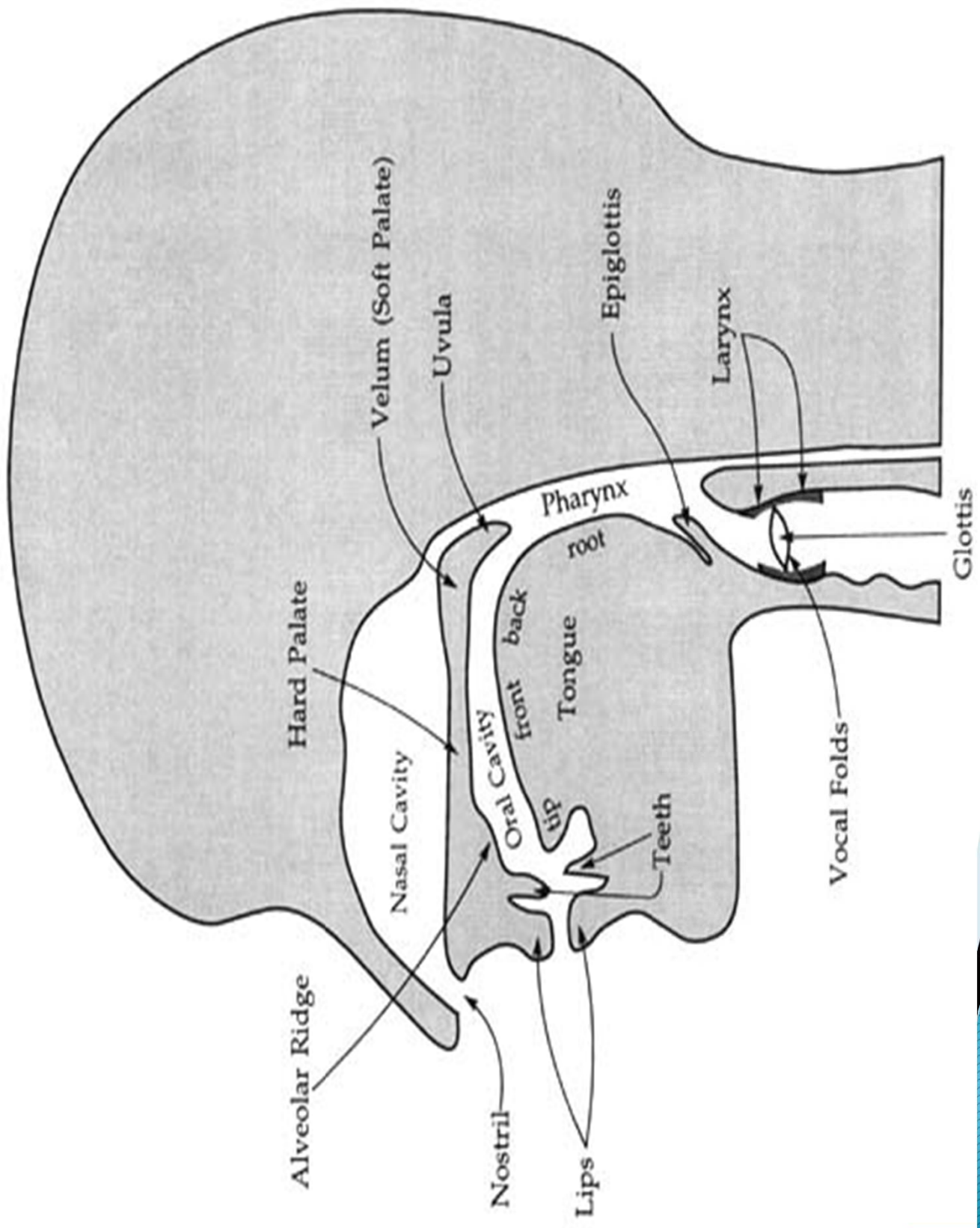
1. Velum (soft palate)– allows air to pass through the nose and through the mouth
 2. Hard palate – often called the ‘ roof of the mouth’
 3. Alveolar ridge – between the top front teeth and the hard palate
 4. Tongue – important and can be moved into many different shapes and different places.
 5. Teeth (upper and lower) – tongue is in contact with the upper side teeth for many speech sounds. Sounds produced called as dental
- 

6. Lips – pressed together (for sounds p, b), brought into contact with the teeth (for sounds f, v), or rounded to produce the lip-shape for vowels like u . Sounds produced when the lips are in contact – bilabial; lip to teeth contact called labiodental
7. Pharynx – about 7cm long in women and about 8cm in men. Top end is divided into 2; one part being the back of the mouth and the other being the beginning of the way through the nasal cavity.

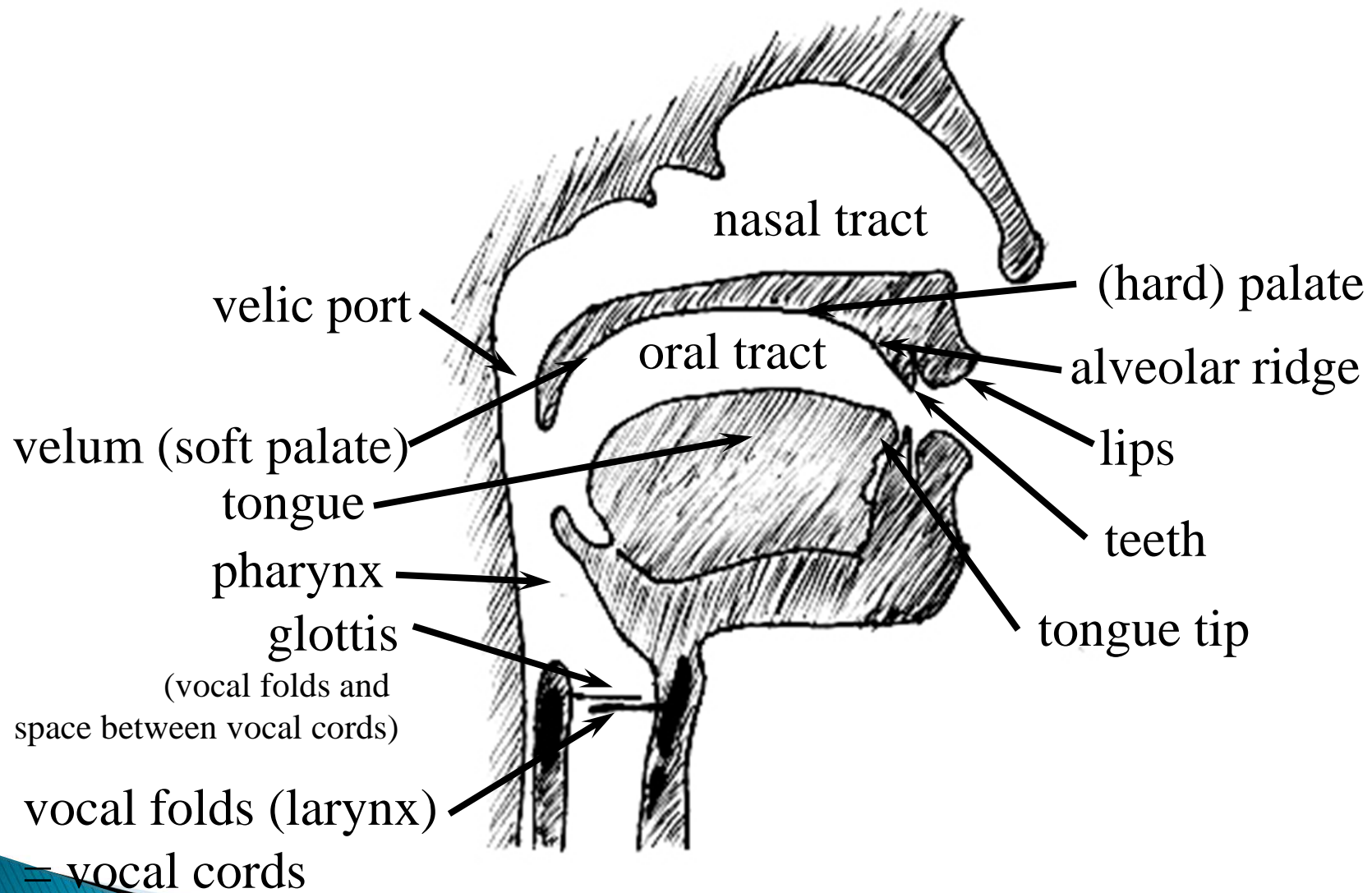


VOCAL TRACT





Phonetics: Distinctive Phonetic Features



The Speech Production Apparatus (from Olive, p. 23)

Sound/symbol correspondence

The need for a transcription system

Consider written English

enough through thorough though bough

think those thistle thong

church chemistry lochCheryl



International Phonetic Alphabet IPA

- ▶ Devised in the 19th Century to help describe the sounds of languages independently of a language's orthography (= writing system).
- ▶ Under continuous revision.
- ▶ Last major revision was in 1993.



Sound/symbol correspondence

enough through thorough thought bough
[ʌf] [u:] [ə] [ɔ:] [aʊ]

think those thistle thong
[θ] [ð] [θ] [θ]

church chemistry loch Cheryl
[tʃ] [k] [x] [ʃ]



Transcription

- ▶ Basically we distinguish two types of transcription:
 - phonemic transcription or broad transcription where only phonemes are given. We write the transcribed text in slashes /teɪl/.
 - phonetic transcription or narrow transcription, where different degrees of allophonic detail are introduced, e.g., devoicing (by a little circle under the letter – [l̥]). Quite frequently, however, any kind of transcribed pronunciation is called phonetic transcription.



The International Phonetics Alphabet (IPA)

The IPA is a writing system used by linguists to communicate with each other. It is an international standard, promulgated by the International Phonetic Association, which provides symbols for all of the sounds that have been discovered in the world's languages.



The International Phonetics Alphabet (IPA)

For the purpose of transcription, the International Phonetic Alphabet – IPA was introduced by the International Phonetic Association (originally in 1929, the latest version in Kiel 1989). Pronunciation Dictionaries, the first was published by Prof. Daniel Jones, London University (1st edition 1917, 16th edition 2003), followed by others (Gimson, Wells, and Roach), use IPA.

