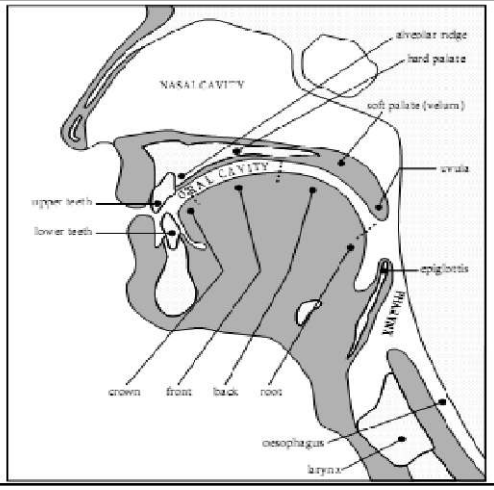
Chapter 2

The production of speech

Introduction

- Production of speech
  - phonetics course
- Normal speech:
  - air from lungs (pulmonic)
  - air going out (egressive)
  - modifications on the way
    - larynx (different shapes)
    - vocal tract (tongue, teeth, lips shapes)



Larynx

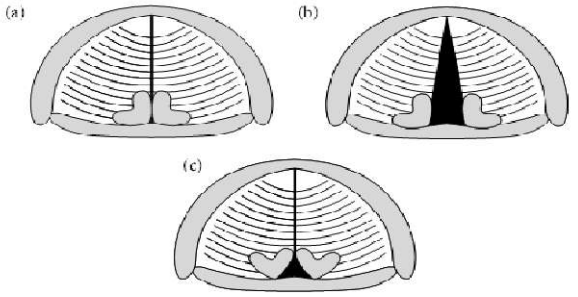


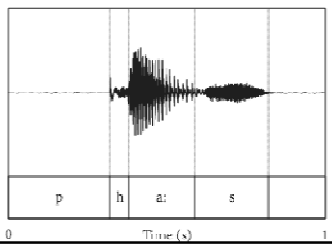
Figure 2.1
Schematic drawings of (a) a closed glottis, as during the closure stage of a glottal stop or during the closed phase of the vibrating glottis; (b) an open glottis; (c) a narrowed glottis.

Larynx

- Two vocal folds / cords
  - closed: no air can pass through
    - glottal stop [ʔ] phonetic symbol
  - open glottis: air can pass through, the vocal folds will not vibrate
    - voiceless sounds [t s p ʃ]
  - narrowed glottis: air can pass through, but vocal folds will vibrate
    - voiced sounds [a m b r]

Voicelessness

- Sometimes a voiceless consonant extends its voicelessness into the next vowel: aspiration



Phonation

- Voicing and voicelessness are the most common types of phonation
- Others are
  - whisper /h/
  - breathy voice
  - creaky voice

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Pitch

- Vocal folds can vibrate more quickly or more slowly
  - heard as **pitch** variations
  - women have higher pitch than men
  - stressed vowels have higher pitch than unstressed ones
  - vowel with a high tone have a higher pitch than vowels with a low tone
    - vowels with a contour tone (tone 3) change their pitch

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Glottal stop

- Not a "phoneme" in English or Mandarin Chinese
  - a phoneme in other languages, e.g. Hawaiian, or Shanghainese
  - Cantonese: luhk '6'
  - Shanghainese loʔ
  - Mandarin liu4 六

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Vocal tract

- Three spaces:
  - pharyngeal cavity (pharynx)
  - nasal cavity (nose)
  - oral cavity (mouth)
    - tongue shape / position
    - roof of the mouth
- Different configurations will give different sounds

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Places of articulation

- Pharynx: pharyngeal sounds
- Nasal cavity: nasal sounds
  - nasal vowels [fã]
  - nasal consonants [m ŋ ..]
- Oral cavity
  - oral consonants: [k tʃ p ....]
  - oral vowels [i a u o ....]

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Vowels

	Front unrounded	Back unrounded	Back rounded
High	i		u
Mid	e		o
Low	ɛ	a	ɔ

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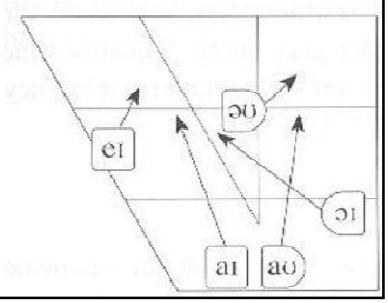
Vowels of Korean

	Front unrounded	Centralized front rounded	Centralized back unrounded	Back rounded
High	i	y	ɯ	u
Mid	e	ø	ɤ	o
Low	(æ)		a	

Diphthongs

- Vowels that start in one place and end up somewhere else
- bay
- low
- boy
- how
- bye



Formants

- Different dimensions in vowels:
  - which part of the tongue is used? front, central, back? **F2**
  - how high is the tongue raised (low, mid, high) **F1**
- Correspond to "formants": different "parts" of the sound
  - also F3, F4, etc.

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Places of articulation

- Pharyngeal
  - Arabic
- Dorsal = velar
  - k g ŋ
- Coronal
  - palato-alveolar tʃ
  - alveolar s t d n l
  - dental θ
- Labial
  - p b m
  - f v

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Types of consonants

- = Manner of articulation
  - stops / plosives p t b
  - fricatives s ʃ x
  - sonorants
    - nasals m n
    - liquids l r
    - semivowels j w
    - vowels i u o

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Length, duration

- short vowels and long vowels
  - Chinese?
  - English?
- also for consonants in some languages
  - = geminates

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Complex consonants

- Affricates
  - El. church, Chinese 车
  - starts as a stop, ends as a fricative
- Secondary articulation
  - e.g. [l] in lip vs. pill : velarization
  - clear l vs. dark l

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Non-pulmonic consonants

- Pulmonic = ?
- Non-pulmonic: using other air to make a sound
  - clicks
  - implosives
  - ejectives => phonetics

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Stress

- English = stress language
  - um brel la e le phant
  - higher pitch on stressed syllables
  - also longer and louder
- Different languages have different stress rules
  - always first, last syllable
  - short vs. long syllables

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Conclusion

- We covered almost the whole phonetics course!
- Production of speech
  - air through a system
  - different modifications result in different sounds
  - vowels: 4 terms: e.g. short, high, front, unrounded vowel
  - consonants: 3 labels: e.g. voiceless, labiodental fricative

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Homework

- Review chapter carefully!
- Note down any questions, look up terms you don't know
- Homework: Qs 13-16
  - Note: Fig. 2.3b has a mistake
- Thank you

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