AIMS OF THE COURSE

→ To introduce the fundamental concepts and areas of Phonetics, its applications and connections with other disciplines
→ To understand the structure and principles of the English sound system and some of its variations across accents.
→ To understand the symbols used to represent sounds and correspondences to orthographic representations in order to improve students' pronunciation targets.
→ To develop the skill of transcription in order to raise student awareness of English pronunciation and as a self-diagnostic tool.
→ To develop students English perceptual competence in order to improve their speech comprehension and as a step to improving their production competence.
→ To be able to understand the main differences between the native and non-native sound systems in order to detect and explain the pronunciation errors of English learners.
→ To understand the functioning of the speech organs for the production of speech in order to increase proprioceptive abilities and self-articulatory control.
→ To initiate students to the acoustic analysis of speech and to be able to record and visualize a speech signal
→ To be able to analyze and perceive the main characteristics of English sounds' allophonic and phonemic variations in speech so as to improve students comprehension and production abilities of real speech.
→ To understand the principles of speech perception

# Phonetics is the study of speech sounds.

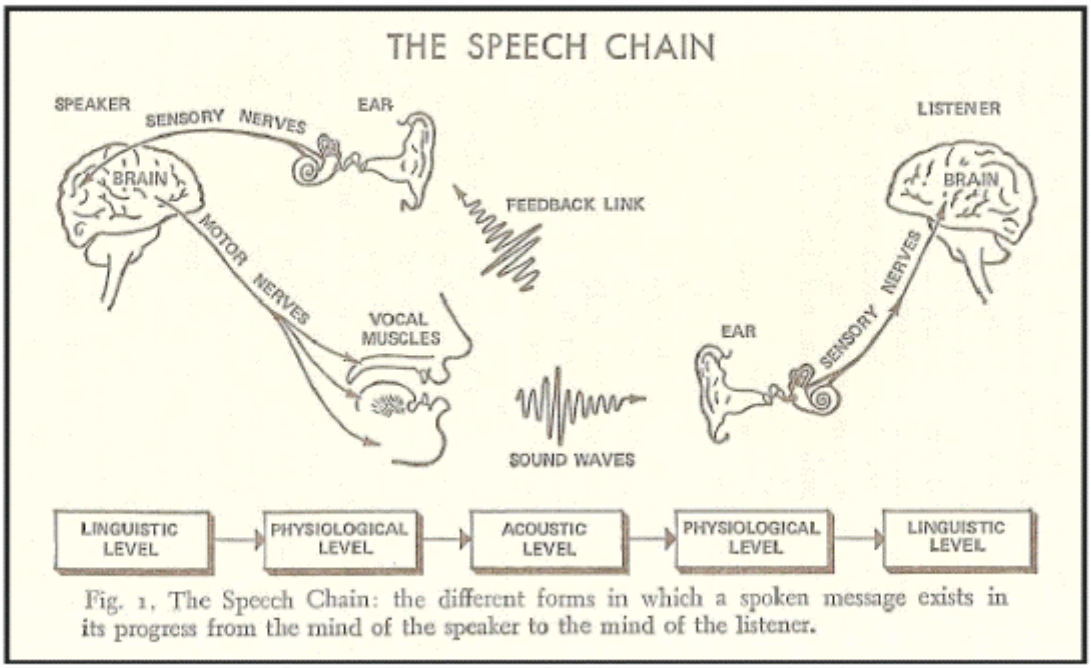



Fig. 1. The Speech Chain: the different forms in which a spoken message exists in its progress from the mind of the speaker to the mind of the listener.

(from Denes & Pinson, 1993)

PHONETICS AREAS

ARTICULATORY PHONETICS: mechanisms of sound production & activity of speech organs

ACOUSTIC PHONETICS: physical properties of sounds and their transmission as sound waves

AUDITORY & PERCEPTUAL PHONETICS: organs and mechanisms of sound perception; decoding of sound waves and processing in brain

LINGUISTIC PHONETICS: sounds of a language and their transcription (overlapping area with Phonology)

PHONEME: contrastive unit, mental target, a speaker's intended sound, a label to designate the family of allophones.

"minimal sound unit capable of contrasting word meaning"

ALLOPHONE: actual realization of a phoneme,

phonemic variant, “co-articulatory variant” (?)

IN TRANSCRIPTION:

Phonemes are represented between slanted bars: /t/

Allophones are represented between square brackets: [$t^h$ ]

*How do you find a language's inventory of phonemes?*

Minimal pair: A pair of words which only differ in one sound and have different meanings (Roach 1992)

§ Contrastiveness: making a difference in word meaning

§ Parallel Distribution: shared environment (at least one)

§Complementary Distribution: mutually exclusive environments (never in the same environment)

## INTERNATIONAL PHONETIC ALPHABET (IPA)

Includes symbols and diacritics to represent speech sounds in human languages. It includes: main chart for consonants, diacritics for segments and suprasegmentals, cardinal vowel chart and list of additional symbols (such as affricates and clicks)

## CARDINAL VOWELS

System used for the description of vowels in any language

Based on articulatorily and auditorily created vowels belonging to no specific language (Daniel Jones)

Cardinal vowels are placed on a vowel chart which is an abstraction of the tongue positions in the oral cavity *(see IPA chart).*

System includes 8 primary vowels, 8 secondary vowels and 2 central ones.

Vowel description includes the following parameters:

> Tongue height: from high to low (or close to open if referring to distance between tongue and palate)
>
> Jaw opening: distance between the upper and lower jaws
>
> Part of the tongue used: front, central, back
>
> Lip attitude: from spread to rounded

Diagram positions together with vowel symbols and specific diacritics are used for vowel labelling and description.

*(see aditional handouts with IPA chart, cardinal vowel charts and English vowel chart)*

# THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)



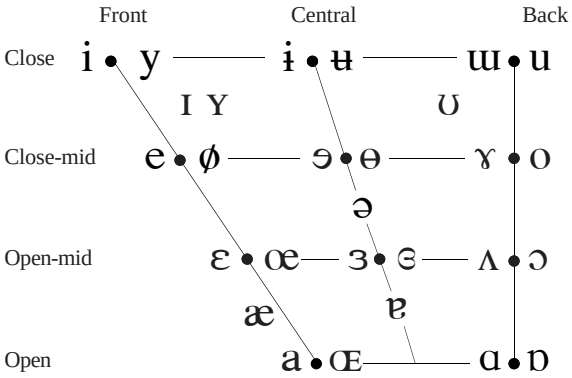
| | Bilabial | Labiodental | Dental | Alveolar | Postalveolar | Retroflex | Palatal | Velar | Uvular | Pharyngeal | Glottal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Plosive | p b | | | t d | | ʈ ɖ | c ɟ | k g | q ɢ | | ʔ |
| Nasal | m | ɱ | | n | | ɳ | ɲ | ŋ | ɴ | | |
| Trill | ʙ | | | r | | | | | ʀ | | |
| Tap or Flap | | ⱱ | | ɾ | | ɽ | | | | | |
| Fricative | ɸ β | f v | θ ð | s z | ʃ ʒ | ʂ ʐ | ç ʝ | x ɣ | χ ʁ | ħ ʕ | h ɦ |
| Lateral fricative | | | | ɬ ɮ | | | | | | | |
| Approximant | | ʋ | | ɹ | | ɻ | j | ɰ | | | |
| Lateral approximant | | | | l | | ɭ | ʎ | ʟ | | | |

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

| Clicks | | Voiced implosives | | Ejectives | |
|---|---|---|---|---|---|
| ʘ | Bilabial | ɓ | Bilabial | ʼ | Examples: |
| ǀ | Dental | ɗ | Dental/alveolar | pʼ | Bilabial |
| ǃ | (Post)alveolar | ʄ | Palatal | tʼ | Dental/alveolar |
| ǂ | Palatoalveolar | ɠ | Velar | kʼ | Velar |
| ǁ | Alveolar lateral | ʛ | Uvular | sʼ | Alveolar fricative |

VOWELS




Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

- ʍ Voiceless labial-velar fricative
- w Voiced labial-velar approximant
- ɥ Voiced labial-palatal approximant
- ʜ Voiceless epiglottal fricative
- ʢ Voiced epiglottal fricative
- ʡ Epiglottal plosive
- ɕ ʑ Alveolo-palatal fricatives
- ɺ Voiced alveolar lateral flap
- ɧ Simultaneous ʃ and x

Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary. k͡p t͡s

SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress ˌfoʊnəˈtɪʃən
- ː Long eː
- ˑ Half-long eˑ
- ̆ Extra-short ĕ
- | Minor (foot) group
- ‖ Major (intonation) group
- . Syllable break ɹi.ækt
- ‿ Linking (absence of a break)

DIACRITICS Diacritics may be placed above a symbol with a descender, e.g. ŋ̊

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ̥ | Voiceless | n̥ | d̥ | ̤ | Breathy voiced | b̤ | a̤ | ̪ | Dental | t̪ | d̪ |
| ̬ | Voiced | s̬ | t̬ | ̰ | Creaky voiced | b̰ | a̰ | ̺ | Apical | t̺ | d̺ |
| ʰ | Aspirated | tʰ | dʰ | ̼ | Linguolabial | t̼ | d̼ | ̻ | Laminal | t̻ | d̻ |
| ̹ | More rounded | ɔ̹ | | ʷ | Labialized | tʷ | dʷ | ̃ | Nasalized | ẽ | |
| ̜ | Less rounded | ɔ̜ | | ʲ | Palatalized | tʲ | dʲ | ⁿ | Nasal release | dⁿ | |
| ̟ | Advanced | u̟ | | ˠ | Velarized | tˠ | dˠ | ˡ | Lateral release | dˡ | |
| ̠ | Retracted | e̠ | | ˤ | Pharyngealized | tˤ | dˤ | ̚ | No audible release | d̚ | |
| ̈ | Centralized | ë | | ̃ | Velarized or pharyngealized | ɫ | | | | | |
| ̽ | Mid-centralized | e̽ | | ̝ | Raised | e̝ | | ( | ɹ̝ = voiced alveolar fricative) | | |
| ̩ | Syllabic | n̩ | | ̞ | Lowered | e̞ | | ( | β̞ = voiced bilabial approximant) | | |
| ̯ | Non-syllabic | e̯ | | ̘ | Advanced Tongue Root | e̘ | | | | | |
| ˞ | Rhoticity | ə˞ | a˞ | ̙ | Retracted Tongue Root | e̙ | | | | | |

TONES AND WORD ACCENTS

| LEVEL | | | CONTOUR | | |
|---|---|---|---|---|---|
| ȅ or | ˥ | Extra high | ě or | ˩˥ | Rising |
| é | ˦ | High | ê | ˥˩ | Falling |
| ē | ˧ | Mid | ᷄e | ˦˥ | High rising |
| è | ˨ | Low | ᷅e | ˩˨ | Low rising |
| ȅ | ˩ | Extra low | ê | ˥˩˥ | Rising-falling |
| ↓ | | Downstep | ↗ | | Global rise |
| ↑ | | Upstep | ↘ | | Global fall |

## BAREA

Odolean garraiatzen dire antigenoak barean jasotzen dira.

2 gune nagusi ditu:

- Mami gorria: makrofago, hematíe, eritrozioto … kokatzen dira.
- Mami zuria: odoleko antigorputzen antzematea ematen da , zelula dendritikoak, B eta T linfozitoetan aberatsa.

Mami gorrira odolo iritsi eta iragazi egiten da, hau makrofagoek eta hematiek egiten dute.

Mami zuria punto txiki batzuk bezalakoa da eta hau handituta ikusi dezakegu, B eta T linfozitoak kokapen desberdina dutela.

- T linfozitoak: arteriola zentralaren (erdian dago) inguruan kokatzen dira (irudian urdina) eta PALS egitura osatzen dute (zorro linfoide periarteriolarra).
- B linfozitoak: mugan kokatuko dira, mami zuriaren ertzean, FOLIKULUA esaten zaio honi.

Amaieran gune marginala dago, muin zuriaren ertzaren kanpoan kokatzen da eta bertan gune margonaleko B linfozitoak kokatzen dira.

## GONGOIL LINFATIKOAK

Linfa hodietan zehar tartekatuta aurkituko ditugu eta gangoil bakarra edo talde bat izan daiteke. Larruazaletik edo sakonetik sar daitekeen edozein antígeno antzemango du, linfak garraiatzen duen edozein antígeno antzemango du. Kortexa, gune parakortikala eta muina desberdintzen dira.

B eta T linfozitoak leku desberdinetan egongo dira:

- Kortexeko zirkuluetan (folikuluetan): B linfozitoak kokatuko dira. Hauen ondoan beste makrofago edo zelula batzuk aurkituko ditugu.
- Gune parakortikalean: kortexaren azpiko gunea da hau eta T linfozitoak aurkituko ditugu, baita beste zelula batzuk ere, dendritikoak adibidez.
- Muinean: denetarik aurkituko dugu, T era B linfozitoak, zelula plasmatikoak, zelula dendritikoak, makrofagoak…

Gongoil linfatikora, hodi linfatiko aferentetik iritsiko da zelula antígeno aurkezlea. Odoletik linfozitoak helduko dira gongoilera eta gongoilean bakoitzak bere kokapena hartuko du.

## MALT

Mukosei asoziatutako ehun linfoidea da.

**Waldeyer eraztuna ,** antgenoa aho edo arnas bidetetatik sartzean difuminatua dagoen ehun linfoidea aurkituko du (kapsularik gabea). Amigdalak dira hauek eta amígdala palatinoak, adenoideak eta lingualak Waldeyer eraztuna osatzen dute. Bertan linfozitoak daude eta honek egingo du antegenoan aurkako lehenengo erreakzioa.

**GALT**

Hesteei asoziatutako ehun linfoidea da.

**Peyer plaka:** hesteetan soilik dauden egiturak dira, hemen, B eta T linfozitoak, zelula dnedritikoak … ordenatuta agertzen dira, bakoitza gune batean.

Lamina propian sistema immuneko hainbat zelula egongo dira, baina solte. Peyer plakan ordea ordenatuta.

Hesteetan, guretzat onuragarriak diren mikoorganismo ugari daude eta hauekiko tolerantzia daukagu. Hau oso garrantzitsau da.

Hesteetako epitelioan, hainbat lnfozito dauzkagu, **linfozito intraepitelailak** dauzkagu. Mikroorgansimo harrotzen bat heltzen daba, zelula dendritikoek barneratuko dute eta hau lehen gongoil linfatikora joango da eta antigenoa aurkeztuko die T linfozitoei.

Epitelioan hainbat substantzia antimikrobiano daude, mikroorganisoen hazkuntza inhibitzen dutenak.

Lamina propian sorlte hainbat zelula egoten dira: makrofagoak, zelula plasmatikoak… Immunoglobulinak A izango da hemen jariatuko den immunoglobulina mota, hainbat entzimekiko erresistentzia duelako. Lamina propian hainbat zelula plasmatiko egongo gira Ig ekoizten (A motakoa). Hainat mikroorganismo neutralizatu ditzake eta antimikrobianoekiko erresistentzia du.

Intraepiteliko linfozitoak

- A motako IEL:
- Lifozito ohikoenak dira baina hesteetan gutxien aurkitzen dira %5: CD4 eta T zelulen errezeptorea αβ dutenak (CD4 TCRαβ)
- %20: CD8 eta TCRαβ

- B motako IEL:
- ≤%50: T zelulen errezeptore γδ dute (TCRgammadelta). Hauek CD8 daukate bi kateduna αα (normalena αβ izatea da).
  Negatibo bikoitza ere izan daiteke ez dute ez CD4 ezta CD8 ere.
- %25-50: CD8αα eta T zelulen errezeptore normala TCRαβ dutenak.

- Berezko linfozitoak (innatoak): CD8αα. Ez dute T linfozitoen errezeptorerik, ez dute antigenoa antzematen espezifikoki (NK antzekoak dira).

**M zelulak:** PEYER PLAKAK M zelulen ondorengo dira. M zelulek, hesteetako edukia barneratzen dute, edozein substantzia. Antigeno bat barneratu bada, M zelulak segituan jarriko du kontaktuan Peyer plakarekin. Hemen, B linfozitoa zelula plasmatiko bihurtuko da eta IgA askatuko du. Berehala emango da erantzun immunea.

LARRUAZALEKO SISTEMA IMMUNEA

Dermisa: zelulak solte aurkituko ditugu.

Epidermisa: barneratzen den edoizen zelula patógeno langerhans zelulek antzemango dute. Larruazala dreinatzen duten hodi linfatikoetatik gongoil linfatikoetara joango da. Linfozito intraepitelialak ere badaude epidermisean CD8.

ZIRKULAZIOA

1. **ANTIGENOAREN BARNERATZEA**

Antigenoaren sarbideak hauek izan daitezke:

- Larruazala
- Arnas traktua
- Traktu gastrointestinala

Mikroorganismoa barneratzen den gunean, gune horretako zelula dendritikoek barneratu egingo dute. Mikroorganismoak aske ere gelditu daitezke.

Zelula dendritikoek, linfa hodietatik lehen gongoil linfatikora eramango dute antigenoa eta bertan B eta T linfozitoei erakutsi.

Odolean ere garraiatu daiteke antigenoa, bera bakarrik edo zelula dendritikoan barneratuta, kasu honetan, barera bideratuko da eta bertan antzemango da.

2. **ZELULA DENDRITIKOEN MIGRAZIOA GONGOIL LINFATIKOETARA**

- CC: kimiozina bat erakartzen duten molekulak izango dira (zitokina mota bat).
- R: errezeptore edo hartzailea. Hartzaile bakoitzak bere ligandoa izango du (L). Beraz, CCR eta CCL.

Epitelioan langerhans zelula bat gongo da, honek antigenoa antzeman eta barneratuko du. Aktibatu egingo da (zelula dendritikoa) eta aktibatzearekin batera bere funtzioa aldatuko da, orain, bere funtzioa gongoil linfatikora joatea izango da.

Zelula dendritikoak epiteliora lotuta daude atxikidura molekula bati esker (E-cadherina). Askatzeko, E-cadherina sintetizatzeari utziko dio eta bere mintzeko molekulak aldatzen joango da. Orain, CCR7 sintetizatzen hasiko da gongoil linfatikora joateko. Epitelioa utzi eta gongoilerantz bideratuko da.

Gongoil linfatikoan, CCL21 eta CCL19 daude, eta hauek CCR7-ari lotuko dira.

Zelula dendritikoak barneratu duen antigenoa suntsituko du migratzen doan heinean eta antiheno horren péptido bat MHC II-ari lotuko du. Gongoilera heltzean, zelula dendritikoek antigenoa erakutsiko diote T linfozitoei. Espezifititatea badago, T linfozitoa aktibatu egingo da. Zelula dendritikoa gongoil linfatikora godi aferentetik helduko da.

Zelula dendritikoak, gongoil linfatikora heltzean beraien funtzioa T linfozitoarekin elkartzea izango da. Gune parakortikalera joateko, zelula dendritikoak gainzalean daukate CCR7 eta horrela lotuko da gune parakortikalean dauden ligandoetara, CCL21 eta CCL19ra. Gongoil linfatikora iristen denean, gune parakortikalean kokatuko da. Bertan egongo dira T linfozitoak.

LEUKOZITOEN MIGRAZIOA (zirkulazioa)

Ikusiko dugu:

- Odol hodietatik neutrofiloek eta monozitoek nola migratzen duten infekzioa edo kutsadura dagoen leku batera. Odol hodietan dauden zelulak, nola joaten diren mikroorganismoak dauden lekura.

- Hezur muinean eta timoan sortutako linfozito birjinak, nola joaten diren bigarren mailako organo linfoideetara.

- Linfozito efektoreek nola migratzen duten hantura dagoen gunera.

Garrantzitsua izango da, **atxikidura molekulak**. Atxikidura molekulak izango dira bi zelulen arteko lotura baimentzen dutenak eta gune extrazelularrarekin atxikitzeko ahalmena ematen dutenak.
Baita ere garrantzitsuak izango dira **zitokinak**, zirkulazioa erregulatzen dute eta atxikidura molekulak sortzen dituzte. Zitokinak proteina batzuk dira, sistema inmunea erregulatzen dutenak.

Atxikidura molekulak 4 familia ezberdinetan banatzen dira:

- Inmunoglobulina familiako atxikidura molekulak.

- Integrinak: bi subunitate ditu, α eta β. Alfa ezberdinak izango ditugu eta beta ezberdinak. Normalean ohikoena da inmunoglobulinei lotzea. Inmunoglobulinak integrinei lotuko dira baina integrinak alfa eta beta katea izango dute, hauen konbinazioz integrina ezberdinak lortuko dira.

- Selektina. Leuzinan aberatsak dira. Hiru mota aurkituko ditugu: L- selektina (leukozitoetan aurkituko duguna), P selektina (plaketetan), E selektina (endotelioan agertzen dena).

- Adresina baskularrak. Glikolipidoak dira. Selektinak adresina baskularretara lotuko dira.

**MIGRAZIOAREN 1. PAUSOA: INTEGRINEN AKTIBAZIOA**

Integrinen aktibazioa garrantzitsua izango da , mugitzen dagoen zelula bat endotelioari lotzeko. Integrinen aktibatzean eraldatu egiten dira eta horrela bi zelulen arteko lotura estuagoa eta denboraz luzeagoa izango da.

Hasiera baten zelula bat izango dugu gainazalean afinitate baxuko integrina duena. Zelula horrek gainazalean errezeptore bat izango du kimiokinentzat.
Momentu batean hanturaren bat badago, ingurune horretan kimiokinak egongo dira. Kimiokina hartzailera lotzen bada, kimiokinak aktibatu eta afinitate altuko integrinak ekoiztuko dituzte. Integrina hauek lotura estuak eratzen dituzte, beraz, zelulak lotzen direnean, denbora luzeagoz egongo dira bata besteari lotuta.

Beheko irudia: Afinitate baxuko integrina.Leukozitoaren mintza da. Gainazalean integrinak izango ditu. Afinitate handia hartzen duenean, konfigurazioa aldatu eta integrinaren buruak kanpora aterako ditu eta inmunoglobulina familiako molekulei askoz hobeto lotuko zaie.

Garrantzitsua izango da zirkulazioan integrinen aktibazioa.

**LEUKOZITOEN ZIRKULAZIOA**

Leukozitoak hantura dagoen lekura joaten dira, prozesu honi DIAPEDESIA esaten zaio.

Fase ezberdinak ematen dira:

1. Errodamendua (rolling)
2. Integrinen aktibazioa
3. Leukozitoen migrazioa

Odol hodi batean beti odola dago mugimenduan, beti fluxu bat egongo da. Ez badago inongo hanturarik, odolaren fluxua jarraituko dute odoleko zelulek, ohiko mugimendua. Hantura bat badago, odol hodiko kapilarrak , odol hodiko endotelioa aldatu egingo da. Makrofagoak mikroorganismoa irentsi eta zitokinak askatu ditu (tartean kimiokinak).

Odol hodietan dauden zelulek azaltzen dituzten molekuletan eragina izango dute kimiokinek. abisatu egingo du mikroorganismoa barneratzen duenean eta horretako TNF eta interleukina 1 askatuko ditu, hauek odol hodietan eragingo dute.

**Endotelioko zelulak**,TNF eta interleukina 1 horren ondorioz, dagokion kimiokina endotelioaren gainean aurkezten dute. Baita ere, selektinak ekoiztuko dituzte eta integrinen ligandoak azalduko dituzte(azken hauek immunoglobulinen familiakoak dira). Beraz, endotelioko zelulak mintzean molekulak ekoizten hasiko dira kimiokinen ondorioz.

**Leukozitoan,** selektinentzako ligandoa, integrinena, afinitate baxuko integrina, eta kimiokinentzako errezeptora izango ditu.

Lehenengo lotura: selektina eta selektinen ligandoaren artean emango da, oso lotura ahula denez, errodamendua (rolling-a) emango da, lotu askatu, lotu askatu … egingo da leukozitoa endotelioko mintzetik.

Rollinak leukozitoak dituen kimiokinen errezeptoreak kimiokinara lotzea erraztuko du. Ondoren,lotura ematen denean, integrinen afinitate aldaketa emango da.
Afinitate aldaketa ematen denean, integrinak estuki lotuko dira integrinen ligandoari (inmunoglobulina familiako molekulei). Orain leukozitoa estuki lotuta dago eta behin estuki lotuta daukagunean, odol hodietatik hantura dagoen gunera joango da. Horretarako, bi zelula endotelialen artetik pasatuko dira zelula hauek. Gradientearen ondorioz, hantura dagoen gunera pasatuko da.

**LINFOZITOEN ZIRKULAZIOA** (B eta T linfozitoak)

Linfozitoak heltzen direnean odolera doaz. Odoletik egongo dira denbora guztian , bigarren mailako organo linfatikoetatik migratzen egongo dira, beren antigenoaren bila.

**Odoletik nola pasatzen dira bigarren mailako organo linfoideetara?**
HEV (endotelio altuko benulak) egitura berezi batzuen bidez, endotelio altuko benulatik. Hau izango dute bigarren mailako organo linfoide guztiek, bareak izan ezik. Hemendik iritsiko dira odolean zirkulatzen duten linfozitoak bigarren mailako organo linfatikoetara.

Gainazalean atxikidura molekula bereziak dituzte linfozitoak erakartzeko eta gero barneratuak izango dira. Benula postkapilar eraldatu bat izango litzateke.

**Nola zirkulatzen dute linfozitoek?**

Linfozito birjinek eta linfozito eragile eta oroimenekoak desberdin zirkulatzen dute. Ezaugarri ezberdinak dituztenez, zirkulatzeko joera ezberdinak izango dituzte. Errezeptore desberdinak dituzte gainazalean, beraz, leku ezberdinetara joango dira.

Irudian: bi gongoil linfatiko daude, batean mikroorganismorik ez bestean bai.

Hasiera batean, odoletik linfozito birjinak iritsiko dira endotelio altuko benulatik, kasu honetan nola ez duten inongo antigenorik, berriro gongoil linfatikotik irten egingo dira hodi linfatiko eferentearen bidez eta beste gongoil linfatiko batera joango dira. Denbora guztian bidaiatzen egongo dira bigarren mailako organo linfoideetatik antigenoa ezagutu arte.

Gorriz: birjinak

- Zelula dendritikoak mikroorganismoa barneratu.
- Hodi aferentetik ngoil linfatikora sartu.
- Antigenoa T linfozitoei erakutsi nahi dienez, antigeno erakusteko gune parakortikaidala joango da.
- Baliteke T linfozitoak espezifikoki ezagutzea antigenoa eta aktibatzea.

Aktibatzea: T linfozitoa ugaritzea eta gero zelula eragile edo efektore batean bilakatzea.
T linfozito efektore hori mikroorganismoa barneratu den lekura joango da, makrofagoei laguntzeko mikroorganismoa suntsitzen.

- T linfozitoa aktibatzean, hodi eferentetik aterako da.
- Linfatik atera eta odolera joango da. Hau konduktu torazikoan emango da.
- T linfozito efektore hauek odoletik hantura dagoen lekura joango dira eta bertako zelulei mikroorganismoa suntsitzen lagunduko diete.

Linfozito birjinak, bigarren mailako organo linfoideetatik zirkulatzen ibiliko dira antigenoa bilatzen. Behin aktibatuta daudenean, hau da, espezifikoa den antigenoa aurkitu dutenean, linfozito efektore bilakatu eta hantura dagoen tokira joango da. Odoletik doanean T linfozitoa, hauek ere antzemango dute endotelio bat dagoela aktibatuta eta bertatik joango dira hantura dagoen lekura. Hantura non dagoen detektatuko dute endotelio aktibaturi esker. Honetan, kimiokina batzuk aurkituko ditugu, CXCL10 aurkituko dugu eta baita selektina batzuk ere, E eta P selektinak. Immunoglobulina familaiko molekula batzuk ere egon daitezke. eta baita ere inmunoglobulina familiako molekula batzuk.

T linfozito birjin eta T linfozito efektoreak gainazalean dituzten molekulak ezberdinak dira beraz horrek eragingo du alde batera joatera edo bestera.

- T linfozito birjina = gorria
- T linfozito aktibatua, efektorea =urdina.

Gongoil linfatikoa izango genuke. Gongoil linfatikora iristeko, T linfozito birjina HEV tik (endotelio altuko benulatik) gongoil linfatikora pasako da.

**T linfozito birjinak**, gainazalean CCR7 molekula izango du (zelula dendritikoak ere CCR7 sintetizatzen zuten gongoil linfatikora joateko), CCR7 horren ligandoak CCL19 eta CCL21 dira. Hauek biak endotelio altuko benulek dituzte, beraz, T linfoztit birjina endotelio altuko benulari lotuko da.

Horrez gain, L-selektina izango dute gainazalean T linfozito birjinek. Selektina hauek adresina batzuei lotuko dira. Hemen dagoen adresina molekulari PNAd (perifenal nodule adresil ..) lotuko da eta honek eragingo du odoletik datozen T linfozito birjinak endotelio altuko zeluletara lotzera, eta horrela gongoil linfatikora barneratzea. Hemen antigenoa antzematen badute, aurretik aipatutako prozesua emango da eta ez badute antzematen, beste 2.mailako organo linfatikoetatik zirkulatzen egongo dira beraiekiko espezifikoa den antigenoa topatu arte.

Hantura gertatzen den endotelio aktibatuan, molekula desberdinak aurkituko ditugu: kimiokinak, E eta P selektinak …

Linfozitoen gainazalean ordea, hauek aurkituko ditugu: E eta P selektinen ligandoak (endotelioari lotzeko), CXCL10 eta CXCR3, baita integrinak ere.

Taila honetan ikusi ditzakegu T linfozito birjinen eta eragileen gainazalean dauden molekulak eta beraien ligandoak:

B

| T cell homing receptor | Ligand on endothelial cell | Function of receptor: ligand pair |
|---|---|---|
| **Naive T cells** | | |
| L-selectin | PNAd | Initial weak adhesion of naive T cells to high endothelial venule in lymph node |
| CCR7 | CCL19 or CCL21 | Activation of integrins and chemokinesis |
| LFA-1 (β2-integrin) | ICAM-1 | Stable arrest on high endothelial venule in lymph node |
| **Activated (effector and memory) T cells** | | |
| E- and P-selectin ligand | E- or P-selectin | Initial weak adhesion of effector and memory T cells to cytokine activated endothelium at peripheral site of infection |
| CXCR3 | CXCL10 (others) | Activation of integrins and chemokinesis |
| CCR5 | CCL4 (others) | Activation of integrins and chemokinesis |
| LFA-1 (β2-integrin) or VLA-4 (β1 integrin) | ICAM-1 or VCAM-1 | Stable arrest on cytokine-activated endothelium at peripheral site of infection |

T cell homin receptor: T zelulak gainazalean dituen molekulen arabera, leku batera edo beste batera joango da.

- T LINFOZITO BIRJINAK

Hauen funtzioa antigenoa ezagutzea da eta hori egiten du bigarren mailako organo linfatikoetan.

L-selektinak izango du antigenoa antzemateko funtzioa. Endotelio altuko benulatik ateratzeko, L-selektina behar du eta hau gongoil periferikoko adresinari lotuko zaio.

Gune parakortikalera joateko, CCR7 du. (zelula dendritikoak ere, antigenoa barneratu duenak, CCR7-a du gainazalean gune parakortikalera joateko).

Integrina ere badu gainazalean, hau immunoglobulina familiako molekula bati lotuko da (ICAM-1).

T linfozitoak aktibatzean, memoriakoa edo efektorea bilakatuko da. Gainazaleko molekulak ere aldatuko dituzte.

- T LINFOZITO AKTIBATUAK

E eta P selektinen ligandoak ekoiztuko dituzte: endotelio bat aktibatzean, gainazalean E eta P selektinak daudenez, linfozitoak endoteliora itsatsi daitezen ekoizten dira.

CXCR3 (2 asteinen artean beste aa bat agertuko da, bi asteinen arteko lotura ez da zuzena) eta CCR5.

Integrinak ere izango ditu: LFA-1 edo VLA-4. Hauek immunoglobulina familiako molekulei lotzen zaizkie (ICAM-1 eta VCAM-1).

**LINFOZITOEN ZIRKULAZIOA**

Leukozitoek egiten duten prozesu bera egingo dute linfozitoek hantura dagoen lekutik gongoil linfatikora joateko:

- Rowling
- Aktibazioa
- Atxikidura (integrinei esker)
- Diapedesia (zelulan barneratzea)

T linfozitoak aktibatzean ugaritzea esan nahi du. Endotelio altuko benulatik linfozitoak iristen dira, zelula dendritikoekin kontaktuan jarri eta ez badute antzematen, hodi eferentetik aterako dira eta antzematen badute ugaritzen hasiko dira.

**BL MIGRAZIOA**

T linfozitoek gainazalean: CCR7

- CCL19 eta CCL21 ligandoei lotu

B linfozitoek gainazalean: CXCR5

- CXCL13-ri lotu.

Folikuluetan B linfozitoa kokatuko da. Endotelio altuko benulatik T linfozitoa helduko da eta CCR7 dutelako, CCL19 eta CCL21 ligandoak dauden tokira joango da→<u>Gune parakortikalera</u>

B linfozitoak, gainazalean CxCR5a dutenez, folikulura joango dira bertan beraien ligandoa dagoelako (CXCL13).
B eta T linfozitoak bera, leku ezberdinetan kokatuko dira.

B linfozitoak antigenoa antzematean ugaritzen hasiko da aktibatu egin delako. Antigenoa suntsitzeko? T linfozitoaren beharra dagoenez, gainazalean CCR7a ekoiztuko du gune parakortikalera joateko eta horrela T linfozitoarekin kontaktuan jartzeko.

T linfozitoa baita ere,bere antigenoa espezifikoki ezagutzen badu, aktibatu egingo da eta ugaritu, T linfozito efektore bihurtuz (T linfozito efektore folikularra). Horrela, B

linfozitoari lagunduko dio antigorputzak ekoizten. Folikulura joateko CXCR5 ekoiztu behar du gainazalean.

Folikuluetan, B linfozito aktibatua antzemango du T linfozito folikularrak. Aktibatu eta B linfozitoa zelula plasmatiko bihurtuko da, hau da, antigorputzak ekoizten dituen B linfozitoa.

**HOMING**

Zelula dendritiko batek antigenoa antzematen duenean gune parakortikalera joango da T linfozitoekin elkartzeko.

Folikuluetako kimiokina→CXCL13 (CXCR15-ari lotzen da). Errezeptore hori B linfozitoak aurkeztuko du. Beraz, endotelio altuko benulatik iritsi den B linfozitoa folikulura joango da.

Gune parakortikalean →CCL19 eta CC21 daude , beraz, T linfozitoak gainazalean CCR7a dutenez, endotelio altuko benulatik iristean gune parakortikalera joango dira.

Linfozito bakoitza bere lekuan kokatzeari deitzen zaio HOMING.

Antigenoa barneratu duten zelula dendritikoek, CCR7a ekoiztuko dute beraien gainazalean gune parakortikalera joateko eta antigenoa T linfozitoari erakusteko.

- Antigenoa ez badute ezagutzen, hodi eferentetik beste gongoil linfatiko batera joango dira.
- Antigenoa ezagutzen badute, T linfozitoa aktibatu egingo da. Ondorioz:
    - Hedapen klonala egingo du
    - Linfozitoek funtzio eragilea hartuko dute

Repaso:
B linfozitoa aktibatzean → zelula plasmatiko bihurtzen da eta bere funtzioa antigenoak ekoiztea da.

T linfozitoa aktibatzean → T linfozito zitotoxiko edo laguntzaile bihurtu daiteke.
T linfozito laguntzaileek antigenoa ezagutuko dute MHC IIari lotuta (MHCII hau zelula antigeno aurkezle profesionalek izango dute, B linfozitoek, zelula dendritikoek eta makrofagoek) eta zitotoxikoek berriz MHCIari lotuta ( hau zelula guztiek daukate).

T linfozitoa aktibatzean funtzio eragilea hartzen du, T linfozito laguntzaile folikularra bihurtuko da (Thf). B linfozitoei lagunduko die antigorputzak ekoizten. Folikuluetara joango da B linfozitoekin elkarrekintza emateko, horretarako, CXCR5 ekoiztuko du bere gainazalean (folikuluetan CXCL13 dagoelako).

Folikuluetara iristean, B linfozitoak aurkezten dion antigenoa ezagutu behar du. B linfozitoak antigenoa barneratu du, prozesatu eta peptido bat MHCII molekulari lotuta erakusten du. T linfozitoek peptido hori ezagutu eta B linfozito gehiago aktibatzea eragingo dute antigorputz gehiago ekoizteko.

B linfozitoak heltzean plasmoblasto bihurtuko dira. Plasmoblastoak (B linfozito aktibatuak) beste leku batera migratuko antigorputzak ekoizteko. Batzuk zuzenean zelula plasmatiko bilakatuko dira (bizitza luzea duten antigorputz ekoizleak). Beste batzuk Hezur muinera joango dira gainazalean CXCR4 dutelako eta hezur muinean bere ligandoa CXCL12 dagoelako. Plasmoblastoek bizitza zelular motza dute baina behin zelula plasmatiko bihurtuta bizitza luzeagoa izango dute.

GUNE GERMINALA: B linfozitoak aktibatzean ugaritzen hasiko dira eta hau mikroskopio bidez antzeman daiteke, gune germinala ikusiko da.

B linfozito batzuek, ez dute T linfozitoaren beharrik antigorputzak ekoizteko.

## English Phonemic Consonant System

| | Voice | Place | Manner | Example |
|---|---|---|---|---|
| **p** | voiceless | bilabial | plosive | pear |
| **b** | voiced | bilabial | plosive | bear |
| **t** | voiceless | alveolar | plosive | tear |
| **d** | voiced | alveolar | plosive | dear |
| **k** | voiceless | velar | plosive | care |
| **g** | voiced | velar | plosive | gear |
| **tʃ** | voiceless | palatoalveolar | affricate | chear |
| **dʒ** | voiced | palatoalveolar | affricate | jar |
| **f** | voiceless | labiodental | fricative | fear |
| **v** | voiced | labiodental | fricative | very |
| **θ** | voiceless | dental | fricative | **th**in |
| **ð** | voiced | dental | fricative | ***th***ere |
| **s** | voiceless | alveolar | fricative | see |
| **z** | voiced | alveolar | fricative | zoo |
| **ʃ** | voiceless | palatoalveolar | fricative | shoe |
| **ʒ** | voiced | palatoalveolar | fricative | rou***g***e |
| **h** | voiceless | glottal | fricative | here |
| **m** | voiced | bilabial | nasal | may |
| **n** | voiced | alveolar | nasal | near |
| **ŋ** | voiced | velar | nasal | so***ng*** |
| **l** | voiced | alveolar lateral | approximant | lie |
| **r** | voiced | post-alveolar | approximant | ray |
| **w** | voiced | labial-velar | approximant | ***wh***y |
| **j** | voiced | palatal | approximant | ***y***ou |
| **ʔ** | voiceless | glottal | stop | |

## English Phonemic Consonant System

| | Voice | Place | Manner | Example |
|---|---|---|---|---|
| **p** | voiceless | bilabial | plosive | pear |
| **b** | voiced | bilabial | plosive | bear |
| **t** | voiceless | alveolar | plosive | tear |
| **d** | voiced | alveolar | plosive | dear |
| **k** | voiceless | velar | plosive | care |
| **g** | voiced | velar | plosive | gear |
| **tʃ** | voiceless | palatoalveolar | affricate | chear |
| **dʒ** | voiced | palatoalveolar | affricate | jar |
| **f** | voiceless | labiodental | fricative | fear |
| **v** | voiced | labiodental | fricative | very |
| **θ** | voiceless | dental | fricative | **th**in |
| **ð** | voiced | dental | fricative | ***th***ere |
| **s** | voiceless | alveolar | fricative | see |
| **z** | voiced | alveolar | fricative | zoo |
| **ʃ** | voiceless | palatoalveolar | fricative | shoe |
| **ʒ** | voiced | palatoalveolar | fricative | rou***g***e |
| **h** | voiceless | glottal | fricative | here |
| **m** | voiced | bilabial | nasal | may |
| **n** | voiced | alveolar | nasal | near |
| **ŋ** | voiced | velar | nasal | so***ng*** |
| **l** | voiced | alveolar lateral | approximant | lie |
| **r** | voiced | post-alveolar | approximant | ray |
| **w** | voiced | labial-velar | approximant | ***wh***y |
| **j** | voiced | palatal | approximant | ***y***ou |
| **ʔ** | voiceless | glottal | stop | |

# R.P. ENGLISH VOWEL SYSTEM

## MONOPHTHONGS

| | Lips | Ocurrence | Example |
|---|---|---|---|
| iː | Spread | not usually closed by ŋ | beet |
| ɪ | Loosely spread | all positions | bit |
| e | Loosely spread, opener than I | not in final open syllables | bet |
| æ | open spread | not in final open syllables | bat |
| ʌ | neutrally open | not in final open syllables | bus |
| ɑː | neutrally open more than U | not usually closed by ŋ | bart |
| ɒ | open rounded | not in final open syllables | pot |
| ɔː | Between open and close rounded | not usually closed by ŋ | bought |
| ʊ | Fairly close but loosely rounded | not closed by ŋ nor in final open syll. except “to” “you” | book |
| uː | close rounded | not usually closed by ŋ | boot |
| ɜː | neutrally spread | not usually closed by ŋ | bird |
| ə | neutrally spread | not in stressed syllables. | ***a***noth***e***r |

## DIPHTHONGS

| | Example | |
|---|---|---|
| aɪ | pie | Closing |
| eɪ | pay | Closing |
| ɔɪ | boy | Closing |
| aʊ | now | Closing |
| əʊ | no | Closing |
| eə | pear | Centring |
| ɪə | peer | Centring |
| ʊə | poor | Centring |

# RP DIPHTHONGS

Diphthongs are vowels of changing quality as opposed to monophthongs, which have a steady (unchanging) quality during their production.

## CLASSIFICATION OF DIPHTHONGS

- According to where the prominence is:
  - Falling: 1st element more prominent
  - Rising: 2nd element more prominent

*In English all diphthong phonemes are falling. Sequences like /jɐ/ or /wɪ/ are not considered diphthongs, but combinations of consonant + vowel.

- According to the direction of movement:
  - Opening: ↘ only allophonically
  - Closing: ↗ /eɪ/ /aɪ/ /ɔɪ/ /aʊ/ /əʊ/
  - Centring: → /ɪə/ /eə/ /ʊə/

# SYLLABLE PHONOTACTICS

## CONSONANT PHONOTACTICS

Syllable: Onset + Nucleus + Coda (or Onset + Rhyme (Nucleus + Coda))

Nucleus: a vowel or syllabic consonant

**Onset**: minimum= 0, maximum= 3 consonants

C = any except /ŋ/

$C_1$ = /s/ + $C_2$ = /p, t, k, f, m, n, l, j, w/

$C_1$ = /plosives, f, θ,ʃ,v, m, n, h/ + $C_2$ = /r, l, j, w/ *(not all present)*

$C_1$ = /s/ + $C_2$ = /p, t, k/ + $C_3$ = /l, r, j, w/ *(not all present)*

**Coda**: minimum= 0, maximum= 4 consonants

Final-C = any consonant except /h, j, w, r*/

(A) Final-C + /s, z, t, d, θ/

(B) /m, n, ŋ , l, s/ + Final-C

Combinations of A &/or B up to 4 consonants

| | PHONOTACTIC RESTRICTIONS ON RP MONOPHTHONGS |
|---|---|
| iː | not usually closed by /ŋ/; not followed by /r/ |
| ɪ | all positions (see * below) |
| e | not in word final open syllables |
| æ | not in word final open syllables |
| ʌ | not in word final open syllables |
| ɑː | not usually closed by /ŋ/ |
| ɒ | not in word final open syllables |
| ɔː | not usually closed by /ŋ/ |
| ʊ | not closed by /ŋ/; not usual in word final open syllable, except unstressed "who" "do" "you" "to" (but see * below) |
| uː | not usually closed by /ŋ/; not followed by /r/ |
| ɜː | not usually closed by /ŋ/ |
| ə | not as nucleus of a stressed syllable. |

| | |
|---|---|
| i | (*) used instead of /ɪ/ when morpheme final in unstressed syllable |
| u | (*) used instead of /ʊ/ when morpheme final in unstressed syllable |

## SUMMARY

- Short non-high vowels except schwa (/e, æ, ʌ, ɒ/) do not appear in word final open syllables
- The two short high vowels (/ɪ/ /ʊ/) may be realized as /i/ and /u/ respectively in that position others (see class notes on *Neutralization of High Vowels*)
- Long vowels are not usually followed by /ŋ/
- In unstressed syllables /ə/ is the most frequent vowel. Additionally /ɪ, əʊ, ʊ/ are also found frequently in unstressed syllables > It is crucial to know if a syllable is stressed/unstressed to predict the vowel.

**NEUTRALIZATION OF HIGH VOWELS**

| | | |
|---|---|---|
| /iː/ | | /uː/ |
| | → /i/ | → /u/ |
| /ɪ/ | | /ʊ/ |

Meaning: in current RP and in certain positions only*, the difference between /iː/ /ɪ/ and between /uː/ /ʊ/ is not maintained, it does not convey any difference in meaning > their contrast is *neutralized*

Therefore some speakers use the older traditional pronunciation /ɪ/ and /ʊ/

Other speakers use the high vowels /iː/ and /uː/

Others use an intermediate vowel between /iː/ - /ɪ/ and /uː/ - /ʊ/

Accordingly, new symbols are used for these neutralization cases /i/ and /u/

When: *

in traditional cases of /ɪ/ and /ʊ/ when they appear as follows:

Never in stressed syllables

Never when the vowel is part of a diphthong

Possible in unstressed syllables:

At the very end of a word /sɪti/

At the end of word with an added suffix /sɪtiz/

In some prefixes /diskraɪb/

Decide whether the following words contain a neutralized vowel

*away*

*tiny*

*city*

*having*

*plenty*

*mutate*

*ladies*

*spoon*

*to eat*

*sorry*

*countries*

*justice*

*baby*

*packet*

*do*

*you*

*blue*

*anybody*

# MORPHEMIC PRONUNCIATION RULES

**PAST TENSE RULES** > For Regular Verbs

1. If the previous sound is voiceless → /t/ "walked" /wɔːkt/

2. If the previous sound is voiced → /d/ "rained" /reɪnd/

3. If the previous sound is /t/ or /d/ → /ɪd/ or /əd/
"wanted" /wɒntəd/

**MORPHEMIC "S" RULES** > For the letter "s" when it corresponds to:

to plural morpheme eg.: "dogs", "cats"

to third person singular morpheme eg.: "goes", " walks"

to saxon genitive eg.: "Tom's" "man's"

to contractions of "is" and "has" eg.: "it's blue", "he's got"

1. If the previous sound is voiceless → /s/ "walks" /wɔːks/

2. If the previous sound is voiced → /z/ "rains" /reɪnz/

3. If the previous sound is /s/ /z/ /ʃ/ /ʒ/ /tʃ/ or /dʒ/ → /ɪz/ or /əz/
"washes" /wɒʃəz/

Add the past tense morpheme, transcribed, to each of the following words:

*laugh*
*walk*
*clean*
*pitch*
*wash*
*manage*
*cook*
*decide*
*order*
*start*
*watch*
*enjoy*
*waste*
*call*
*bore*
*stop*
*survive*
*worry*
*crash*
*need*
*wait*
*arrive*
*erode*
*row*
*hate*
*please*
*blot*
*show*
*bar*

Add the plural or 3rd person morpheme, transcribed, to each of the following words:

*shine*
*ray*
*rock*
*bush*
*laugh*
*store*
*ring*
*pitch*
*miss*
*egg*
*steak*
*wash*
*hate*
*order*
*live*
*put*
*watch*
*manage*
*hour*
*house*
*bus*
*hair*
*church*
*sock*
*bath*
*cow*
*go*

**SOME *PHONICS* HINTS ON VOWEL SPELLING/PRONUNCIATION**


## Diagraph pronunciations

| Spelling | **Pronunciation** | Examples | Exceptions[i] |
|---|---|---|---|
| "ai"[ii] | /eɪ/ | "train, rain, snail, paint" | "plait" "said" |
| "ay" [iii] | /eɪ/ | "day, say, pay, spray" | "Monday"(*) "says" |
| "ie" [iv] | /aɪ/ | "tie, pie, lie, die" | "field" "view" "thief" |
| "ee" [v] | /iː/ | "bee, see, need, sheep" | |
| "ea" [vi] | /iː/ | "sea, read, bead, peal" | "bread" "steak" |
| "oa"[vii] | /əʊ/ | "goat, boat, oak, foam" | "abroad" "broad" |
| "ow" [viii] | /əʊ/ | "slow, snow, low, grow" | |
| *"ow" | /aʊ/ | "cow, now, how, brown" | |
| *"ou" | /aʊ/ | "about, south, mouth, round" | "touch" "rough" "could" "thought" "though" |
| *"oo" | /ʊ/[ix] | "book, look, foot, took" | |
| "OO" | /uː/ | "goose, moon, spoon" | |

## Silent "e" rules

| Spelling | **Pronunciation** | Examples | Exceptions |
|---|---|---|---|
| "a_e"[x] | /eɪ/ | "cake, take, make, lake" | |
| "i_e" | /aɪ/ | "bike, kite, white, write" | |
| "o_e" | /əʊ/ | "bone, rose, those, nose" | "love, dove,come, shone" |
| "u_e" | /juː/ | "cute, tube, " | |
| "e_e" | /iː/ | "Pete" | |

## Short vowel tendencies[xi]

| Spelling | **Pronunciation** | Examples | Exceptions |
|---|---|---|---|
| "CiC" | /ɪ/ | "bit, lip, six, sick" | |
| "CeC" | /e/ | "pet, net, mess, rest" | |
| "CaC" | /æ/ | "man, rat, tax, lack" | 'a+ll'= /ɔː/ 'ball' 'w+a+C'= / ɒ / 'wash' 'a+nasal' 'a+voiceless fricative'= /ɑː/ 'bath' |
| "CoC" | /ɒ/ | "rock, doll, shock, crop" | |
| "CuC" | /ʊ/ | "bush, push, pull, butcher" | |
| "CuC" | /ʌ/ | "bus, cut, luck, plus" | |

## Vowels followed by “r”

| Spelling | Pronunciation | Examples | | | | **Exceptions** |
|---|---|---|---|---|---|---|
| “er, ir, ur, *wor” | /ɜː/ | “term” | “girl” | “burn” | *“word” | |
| “ar " | /ɑː/ | “car" | | | | ‘war’ =/ɔː/ ‘war’ |
| “or, oor, ore,oar" | /ɔː/ | “port" | “door" | “shore" | “boar” | ‘wor’=/ɜː/ ‘word’ |
| “oor, ure” | /ʊə/ɔː/ | “poor” | “sure” | | | |
| “eer, ere, ear” | /ɪə/ | “peer” | “here” | “hear” | | |
| “ear, are” | /eə/ | “bear” | “bare” | | | |

## Combinations with same pronunciation

| Spelling | Pronunciation | Examples | | | | Exceptions |
|---|---|---|---|---|---|---|
| “ie, i_e, y, igh” | /aɪ/ | “pie” | “nice” | “sky” | “night” | ‘friend’ |
| “ai, ay, a_e" | /eɪ/ | “rain" | “pay" | “make" | | ‘said, plait’ |
| “oa, ow, o_e" | /əʊ/ | “boat" | “snow" | “bone" | | |
| “ou, ow" | /aʊ/ | “loud" | “cow" | | | ‘could, rough’ |
| “au, aw" | /aʊ/ | “Paul" | “law" | | | ‘author,law, laugh,because’ |
| “ee, ea" | / iː/ | “see" | “sea" | | | ‘bread,steak’ |
| “ue, ew, u_e” | /juː/ | “cue” | “few” | “tube” | | |
| “ue, ew, u_e” | /uː/ | “blue” | “flew” | “rule” | | |

[i] In "exceptions" only a few words are included if any. This section is for each student to fill in as they come across new words.

[ii] "When two vowels go walking, the first does the talking (So the spelling *ai* says the name of the first vowel A.) (From S. Lloyd & S. Wernham, *Jolly Phonics*
[ii] "When two vowels go walking, the first does the talking (So the spelling *ai* says the name of the first vowel A.) (From S. Lloyd & S. Wernham, *Jolly Phonics*
*Workbook,* 4: 3). Notice that this doesn't include cases with a following "r" or a preceding "w".
[iii] "When two vowels go walking, the first does the talking" (From S. Lloyd & S. Wernham, *Jolly Phonics Workbook,* 4: 3).
[iv] "When two vowels go walking, the first does the talking" (From S. Lloyd & S. Wernham, *Jolly Phonics Workbook,* 4: 9).
[v] "When two vowels go walking, the first does the talking (From S. Lloyd & S. Wernham, *Jolly Phonics Workbook,* 4: 9).
[vi] "When two vowels go walking, the first does the talking (From S. Lloyd & S. Wernham, *Jolly Phonics Workbook,* 4: 9).
[vii] "When two vowels go walking, the first does the talking (From S. Lloyd & S. Wernham, *Jolly Phonics Workbook,* 4: 9).
[viii] "When two vowels go walking, the first does the talking (From S. Lloyd & S. Wernham, *Jolly Phonics Workbook,* 4: 9).

[ix] There is a finite list of words with "oo" which are pronounced with /ʊ/. The majority, and the general tendency is for "oo" to be pronounced /uː/

[x] "The Magic "e" changes the previous vowel from its sound to its name" (From S. Lloyd & S. Wernham, *Jolly Phonics Workbook,* 5: 15).

[xi] This is a general rule for single vowels preceded by one or more consonats and followed by one or more consonants and no vowels, particularly 'silent e'. However, be aware that a preceding "w" or a following "r" or "ll" may change the pronunciation against the general rule.

# /s/ vs /z/

The English sounds /s/ and /z/ can be particularly confusing for foreign speakers because they may correspond to various spellings. Additionally, the letter "s" can have several different pronunciations, amongst which the most common are /s/ and /z/.

What must be borne in mind is that in English /s/ and /z/ are two different phonemes and therefore we can't expect to predict the use completely depending on the sounds that surround them ("always preceded by ... or followed by ..."). If that was the case we would be talking about contextual allophones of the same phoneme (as in Spanish and other languages). The big problem for a foreign learner is that the spelling does not reflect the two sounds faithfully or consistently, but that is also the case for many of the vowel sounds of English.

The following are a few guidelines to the use of these two phonemes (possible correspondences between letters and other phonemes such as /k/ /ʃ/ and /ʒ/ are not discussed here).

**I- When the spelling is "c"**, the pronunciation is never /z/ (although it can often be /k/ or /ʃ/)

e.g.: "face" /ˈfeɪs/ "once" /ˈwʌns/

**II- The spelling "ss"** is often pronounced /s/ as in "kiss" /ˈkɪs/

but there are exceptions such as "possess" /pəˈzes/, "dessert" /dɪˈzɜːt/

**III- The spelling "z"** is often pronounced /z/ and never /s/ (it may also correspond to other sounds such as /ʒ/)

ex.: "zoo" /ˈzuː/ "realize" /ˈrɪəlaɪz/

**IV- When the spelling is "s"**

1- At the beginning of a word, it is most of the time /s/ and never /z/ (in a few words like "sure" it is /ʃ/)

ex.: "sea" /ˈsiː/ "slave" /ˈsleɪv/

2- It is always /s/ when followed by a silent "t"

ex.: "listen" /ˈlɪsən/ "fasten" /ˈfɑːsən/

3- After a consonant:

**/s/** if the preceding consonant is voiceless or /l/, /n/ or silent "r"

ex.: "gypsy" /ˈdʒɪpsi/ "also" /ˈɔːlsəʊ/

"answer" /ˈɑːnsə/ "person" /ˈpɜːsən/

**/z/** tends to be used if the preceding consonant is voiced (except for /l/, /n/, or silent "r")) ex.: "clumsy" /ˈklʌmzi/

However, there are many exceptions to this, ex. "absent" /ˈæbsent/

There are also words which can have either /s/ or /z/

"obsession" /əbˈseʃən/ "absurd" /əbˈsɜːd/ /əbˈzɜːd/

4- When between a vowel and a consonant:

It tends to be **/s/** if the following consonant is voiceless:

ex.: "taste" /ˈteɪst/ "ask" /ˈɑːsk/

It tends to be **/z/** if the following consonant is voiced:

ex.: "husband" /ˈhʌzbənd/

5- Between vowels, there is no rule: it can be either /s/ or /z/. Sometimes the use of one or the other phoneme indicates different grammatical categories (noun or adjective vs. verb):3

ex.: "reason" /ˈriːzən/ "basin" /ˈbeɪsɪn/

"close" (adj-adv) /ˈkləʊs/ "close" (vb) /ˈkləʊz/

6- At the end of a word or followed by silent "e", there is no rule. It is usually /s/ if it is preceded by /l/, /n/ or silent "r"

ex.: "else" /ˈels/ "ease" /ˈiːz/

"rose"/ˈrəʊz/ "case" /ˈkeɪs/

7- If "s" is a morpheme or a contraction, it always agrees in voicing with the previous sound

ex.: "loves" /ˈlʌvz/ "rats" /ˈræts/

"Tom's" /ˈtɒmz/ "it's" /ɪts/

# INTRODUCTION TO TRANSCRIPTION

**TRANSCRIPTION**: useful for native and non native speakers

**Native speakers:**

- Realise what they say, rather than what they think they say.

**Non native speakers:**

- Raise phonetic awareness
- Improve pronunciation of English
- Clarify pronunciations which can be heard from native speakers.

**Problems:**

• English spelling > irregular correspondence with pronunciation (exceptions, special cases) >

• To know how a word is pronounced > pronouncing dictionary & phonetic transcription.

§ Most words with "ea" > /iː/ ("tea" "seat" "bean" "read"). ɪ

But "steak" "break" > /eɪ/, like "mistake".

§ Most words with: C "u" C > /ʌ/ ("bus" "cut" "luck" "muck" "lung").

But there is a group of words like "push" "pull" > /ʊ/

• Pronunciation can also differ depending on the function or environment in which the word is said.

In isolation & as demonstrative = "I want that book" "that" = /ðæt/

But different if it is a conjunction: "He said that you are wrong" /ðət/

*Transcribing is a skill which needs regular practice*

ENGLISH VOWEL SOUNDS >>> SPELLINGS

/iː/

| | | |
|---|---|---|
| “ee” | “tree” | /triː/ |
| “ea” | “tea” | /tiː/ |
| “ie” | “piece” | /piːs/ |
| “i” | “machine” | /məˈʃiːn/ |
| “e” | “cathedral” | /kəˈθiːdrəl/ |
| “ei” | “receive” | /rɪˈsiːv/ |
| “ey” | “key” | /kiː/ |
| “eo” | “people” | /ˈpiːpəl/ |
| “oe” | “phoenix” | /ˈfiːnɪks/ |

/ɪ/

| | | |
|---|---|---|
| C“i”C | “bit” | /bɪt/ |
| “e” | “review” | /rɪˈvjuː/ |
| “ay” | “monday” | /ˈmʌndɪ/ |
| “y” | “happy” | /ˈhapɪ/ |
| “a” | “village” | /ˈvɪlɪdʒ/ |
| “u” | “busy” | /ˈbɪzɪ/ |
| “ui” | “build” | /bɪld/ |
| “o” | “women” | /ˈwɪmɪn/ |

/e/

| | | |
|---|---|---|
| C“e”C | “dress” | /dres/ |
| “ea” | “bread” | /bred/ |
| “ai” | “said” | /sed/ |
| “ay” | “says” | /sez/ |
| “a” | “any” | /enɪ/ |
| “u” | “bury” | /ˈberɪ/ |
| “ie” | “friend” | /frend/ |

/æ/

| | | |
|---|---|---|
| C“a”C | “cat” | /kæt/ |
| “ai” | “plait” | /plæt/ |

/ʌ/

| | | |
|---|---|---|
| C“u”C | “bus” | /bʌs/ |
| “ou” | “touch” | /tʌtʃ/ |
| “o”+nasal | “come” | /kʌm/ |
| “o”+ “v” | “love” | /lʌv/ |
| “o” | “worry” | /ˈwʌrɪ/ |
| “oe” | “does” | /dʌz/ |
| “oo” | “blood” | /blʌd/ |

/ɑː/

| | | |
|---|---|---|
| “ar” | “bar” | /bɑː/ |
| “a”+nasal | “dance” | /dɑːns/ |
| “a”+voicless fric | “bath” | /bɑːθ/ |
| “au” | “laugh” | /lɑːf/ |
| “ear” | “heart” | /hɑːt/ |
| “er” | “clerk” | /klɑːk/ |

/ɒ/

| | | |
|---|---|---|
| C“o”C | “pot” | /pɒt/ |
| “a” | “watch” | /wɒtʃ/ |
| “au” | “because” | /bɪˈkɒz/ |

/ɔː/

| | | |
|---|---|---|
| “or” | “port” | /pɔːt/ |
| “oar” | “board” | /bɔːd/ |
| “ar” | “warm” | /wɔːm/ |
| “au” | “author” | /ˈɔːθə/ |
| “aw” | “law” | /lɔː/ |
| “ou” | “thought” | /θɔːt/ |
| “oor” | “door” | /dɔː/ |

/ɜː/

| | | |
|---|---|---|
| “er” | “serve” | /sɜːv/ |
| “ear” | “early” | /ˈɜːlɪ/ |
| “ir” | “bird” | /bɜːd/ |
| “or” | “work” | /wɜːk/ |
| “ur” | “burn” | /bɜːn/ |
| “our” | “journey” | /ˈdʒɜːnɪ/ |

/ʊ/

| | | |
|---|---|---|
| “u” | “push” | /pʊʃ/ |
| “u”+l | “pull” | /pʊl/ |
| “o” | “woman” | /ˈwʊmən/ |
| “ou” | “could” | /kʊd/ |
| “oo” | “book” “cook” “look” “hook” “shook” “took” “foot” “good” “stood” “wood” “hood” “wool” | |

/uː/

| | | |
|---|---|---|
| “oo” | “food” | /fuːd/ |
| “ou” | “group” | /gruːp/ |
| “u” | “music” | /ˈmjuːzɪk/ |
| “ue” | “blue” | /bluː/ |
| “ui” | “fruit” | /fruːt/ |
| “o” | “move” | /muːv/ |
| “oe” | “shoe” | /ʃuː/ |

/ə/ Can be spelt by any of the five vowel letters
It can never appear alone in a stressed syllable

| | | |
|---|---|---|
| “a” | “about” | /əˈbaʊt/ |
| “ai” | “curtain” | /ˈkɜːtən/ |
| “e” | “agent” | /ˈeɪdʒənt/ |
| “i” | “admiral” | /ˈædmərəl/ |
| “o” | “method” | /ˈmeθəd/ |
| “u” | “album” | /ˈælbəm/ |
| “ui” | “biscuit” | /ˈbɪskət/ |

Often /ə/ and /ɪ/ are alternative pronunciations: /ˈwɒntəd/ /ˈwɒntɪd/

# NL Sound System: consonant phonemes and allophones

| | Bilabial/labiodental | Inter-dental | Dent-Alveolar | AlveoloPalatal | Velar |
|---|---|---|---|---|---|
| Plosives | p b [β] | | t d [ð] | | k g [ɣ] |
| Affricates | | | | tʃ [ʃ] | |
| Fricatives | f | θ | s [z] | | x [χ, h] |
| Nasals | m | | n | ɲ | [ŋ] |
| Aproximants | | | | j [dʒ] | [w] |
| Laterals | | | l | ʎ [j dʒ] | |
| Vibrants | | | r ɾ | | |

# Phonetics in Foreign Language Acquisition

# Foreign Accent Markers

- **L1 influence** is noticeable in most non-native speakers
- Many times we can identify the L1 of the speaker from their FA
- A phonetically aware person can 'glimpse' the L1 sound system through the NN pronunciation.

# Factors in L2/FL phonetic acquisition

- Inventory of relevant factors is an open issue:
  instrucction, exposure, motivation, attitude, learning styles, aptitude, native input, integration, acculturation, level of L1 use ... (Purcell & Suter 1980; Moyer 1999)

- Differente factors in different combinations in each learner
- General, non-individual factors in L2/FL pronunciation acquisition:
  - L1 influence, Age & Exposure/input

# 1. Age: Critical Period Hypothesis

★ Critical Period Hypothesis popular belief: once CP is past > impossible to attain Native-like competence (Lenneberg 1967).

Strict version: ability disappears Versión estricta: la capacidad desaparece

Soft version: ability decreases

★ When? controversy: 5 or 6 years ---------- 12 years

★ Why?

- biological / neurological basis : disputed / replaced
- selective tuning towards NL sounds through exposure

# Critical Period Hypothesis

**Natives**

- CP probable in L1s
- Cases of 'wild children' (Victor, 1788; Genie n.1957): never total/native competence (other added problems)

**Non-Natives**

Depending on acquisition setting:

Natural setting (L2) vs. formal instruction (FL)

# Critical Period Hypothesis in L2s

## L2 – Natural settings

Age advantage: younger usually better

- **Adults** Frequently higher competence in other skills than in pronunciation (Joseph Conrad Effect)

- **Children better phonetic acquisition but not always native-like**

  - Depending on input, use of L1 etc..
  - Bilinguals: not equal to two monolinguals (Mayo et al 1997)

# Critical Period Hypothesis in FLs

## FL- Formal Instruction :

L2 conditions not replicated

No clear advantage of early start in most pronunciation aspects (better motivation, intonation, less spelling inteference ...)

# 2. NL/L1 Influence

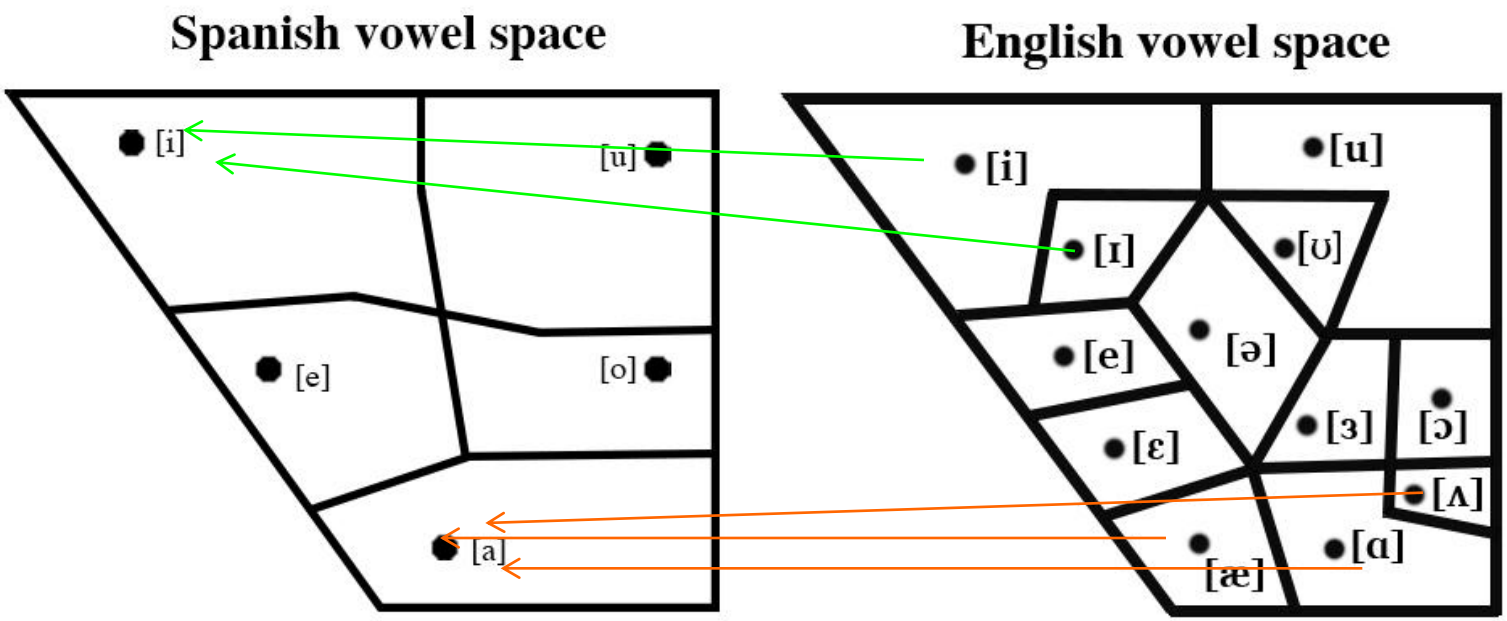
- Traditionally transfer seen as fundamental cause of errors & pronunciation predictable/explainable by phonemic system comparison /a/ [ɑ: æ ʌ]

# Native Magnet Model (Kuhl 1993, 2000, 2004, 2012)

- In L1 acquisition, children create prototypes for the best exemplars of each phoneme (sound)
- Prototypes act like magnets attracting neighbouring sounds
- Perceptual space gets distorted:

  Differences which are irrelevant for L1 are perceived as smaller

  Differences which are important for L1 are perceived as greater



# Native language influence

- (Flege 1995, 2005, 2012):

  Identical sounds **:** no problem > use L1 sound

  /m/ > /m/ /n/ > /n/

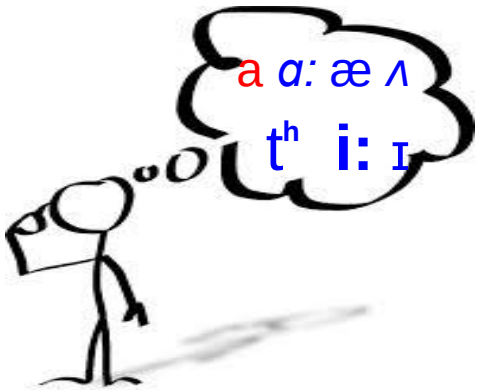
  New sounds**:** if difference from L1 large enough, it is perceived> may create new category / ɜː/

  Similar sounds**:** difference too small to be perceived>L2 sound merged with L1 sound > acquisition is blocked

  /ɪ iː/> /i/ /ʊ uː/ > /u/

# 3. Exposure: Quantity and Quality

- Learner creates mental models (categoriess/fonemas) from received input *(probably via L1 filter) to perceive L2 sounds*




- Based on those mental models, sounds will be produced (*with probable interference of L1 articulatory habits )*

# Exposure Quality

## Native (-like) exposure

Correct input ➔ ± correct categories ➔ ± correct perception & production = FA range (from minimal to …)

Native

Model

➔ Learners

# Exposure Quality

## Foreign-accented exposure

± defective input ➔ defective categories ➔ defective perception & production = Foreign accent (from noticeable to … )

Native

Model

➔ Learners

# Exposure Quantity

- Natural setting:

- Monolinguals native exposure + massive + over long time
- Bilinguals: less exposure in each language

➢ Natural: (10 h/day) x (365 d/year) = 3650 h/year

- Non-natural setting:

- One parent (2 h/day) x (5d/week x 36 weeks) + w/e + holidays = 1000 h/year

➢ Total immersion (school in one language) (30 h/week) x (36 weeks/year) = 1080 h/year

➢ Formal Instruction : (5 h/week) x (36 weeks/year) = 180 h/year

# 4. Other factors

English for Spanish speakers: ***Orthography***

- Spanish orthography very consistent > learner used to reading orthographically:

  m + u + s + e + o  /muséo/

- English: unreliable correspondence

  "read" "red" ; "speak" "steak" ; "son" "sun" ; "walk" "world"

- Learners: difficulties with sounds + use of Spanish orthographic strategy = intelligibility problems

  "country" "vegetables" "museum" "square"...

# Positive attitude to FL pronunciation learning

- General positive attitude to FL + Affective/integrative motivation > effort to sound native
- **Phonetic awareness:** Belief in pronunciation importance
- Phonetic awareness through **phonetic knowledge**

- Lack of knowledge of NL/FL differences > abundant perception & production in NL categories' terms (*transfer*).

- Teachers' Phonetic knowledge as apriori necessity for efficient pronunciation work within rational syllabus instead of drills

- Raising phonetic awareness in learners
  - Sensitizing about TL phonetic/phonological system
  - Role of phonetic component in effective communication

# Native Language Sound System

# 1. NL Consonant System: /phonemes/ & [allophones]

| | Bilabial/labiodental | Inter-dental | Dent-Alveolar | AlveoloPalatal | Velar |
|---|---|---|---|---|---|
| Plosives | p b<br>[ß] | | t d<br>[ð] | | k g<br>[ɣ] |
| Affricates | | | | tʃ [dʒ] | |
| Fricatives | f | θ | s [z] | [ʃ ʒ j] | x |
| Nasals | m | | n | ɲ | [ŋ] |
| Aproximants | [ß] | [ð] | | j<br>[dʒ] | [w] [ɣ] |
| Laterals | | | l | ʎ<br>[j ʒ dʒ] | |
| Vibrants | | | r ɾ | | |

# 2. Spanish Vowel System

| | Occurrence | Example |
|---|---|---|
| i | all positions | mi |
| e | all positions | me |
| a | all positions | ana |
| o | all positions | no |
| u | all positions | tu |

# 3. NL Consonant System Activity

- Which sounds *(phonemes & allophones)* can you find:
  - Word initial:
  - Word final:
- Which phonemes can you find in clusters:
  - Word initial:
  - Word final:
- What can you conclude about the Spanish system's tolerance to consonants?

# Analysing Pronunciation Errors

# 1. Analysing pronunciation errors

**Aim:** analyse mispronunciations in order to:

- Find the **reasons** why a particular mispronunciation occurs: based on a comparison of the L1 and FL phonetic/phonemic systems and orthographic systems.
- Evaluate the **results**: how the mispronunciation differs from the target pronunciation, i.e., to what level it deviates from the norms of the FL phonemic system.
- Weigh the **effects**/consequences of the mispronunciation on intelligibility and degree of Foreign Accent.
- In what follows the level to which intelligibility may be compromised is indicated with *** (very likely) or * (possible).

# 1. Analysing pronunciation errors

**Reasons for errors:** *based on the interaction L1/FL*

A. **Phonemic** differences ***

   i. Presence/abscence of a phoneme in FL/L1, e.g.: several English vowels (/ɪ æ ʊ ʌ ɜː/) and consonants (/v ʒ/), absent in Spanish.

   ii. Differences in phonemic status (phoneme in one language vs. allophone in the other language), e.g.: /ð dʒ z/ phonemes in English, allophones in Spanish.

B. **Allophonic** (realisationa) detail differences, e.g.:

   - Aspiration of /p t k/ in English vs. unaspirated in Spanish.
   - Weakening of /b d g/ in Spanish vs. fully plosive in English.

C. **Phonotactic** differences, e.g.:

   - word final /b g/ and consonant clusters, allowed in English, not in Spanish.
   - /s/ + consonant word initial in English, not in Spanish (/skaɪ/)

D. **Spelling** pronunciation: due to the L1 orthographic correspondences, or overgeneralisation of FL spelling rules ***

   - "word" pronounced with /o/ is "ward"; "bush" with /ʌ/

# 2. Analysing pronunciation errors

**Results of errors: (i)** *how a mispronunciation differs from the target pronunciation* & **(ii)** *the effect this has on intelligibility and Degree of Foreign Accent.*

The mispronunciation may result in ...

- in a **Phonemic** error
  - a) Using another FL phoneme: /f/ insted of /v/ ***
    - may cause phonemic confusions (***intelligibility***): "very, berry"/beɹɪ/, "save, safe" /seɪf/
  - b) Using an L1 phoneme absent in FL: /x/ instead of /h/ *
    - mainly sounds as ***foreign accent***: "house"/xaʊs/, "rain" /reɪn/
- in a **Allophonic** (realisational) error: mispronunciation differs in phonetic detail from target *
  - may cause phonemic confusions (***intelligibility***) : "coat" /k-gəʊt/
  - or may just cause a ***foreign accent***: /b g/ word medial as/β ɣ/ ( "abby" /æβ̞ɪ/, "ago"/əɣəʊ/)
- in a **Phonotactic** violation: mispronunciation not phonotactically possible in FL
  - mainly sounds as a **foreign accent**: "go" /gɒ/ "Emma" /emæ/ "lamb" /læmb/

# 3. Analyse

Analyse the pronunciation errors in the following words.
Remember there may be more than one reason / result for each mistake

- skipper /eskiper/
- word /gworθ/
- that /dat/
- again /ayen/
- half /xalf/
- vamps /bans/
- tub/tuf/
- wrong /ronx/

➢ Discuss the **reasons** for each errror (based on the interaction between the native and non-native sound systems and spelling conventions); the **results** (phonemic, allophonic, phonotactic differences-errors compared to the English target pronunciation), and the **effect** on intelligibility/foreign accent.

# Rhythm

Rhythm: the periodic repetition of an event.

Syllable timed languages: syllables are repeated periodically, all syllables take approximately the same amount of time

Stress timed languages it is stresses ("accents") which occur at approximately equal intervals

'w - - 'x 'y - - - - - 'z -

ˈDavid had ˈseen ˈhelicopters in the ˈairport

the 3 syllables between w-x = one syllable between x-y = six syllables between y and z and for the two syllables between z and the end of the utterance. It is therefore necessary to make more reductions and shortenings in the stretch between y-z : <ˈhelicopters in the>, than in the one between w-x: <ˈDavid had>, while the syllable between x-y, <ˈseen> and the ones after z <ˈairport> will be lengthened.

T. S. Eliot, The love song of Alfred Prufrock

u _ u _ u _ u _ u _ u _ u _

/The ye /llow fog / that rubs / its back / upon / the win /dow panes,/

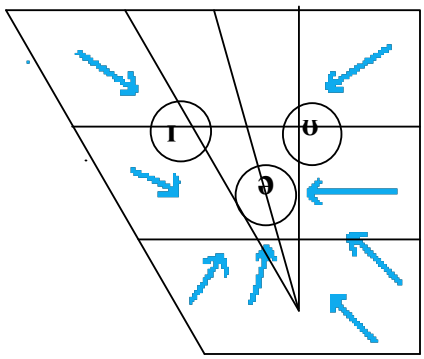
u _ u _ u _ u _ u _ u _ u _

/The ye /llow smoke/ that rubs/ its muzz /le on /the win /dow panes

# ENGLISH WEAK FORMS

## Vowel Changes

Weakening makes all vowels move to the centre of the vowel space. They will first move to the central vowel quality nearest to their original one




*Vowel change direction in weak forms*

/iː/> /ɪ/ <be>

/e/> /ə/ <them>

/ʌ/> /ə/ <but>

/ɒ/> /ə/ <of>

/ɜː/> /ə/ <her>

/uː/> /ʊ/ <do>

/æ/> /ə/ <and>

/ɑː/> /ə/ <are>

/ɔː/> /ə/ <for>

/ʊ/> /ə/<should>

A second step in weakening would make the vowel /ʊ/ go to /ə/:

/duː/ > /dʊ/ > /də/ <do> /juː/ > /jʊ/ > /jə/ <you>.

This pronunciation is considered to be colloquial in RP, but is usual in other varieties of English

- Stress timing induces **syllable weakening**, particularly of unstressed syllables ⇒ vowel reduction/weakening &/or consonant deletion
- **Lexical words:** unstressed syllables are already fixed in a reduced form. E.g. "vegetables" / ˈve dʒə tə bəlz / *(sometimes further weakening still possible, ie. deletion, shortening)*
- **Grammatical words:** depending on whether stressed/unstressed or on function in utterance will appear full or reduced (so at least two pronunciations of the word coexist)

MOST USUAL WEAK FORMS

| *Word* | *Strong Form* | *Weak Form* |
|---|---|---|
| *a* | /ˈeɪ/ | /ə/ |
| *am* | /ˈæm/ | /əm/ |
| *an* | /ˈæn/ | /ən/ |
| *and* | /ˈænd/ | /ənd//ən//n̩/ |
| *are* | /ˈɑː/ | /ə/ |
| *as* | /ˈæz/ | /əz/ |
| *at* | /ˈæt/ | /ət/ |
| *be* | /ˈbiː/ | /bɪ//bi/ |
| *but* | /ˈbʌt/ | /bət/ |

| | | |
|---|---|---|
| *can* | /ˈkæn/ | /kən//kn̩/ |
| *could* | /ˈkʊd/ | /kʊd//kəd/ |
| *do* | /ˈduː/ | /dʊ//du//də/ |
| *does* | /ˈdʌz/ | /dəz//z//s/ |
| *for* | /ˈfɔː/ | /fə/ |
| *from* | /ˈfrɒm/ | /frəm/ |
| *had* | /ˈhæd/ | /həd/ /əd//d/ |
| *has* | /ˈhæz/ | /həz/ /əz/ /z/ |
| *have* | /ˈhæv/ | /həv/ /əv/ |
| *he* | /ˈhiː/ | /hɪ//hi//ɪ//i/ |
| *her* | /ˈhɜː/ | /hə/ /ə/ |
| *him* | /ˈhɪm/ | /ɪm/ |
| *his* | /ˈhɪz/ | /ɪz/ /z/ |
| *is* | /ˈɪz/ | /z/ /s/ |
| *me* | /ˈmiː/ | /mɪ//mi/ |
| *must* | /ˈmʌst/ | /məst/ |
| *of* | /ˈɒv/ | /əv/ |
| *or* | /ˈɔː/ | /ɔː//ə/ |
| *shall/* | /ˈʃæl/ | /ʃəl/ /ʃl̩/ |

| | | |
|---|---|---|
| *she* | /ˈʃiː/ | /ʃɪ//ʃi/ |
| *should* | /ˈʃʊd/ | /ʃʊd//ʃəd/ |
| *some* | /ˈsʌm/ | /səm/ |
| *than* | /ˈðæn/ | /ðən//ðn̩/ |
| *that* | /ˈðæt/ | /ðət/ |
| *the* | /ˈðiː/ | /ðɪ//ði//ðə/ |
| *them* | /ˈðem/ | /ðəm/ |
| *there* | /ˈðeə/ | /ðə/ |
| *to* | /ˈtuː/ | /tʊ//tu//tə/ |
| *us* | /ˈʌs/ | /əs/ |
| *was* | /ˈwɒz/ | /wəz/ |
| *we* | /ˈwiː/ | /wɪ//wi/ |
| *were* | /ˈwɜː/ | /wə/ |
| *who* | /ˈhuː/ | /hʊ//hu/ |
| *would* | /ˈwʊd/ | /wʊd//wəd//d/ |
| *you* | /ˈjuː/ | /jʊ//ju/ |

## *USE OF WEAK FORMS IN RP*

Grammatical words in connected speech are used in their weak form most of the time but taking into account the following restrictions:

**(i)** When the word is stressed because of emphasis or contrast, the strong form is compulsory, fex. /ənd/ > /ˈænd/ in:

<I didn't say apples or pears, I said apples and pears>

**(ii)** Strong forms are used when grammatical words, except pronouns, appear at the very end of the group (exposed)

<What are you looking at> /æt/ in strong form.

<I was looking for you> /jʊ/ in weak form

<Peter can swim> /kən/ or /kn̩/ in weak form. But <Peter can> with /ˈkæn/ in strong form.

**(iii)** Auxiliary verbs are pronounced in weak form but if they constitute a main verb they must be used in strong form

<I have a car> /ˈhæv/

<We have to go> /ˈhæv/

<You have seen them> /həv/, /əv/

"to be" is an exception to this rule since it can appear in weak form even if it is the main verb:

<they are happy> /ə/

<We were running> /wə/

**(iv)** There are a number of words other than verb for which the use of weak or strong forms is determined by their function in the utterance.

•<some> /ˈsʌm/, /səm/. Strong form when it precedes countable singular nouns and it means "a certain": /ˈsʌm/ en <some animal was shot>. In other cases the weak forms is normally used: /səm/ <I need some money>

•<that> /ˈðæt/, /ðət/. Strong form as an adjective or pronoun /ˈðæt/: <That boy is sad>. Weak form as a relative conjunction /ðət/: <I know that you have a bike>

•<there> /ˈðeə/, /ðə/. Strong form as an adverb. Weak form in existential constructions. For Example, /ðə/ in <there is a dog> and /ˈðeə/ in <I bought it there>

**(v)** Weak forms beginning with /h/(except the adjective "her") can have it deleted (dropped) as long as the word is not at the beginning of the group (sentence initial or after pause).

/hɪs haʊs/ → no deletion because sentence initial

/aɪ went to his haʊs/ → /aɪ went <u>tʊ ɪz</u> haʊs/

**(vi)** A preposition preceding a pronoun can be used in strong or weak form: <I was looking <u>for</u> you> /fə jʊ/ or /fɔː jʊ/.

**(vii)** some words with more than one weak form have their choice determined by the phonetic context They have been marked with '**'

a. <does> /z/, /s/ <has> /əz/, /z/ <is> /z/, /s/

The weak form agrees in voicing with the previous sound:

/tɒmz gɒn aʊt/ <Tom has gone out >

/ɪts reɪnɪŋ/ <It is raining>

b. <the>

/ðɪ/ before vowel as in <the apples were good>

/ðə/ before consonant as in <the children left>

c. <to>

/tʊ/ before vowel as in <he spoke to everybody>

/tə/ before consonant as in <I gave it to my neighbour>

d. <or>

/ɔː/ careful speech

/ə/ fast colloquial speech and set prases "one or two"

**(viii)** In negative contractions the vowel cannot be weakened but the consonats may suffer phonological processes

/dɪdənt/ → / dɪdn̩t / → / dɪdn̩tʔ /

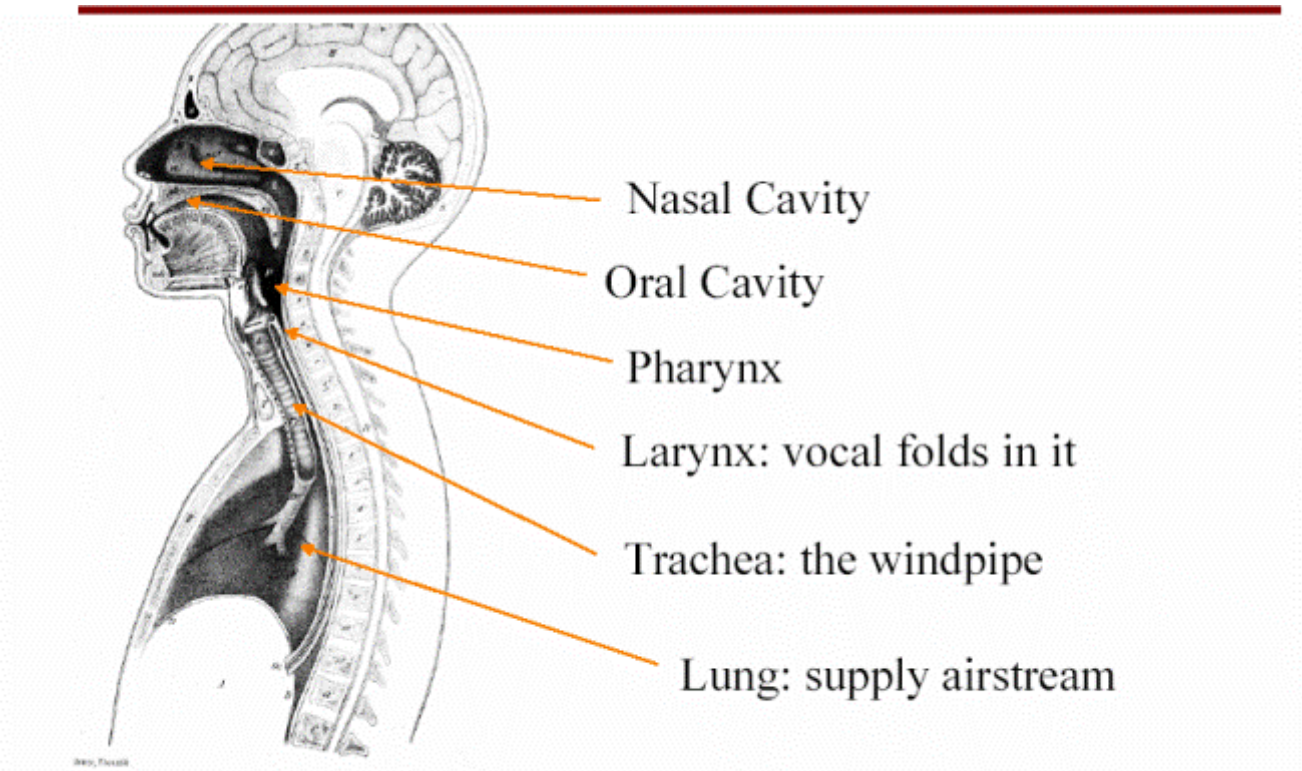
/kɑːnt/ → / kɑːn / → / kɑːnʔ/

**********

# ARTICULATORY PHONETICS

COMPONENTS OF SOUNDS:

- A- INITIATION: Sets air in motion
- B- PHONATION: voicing, pitch ....
- C- ARTICULATION: Shapes – modulates air> speech sounds differentiated




Sagittal section of the vocal tract (Techmer 1880)
[From: Dan Jurafsky slide]

## (A) INITIATION

- Direction of movement: Egressive / Ingressive

- Initiator Organ-s: Pulmonic / Glottalic / Velaric

(1) Pulmonic Initiation. Initiator: lungs with respiratory muscles

- Egressive: most linguistic sounds
- Ingressive: alternative (fast speech, sobbing)

(2) Glottalic Initiation. Initiator: glottis

-Egressive: Ejectives (English allophones, Caucasian, African, Amerindian Langs.)

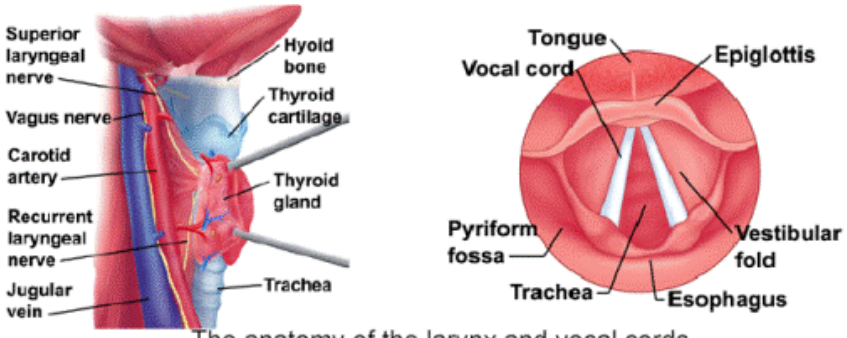
-Ingressive: Implosives (African Langs.)

(3) Velaric Initiation. Initiator: tongue closure at velar area

- Ingressive: clicks (African Bushman Langs.)

## (B) PHONATION

Activity in the larynx which is not initiatory *(excludes glottalic initiation)* nor articulatory *(excludes glottal sounds)*




The anatomy of the larynx and vocal cords
[From: www.yoursurgery.com]

- The Larynx (voice box):
  - A structure made of cartilage and muscle
  - Located above the trachea (windpipe) and below the pharynx
  - Contains the vocal folds
- Vocal Folds (vocal cords)
  - Two bands of muscle and tissue in the larynx

### BASIC PHONATION TYPES:

**Voiced:** regular vibration of the vocal folds

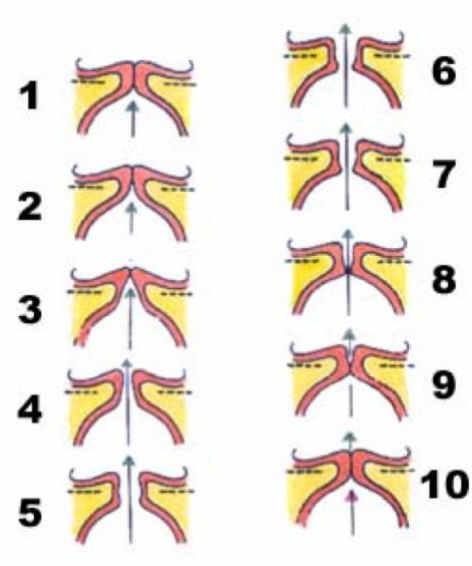
**Voiceless:** no vibration of the vocal folds, they stand apart

Whisper: air scapes throgh the back while front held closed

Creak: vocal folds vibrate in front but arytenoids held closed

Breathy voice (murmur): vocal folds vibrate but stay apart

## Voicing cycle




Three parameters resulting/dependent on Phonation:

**Pitch**: dependent on rate of vibration of vocal folds (therefore only present in voice phonation) & shape (length & thickness of VFs):

- Small, thin vocal folds > high pitch
- Big, thick vocal folds > low pitch
- Fast vibration > high pitch
- Slow Vibration > low pitch

**Loudness**: Air pressure > amount of subglottal air

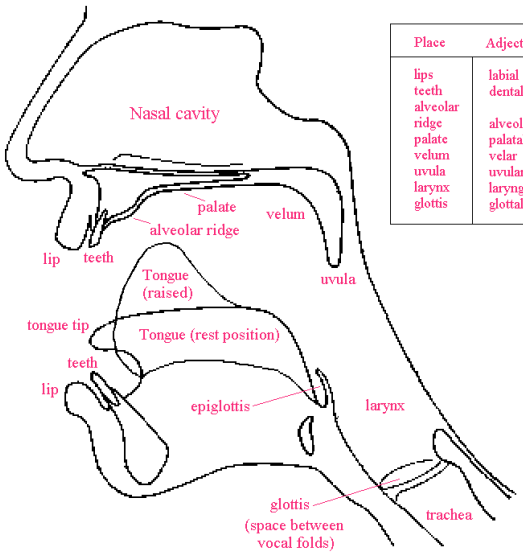
**Timbre** (voice quality): Mode of vibration of vocal folds (opening quotient):
*(Inversely proportional to subglottal pressure: less subglottal pressure, longer opening)*

- Short opening > bright, sharp voice
- Long opening > mellow voice
- Always open with vibration > breathy voice

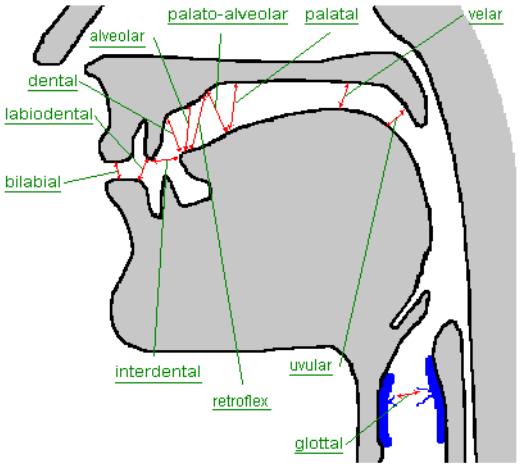
## (C) ARTICULATION

Shapes all sounds, generates friction (in fricatives) or transient noise (in plosives)

**PLACES OF ARTICULATION:** 2 articulators: passive (upper part of oral cavity) and active (lower lip and tongue). Name of place or articulation is derived from passive articulator: bilabial, dental, alveolar, palatal.....etc.




| Place | Adjective |
|---|---|
| lips | labial |
| teeth | dental |
| alveolar ridge | alveolar |
| palate | palatal |
| velum | velar |
| uvula | uvular |
| larynx | laryngeal |
| glottis | glottal |

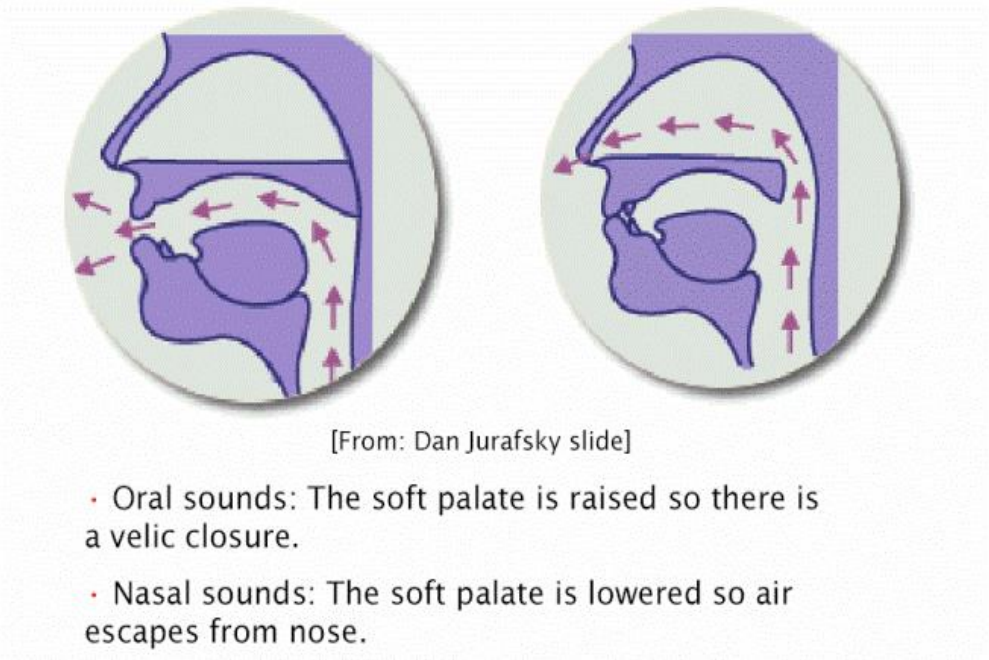



Lower, active articulator not named because of direct correspondence with passive articulator, unless ambiguous: bilabial, labio-dental

## MANNERS OF ARTICULATION

**(I) Nasal vs. Oral vs. Nasalized.** (*Although this division is usually studied under "manners", it can also be seen as a question of place of articulation*).

- Nasal: velum down + closure in mouth > all air escape through nose
- Oral: velum UP > no air escape through nose > all through mouth
- Nasalized: velum down + opening in mouth > air escape both ways



- Manners of articulation can be classified according to the **degree of opening**, the **shape of the oral channel** and the **location of the air release** in the mouth.

(II) Degree of opening between articulators:

Stop >

Affricate >

Fricative >

Approximant >

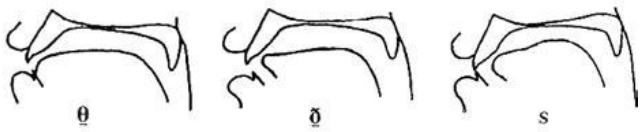
Resonant (open vowels)

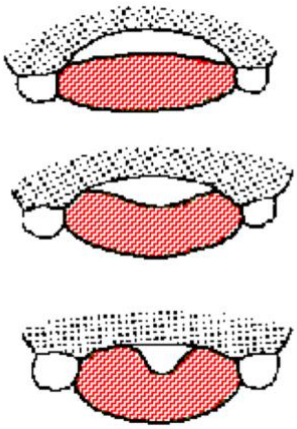
Special: Trill, tap (small closures)

(III) Shape of oral channel:

Grooved Fricatives = Sibilants

Flat Fricatives= non sibilants

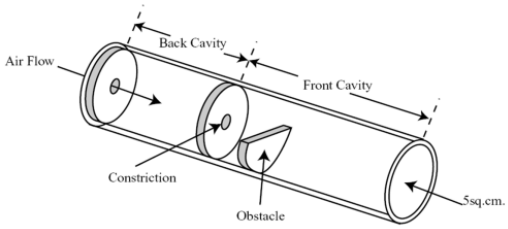


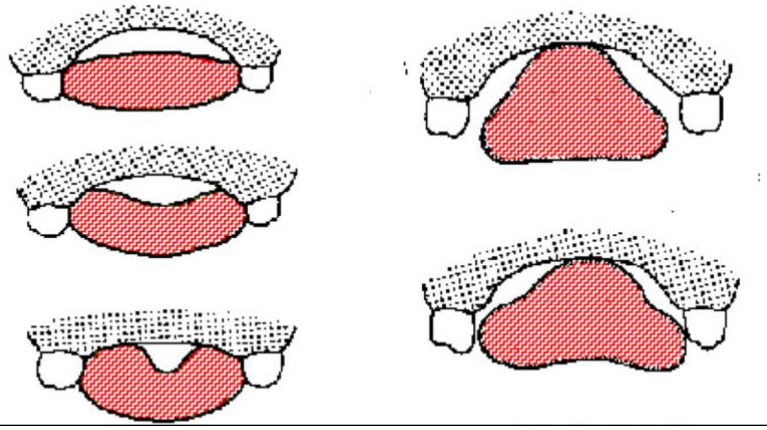
Flat: [f $\theta$ ...]

Grooved: [ʃ ʒ]

Grooved: [s z]



(IV) Central vs. Lateral opening: central or medial (most) vs. lateral sounds



| Central | Lateral |
|---|---|

## COARTICULATION

1. Coarticulation
    - 1.1. Meaning
    - 1.2. Reasons
    - 1.2. Procedures
2. Coarticulation vs. Allophonic variation
    - 2.1. Allophones vs. phonemes
    - 2.2. Allophones vs. coarticulatory variants
3. Main types of Allophones
    - 3.1. Universal vs. Language specific
    - 3.2. Coarticulatory vs. unmotivated

## ENGLISH ALLOPHONES

1. Plosive allophones
    - 1.1. Stages of a plosive
    - 1.2. Aspiration
    - 1.3. Releases
        - 1.3.1. Nasal release
        - 1.3.2. Lateral release
        - 1.3.3. Release Masking
    - 1.4. Preglottalization

2- Other consonant allophones:
    - 2.1. Obstruents devoicing
    - 2.2. Approximant devoicing
    - 2.3. Allophonic affricates
    - 2.4. Voicing of /h/
    - 2.5. Gemination
    - 2.6. Lateral velarization

3- Vowel Allophones
    - 3.1. Nasalization
    - 3.2. Shortening or clipping (vowels and sonorants)
    - 3.3. Schwa height

# 1. COARTICULATION

## 1.1. MEANING OF COARTICULATION

COARTICULATION: Modification in the articulation of a segment due to the influence of phonetic context (adaptation, accommodation, assimilation,)

**Coarticulation vs. Assimilation**: Both are essentially the same process independently of whether they result in a different allophone or phoneme. Phonologists use the term **assimilation** for coarticulation *(we will use it for* ***phonemic*** *coarticulation)*

In general we tend to speak of *coarticulation* when the accommodation change results in a different allophone and of *assimilation* when the accommodation results in a different phoneme.

## *1.2. Reasons*

→ Coarticulation eases articulation: by modifying some sound features so that they resemble surrounding ones > save articulatory effort

→→ Coarticulation because of physiological and mechanical constraints:

♦ Humans may produce 15-18 sounds per second

♦ Differences between sounds may take more time than our possibilities.

♦ Articulatory movements may be started early or preserved to avoid making all changes simultaneously

## *1.3. Procedures*

**Direction of Influence**

♠ Anticipatory coarticulation, as in [**hen**] > [**hẽn**]

♠ Perseverative coarticulation, as in [**pl**eɪ] > [**pl̥eɪ**]

## 2. COARTICULATION VS. ALLOPHONIC VARIATION

### 2.1. ALLOPHONES VS. PHONEMES

Phonemes are: contrastive, distinctive units (which can make differences in meaning)

| ENGLISH | SPANISH | BASQUE |
|---|---|---|
| **p**ɪl | ka**m**a | u**d**a |
| **b**ɪl | ka**n**a | u**ɾ**a |
| **m**ɪl | ka**ɲ**a | u**r**a |

Allophones: are variants, the various **realizations** of a phoneme

| | | | |
|---|---|---|---|
| ENGLISH: | te**n**t | te**n**th | be**ɲ**ch |
| SPANISH: | **b**ase | am**b**as | ha**β**as |
| BASQUE: | **g**ero | ha**ŋg**o | a**ɣ**ur |

### 2.2. ALLOPHONES VS. COARTICULATORY VARIANTS

So what does coarticulation have to do with allophones?

⇒ **Coarticulatory** changes **often** result in different variants (***allophones***) of the same sound BUT

⇓ But sometimes coarticulation is allowed even though the modification results in a different phoneme *(this will be studied in Phonology)*

∗ Additionally: **not all allophones result from coarticulation**

## 3. MAIN TYPES OF ALLOPHONES

### 3.1. UNIVERSAL VS. LANGUAGE SPECIFIC ALLOPHONES

We find that some accommodations between sounds are **UNIVERSAL** (that is, found in most languages):

- **Nasalization of vowels** before nasals:

  [sã**n**] (Spanish "saint")

- and the **Advancement or retraction of velars** depending on the place of articulation of the following sound

  [ k̟ili k̟ili] (Basque "tickles") [k̠ɑː] (English "car")

**On the other hand**

We find that some sound accommodations are **LANGUAGE SPECIFIC** (that is, not necessarily exclusive to ONE language only, but not found in most languages either)

Lenition (plosives become fricatives or approximants) of voiced plosives in Spanish (and Basque)

[baba] → [baβa] (Spanish "dribble")

[dado] → [daðo] (Spanish "die")

## 3.2. COARTICULATORY VS. UNMOTIVATED

♥ Most of the time allophones can be seen as coarticulatory variants: they are motivated by the influence of surrounding sounds (that is, there is phonetic motivation): so variation is produced because of **accommodation and allophones are coarticulatory variants, fex**

Labialization of consonants before rounded vowel/semi-vowel: **[ʃuː]** → **[ʃʷuː]**

♥ Some times allophones are bound to particular contexts **but** there is no apparent phonetic motivation (they not coarticulatory variants) However the language determines the context where they must be used: fex

•Velarization of lateral in English RP:

[leɪm] → [meɪɫ] (in RP English)

♥ Other times allophones are not phonetically motivated (they are not coarticulatory variants) nor are they bound to a particular context: they occur randomly or freely depending on speakers, styles etc. (they are in free variation)

Frication of the palatal approximant in Spanish initial position:

[**j**o] [j̞o] [**dʒ**o] (in initial position in Spanish ["I"])

***Allophones which do not have phonetic motivation are, obviously, not universally found, but language specific.***

# ENGLISH ALLOPHONES

## 1. PLOSIVE ALLOPHONES

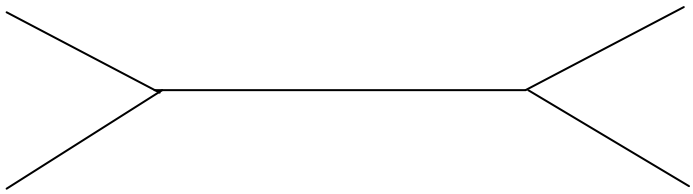
### 1.1. STAGES OF A PLOSIVE

Fricatives and vowels can be described in terms of static articulatory targets, whereas stop consonants have dynamic articulations . That is why it is useful to describe stops specifying three stages or phases in their production. For pulmonic plosive stops (that is, non-nasals) these stages may be characterized as follows:

In the APPROACH: the two articulators move towards each other in order to make contact and form a closure

During the HOLD: the closure is maintained and egressive air accumulates behind the closure

And for the RELEASE: the two articulators break contact and air is released in a burst (plosion) or contact is maintained (to some extent) and air is released via an alternative route



approach hold release

Diagram for the articulation of plosives

## 1.2. ASPIRATION

⇓ **WHAT?** Aspiration is a period of voiceless air after the release of a consonant, in English, voiceless plosives.

⇓ **WHY?**

→ For English voiceless plosives (in stressed syllable initial position) the vocal folds are more open than in other positions and than in other voiceless sounds > so they take longer to get to the voicing position for the following sound > and there is a *voicing lag* during which the vocal folds remain apart > while the vocal folds get ready for voicing voiceless air escapes through the released oral closure

→ Accordingly, for English voiceless plosives followed by a voiced sound > Aspiration is related to *Voice Onset Time*

→ Voice Onset Time (or VOT )= is The moment in which voicing starts in relation to a plosive closure release. For aspiration, the VOT value is positive (above 30msc.), that is to say, there is a lapse of time between the release of the closure and the onset of vocal fold vibration.

→ Aspiration is language, and sometimes even dialect, specific: its presence/absence. In English different accents show different degrees of aspiration and different positions.

⇓ **Diacritics:** [pʰ] Aspiration (raised "h" following the plosive)

[p⁼] No aspiration (raised "=" following the plosive)

⇓ **WHEN?** it depends on the variety of English ; in RP:

there is **Strong Aspiration:** Following voiceless plosives if at the beginning of stressed syllable, as in

[sə'pʰəʊz] ['tʰiːm] [ə'kʰɜː]

there is **No Aspiration:** When voiceless plosives are preceded by the voiceless alveolar fricative in the same syllable, as in

/s/ + /voiceless plosive/ → plosive is unaspirated

[ˈspˣaɪ] [ˈstˣeɪ] [ˈskˣɪm]

and there may be **Weak or optional Aspiration:** Elsewhere as in

[pəˈlaɪt] [ˈrɒts] [ɪkˈsaɪt]

## 1.3. RELEASES

### *1.3.1. Nasal release*

⇓ **What?**

The release of the air accumulated for a plosive is not oral but nasal, that is to say, the air does not escape through the mouth but through the nose

⇓ **Diacritic:** [pⁿ] Nasal release (raised "n" following the plosive)

⇓ **When?** When a plosive is immediately followed by a homorganic nasal: fex in

plosive + homorganic nasal → plosive with nasal release + nasal

[sʌdn̩] → [sʌdⁿn̩]

⇓ **How?**

Since the plosive and following nasal share the same place and similar manner of articulation (both are stops) the plosive articulation is not broken (there is no oral release). To go from the plosive to the nasal the velum is lowered and the air accumulated behind the oral closure goes into the nasal chamber and is released through the nose > this is Nasal Release

### *1.3.2. Lateral release*

⇓ **What?**

In lateral release, the air accumulated for a plosive does not come out through the centre of the mouth but along one or both of its sides.

⇓ **Diacritic:** [tˡ] Lateral release (raised "l" following the plosive)

⇓ **When?**

When a plosive is immediately followed by a homorganic lateral, so in English only the alveolar plosives, /t/ and /d/, may have lateral release.

plosive + homorganic lateral → plosive with lateral release + lateral

fex [set̩l] → [setˡ̩l]  [sæd̩l ] → [sædˡ̩l ]

⇓ **How?**

Since the plosive and following lateral share the same place of articulation and, to a certain extent, manner (both being central stops) the central stop constriction is maintained and when the *hold* phase for the plosive is finished the sides of the tongue are lowered for the following lateral. Therefore the air accumulated behind the closure for the plosive escapes out of the sides of the mouth overlapping with the /l/ sound > this is Lateral Release

### *1.3.3. Release Masking*

⇓ **What?** the release of the air accumulated for a plosive is (nearly) inaudible. This is one type of inaudible release.

⇓ **Diacritic:** [t˺] Masked release (raised right angle "˺" following the plosive)

⇓ **When?**

When a plosive is immediately followed by another plosive or affricate with a different place of articulation and the two sounds are produced in quick succession so that there is overlapping of articulations.

[sæ**gd**] → [sæ**g˺d**] [æ**pt**] → [æ**p˺t**]

⇓ **How?**

What happens is that the articulation for the second plosive is started before the first plosive has been finished. Since both sounds involve a complete oral closure, the release of the first sound will be masked by the articulation for the second one. The first plosive is approached and held. During this hold stage the approach for the second plosive is begun. By the time the first plosive is released the hold for the second one is already formed.

## 1.4. PREGLOTTALIZATION:

⇓ **What?** A glottal closure precedes or is made simultaneously with a voiceless plosive as a *reinforcement* of its articulation.

⇓ **Diacritic:** [ˀk] Preglottalization (raised "ˀ" preceding the plosive)

⇓ **When?**

The environments for preglottalization vary considerably depending on the variety of English. In Mainstream R.P. it may be found -optionally- when the voiceless plosive is in syllable coda position (final or in a consonant cluster) and preceded by a sonorant (nasal, approximant, lateral or vowel) and followed by a consonant or pause:

sonorant + voiceless plosive + consonant / silence →

sonorant + preglottalized voiceless plosive consonant / silence

[sæ**k**] → [sæˀ**k** ]  [fel**t**] → [felˀ**t**]

∗ Preglottalization in word final position often co-occurs with inaudible release for the plosive.

[je**p**] → [jeˀp ]

## *2. OTHER CONSONANT ALLOPHONES*

### 2.1. OBSTRUENT DEVOICING

⇓ **WHAT?** English voiced obstruents lose all or part of their voicing

⇓ **WHY?**

English voiced plosives anticipate or preserve previous voicelessness as a kind of coarticulatory phenomenon.

⇓ **Diacritics:** [d̥] Circle underneath symbol

⇓ **WHEN?** in contact with voicelessness whether from silence or a voiceless sound

[ˈrəʊz̥] [ˈsɪt ˈd̥aʊn] [ˈð̥eə]

⇓ **How?**

The "voiced" obstruents get influenced by previous or following voicelessness so that they carry on with it or anticipate it (perseverative or anticipatory coarticulation). Accordingly, "voiced" obstruents may actually be pronounced with very little or no voicing at all.

Because of this devoicing, sounds like [s] and [z̥] might be wrongly thought to be the same: voiceless alveolar plosives. To avert this confusion, the term fortis is used for intrinsically "voiceless" consonants and "lenis" for intrinsically voiced ones. Thus [z̥] is a devoiced/voiceless **lenis** alveolar fricative. Nevertheless, devoicing can make fortis and lenis consonants sound very similar in English, so that other clues may intervene to differentiate the two types of consonant (see below).

## 2.2. APPROXIMANT DEVOICING

⇓ **What?**

The approximants are realized with no or only some voicing

⇓ **Diacritic:** [w̥] Circle underneath symbol

⇓ **When?** When an approximant is in the environment of aspiration, that is, preceded by a voiceless plosive which is at the beginning of a stressed syllable

[ˈpl̥eɪ] [ˈkj̥uː]

⇓ **How?**

The plosive is aspirated, i.e., it has an interval of voiceless air after its release. If the following sound is an approximant, that period of voicelessness does not take up a separate interval but it occurs during the approximant, making it devoiced.

## 2.3. ALLOPHONIC AFFRICATES

⇓ **What?**

A sequence of alveolar plosive and post-alveolar approximant become one sound= a post-alveolar affricate

⇓ **Diacritics:** [t͡ɹ̥ˠ] [d͡ɹˠ] *with tie-bar* [‿] *underneath*

⇓ **When?** When an alveolar plosive is immediately followed by post-alveolar approximant in the same syllable: fex in

alveolar plosive + post-alveolar approximant → post-alveolar affricate

[t͡ɹ̥ˠ uː] [d͡ɹˠ aɪ] *with tie-bar* [‿] *underneath*

⇓ **How?**

In that environment the post-alveolar approximant becomes a fricative and, if preceded by /t/, it also becomes voiceless (see approximant devoicing above), so the result is:

voiceless alveolar plosive + voiceless post-alveolar fricative
voiced alveolar plosive + voiced post-alveolar fricative

The alveolars become retracted, i.e., post-alveolar, adapting to the place of the following sound by coarticulation, so the result has the components of an affricate: sequence of homorganic plosive and fricative in the same syllable.

## 2.4. VOICING OF /h/

⇓ **What?**

/h/ is realized as a voiced glottal fricative

⇓ **Symbol:** [ɦ]

⇓ **When?**

Between vowels

[bɪɦaɪnd] [əɦed]

*NB: We will not include it in our narrow transcriptions*

## 2.5. GEMINATION

⇓ **What?**

It is a succession of two homorganic consonants with the same manner of articulation which is realized as a single longer one.

⇓ **Diacritic: [dː]** (duration mark "ː" following the consonant)

⇓ **When?**

When a consonant is immediately followed by another homorganic consonant and they both have the same place of articulation. So in English usually only across syllables or words.

[sɪk kaʊ] → [sɪ**kː**aʊ] [ðɪs saɪd] → [ðɪ**sː**aɪd]

⇓ **How?**

Since the two consonants share the same place and manner of articulation, the articulation is maintained and we only make one approach and one release but with a longer hold, which is what makes the difference between a geminate consonant and a single non-geminate one.

*NB: We will not include it in our narrow transcriptions*

## 2.6. LATERAL VELARIZATION

⇓ **What?** the alveolar lateral has a secondary articulation: velar approximant, so that it is a velarized alveolar lateral.

⇓ **Diacritic:** [ɫ]

⇓ **When?**

The environments for lateral velarization vary depending on the variety of English. In Mainstream R.P. it is found whenever the alveolar lateral is not followed by a vowel. In other words, when the lateral is followed by (any) consonant or at the end of word.

[ʃeɫz] [fi:ɫ]

⇓ **How?**

As we saw at the beginning of this topic, some sounds have a secondary articulation besides the primary one. In RP English, in certain positions, the alveolar lateral has besides its primary articulation (alveolar lateral stop) a secondary one simultaneous with it: a velar approximant (the back of the tongue is raised towards the velar area).

This secondary articulation in other languages is a coarticulatory effect because it is only found when there is a velar consonant after the lateral (as in [ɫk] or [ɫg]). In English, however, it is not a coarticulatory allophone since it occurs in environments which do not provide phonetic motivation.

# 3. VOWEL ALLOPHONES

## 3.1. NASALIZATION

⇓ **What?** During the vowel there is a period of nasal escape

⇓ **Diacritic: [ẽ̽]**

⇓ **When?**

When a vowel is followed by a nasal

[sĩŋ] [pẽn]

⇓ **How?**

The vowel is oral, so that the velum is raised (up). However, if there is a nasal following the vowel, the velum starts going down in anticipation of the nasal during the vowel so that by the time we start making the nasal it is ready and down. Therefore during part of the vowel, some air is escaping through the nose as well as through the mouth > nasalization.

## 3.2. SHORTENING OR CLIPPING

⇓ **What?** A sonorant (vowels, nasals, laterals, approximants) has its duration reduced

⇓ **Diacritic: [ʌ˙]** One dot to the right of the symbol

⇓ **When?**

When the sonorant is followed by a voiceless obstruent in the same syllable

[ɹəʊ˙tʃ] [wʌ˙n˙s] [fɔ˙l˙t]

⇓ **How?**

Voiceless obstruents are longer than voiced ones. Therefore, a syllable which ends in sonorant(s) followed by a voiceless obstruent should last longer than if the same syllable contains voiced obstruent(s). To even out the durations, sonorants followed by voiceless obstruents get shortened and thus the syllables made of voiced obstruents and those with voiceless obstruents last more or less the same.

NB. Because voiced obstruents may get devoiced (see above) in English, sonorant duration may be a clue to whether the following obstruent is fortis or lenis.

## 3.3. SCHWA HEIGHT

⇓ **What?** The realizations of schwa may vary considerably in height

⇓ **Diacritic:** [ə̝] [ə̞]

⇓ **When?**

Schwa is higher when it appears preceding the stressed syllable

[ə̝ˈgen]

Schwa is much lower when it appears finally in an open syllable so that it can even resemble the quality of /ʌ/

[ˈletə̞]

# Connected Speech Processes

- As we saw in allophonic coarticulation, phonemes often change because of the surrounding phonetic context.

- When sounds combine to form words they often change in order to ease the complexity of articulation because of the speed of fluent speech and/or to improve distinctiveness.

- Articulation may be made easier by

  Eliding (deleting) a sound altogether

  Making a sound more similar to surrounding ones (assimilation)

  Substituting the sound by easier ones

  Inserting a sound to ease the transition between two others

- When the modifications involve phonemes changing into other phonemes, we usually study them separately from allophonic processes. This is partly because allophonic processes are reflected in narrow phonetic transcriptions whereas phonemic-phonological processes are reflected in broad phonemic transcription

# Connected Speech Processes List

- **1 Sandhi-r:** Linking r vs. Intrusive-r
- **2 Syllabicity:** Nasal and Lateral syllabicity
- **3 Elision:** /t/ /d/ /h/ elision
- **4 Assimilations:** Alveolar stops & fricatives; Coalescence
- **5 Glottaling**

NB: these processes will be incorporated into transcriptions as indicated in class. For more explanations and practice see "*English Transcription Course*"

# 1. Sandhi-r

- /r/ ***elision*** (historical process): /r/ deleted when followed by consonant or silence, preserved when followed by vowel.

/pɔː/ /pɔːz/ /pɔːrɪŋ/ /pɔːr ɪt/

- Linking /r/: the remanent of /r/ deletion. Compulsory within words, optional across words.

/pɔː/ /pɔːrɪŋ/ /pɔːr ɪt/

- Intrusive /r/: by analogy after same vowels that suffered /r/ deletion (/ɑː ɔː ə ɪə eə ʊə/) ***insertion*** of unetymological /r/. Acceptable across words, not within word.

/drɔː ɪt/ → /drɔːr ɪt/ /drɔːɪŋ/ → */drɔːrɪŋ/

# 2. Syllabicity

- When /ə/ is followed by /n/ or /l/, it may disappear and the consonant becomes the nucleus (*syllabic*).

/sʌdn̩/ /piːpl̩/ /kɒtn̩/

- In the case of /n/ the process is not likely when /ə/ is preceded by a sonorant or 2 consonants, specially if one of them is a nasal. ('barren' 'London').

- When an unstressed morpheme is added to the word with syllabicity, /n/ or //l/ may stop being syllabic and form a syllable with the next vowel:

/hæpn̩/+/ɪŋ/ → /hæpn̩ɪŋ/ (3 sylls) or /hæpnɪŋ/ (2 sylls)

# 3. Elision

- In a sequence of 3 consonants, the middle one may be dropped if:

  C2 = /t/d/, C1 & C2= same voicing, C3 = not /h/

  /lɑːst neɪm / → /lɑːs__neɪm/

  /send fɔː / → /sen__fɔː/

  In negative contractions, /t/, may be dropped even though C1 & C2 don't share same voicing

  /dəʊnt gəʊ / → /dəʊn__gəʊ/

- Remember that /h/ may be elided in grammatical words which are not at the beginning of the group

  /get hɪm / → /get__ɪm/

# 4. Assimilation

- /t d n/ may change from alveolar to bilabial or velar when followed by bilabial or velar

/ðæt mæn/ → /ðæp mæn/  /ðæt gɜːl/ → /ðæk gɜːl/
/bæd peɪn/ → /bæb peɪn/ /bæd kæt/ → /bæg kæt/
/ten penz/ → /tem penz/ /ten kæts/ → /teŋ kæts/

- /s z/ may change from alveolar to palatoalveolar when followed by palatoalveolar or palatal

/ðɪs ʃɒp/ → /ðɪʃ ʃɒp/ /ðəʊz ʃɒps/ → /ðəʊʒ ʃɒps/

# 4. Coalescence

- Consonant coalescence: /t d/ followed by /j/ (in grammatical words or frequent sequences) may chance to /tʃ/ /dʒ/

/ðæt ju/ → /ðætʃu/  /wʊd ju/ → /wʊdʒu/

- Note that the monophthonging found in words such as "sure" can be seen as a kind of coalescence:

/ʃʊə/ → /ʃɔː/  /pʊə/ → /pɔː/

Also note that /ʊə/ words written with "ewer" (fex "fewer") do not monophthong.

# 5. Glottaling

- /t/ may change to /ʔ/ when it is in the syllable coda, preceded by vowel or sonorant (nasals, approximants) and followed by another consonant (not /h/):

/ðæt ʃɒp / → /ðæʔ ʃɒp /
/nɒt naʊ / → /nɒʔ naʊ /

- The environments are very informative about regional and social class accent. In many popular accents glottaling may also happen when /t/ followed by vowel or silence

/gɒt aʊt/ → /gɒʔ aʊʔ/
/letə/ → /leʔə /

# Connected Speech Exercise

**Transcribe & find all processes studied**

The other animals followed his example and sat like dogs looking at the tall black figure on the tower. "Are you alright? Have you been hurt?" he asked me suddenly. I nodded quite calmed now. "Then you can raise yourself slowly and come towards me. Don't run. The beasts will not attack you" When we were inside the castle, he talked to me again. "Let me offer some advice. Should you find yourself in another area of the castle, take care to return to these rooms before dark. This is an old place which has had much blood and terror. Keep to these rooms because you have my word you won't be hurt here".