

Introduction to Phonetics I

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7. Consonants: Manner of Articulation

I. Outline for today:

1. *A Course in Phonetics*: Chapter 1: Articulation and Acoustics
2. Homework

II. Notes

1. *A Course in Phonetics*: Chapter 1: Articulation and Acoustics (p. 13-24)

- a. Quick review: Places of articulation for English (p.11-13)
 - bilabial 雙唇; labiodental 唇齒; interdental 齒間 (dental 齒音); alveolar 齒齦/舌尖; retroflex 捲舌(翹舌); palato-alveolar 顎齦; palatal 硬顎; velar 軟顎/舌根/舌後

*Sounds we **won't** be discussing:

-marginal sounds in English: this includes extralinguistic sounds that occur in particular situations and are not part of the phonetic/phonological system of English, for example, coughs, sneezes, clearing your throat, which are not phonemes in any language.

Some sounds have only special uses in one language but are ordinary phonemes in another, e.g. in English, a lateral click means “giddy up”, used to tell a horse to get moving; however, in some languages – all in southern Africa – it is an ordinary phoneme)

b. The oro-nasal process

- Velic closure 軟顎閉塞狀態: The velum (aka the soft palate) is lowered to produce nasals (in English: *rang*, *ran*, *ram*); the air comes out through the nose while being prevented from going out through the mouth.
 - nasal consonant: when the velum is lowered and an **obstruction** is formed in the mouth
- Another possibility: incomplete velic closure
 - e.g. When articulating a **nasalized vowel** 鼻化母音, the velum is partly lowered, while air is **not** at the same blocked from going through the oral tract → air can come out through both the oral and nasal tracts

*nasalization 鼻化

- in English and Mandarin: not a phonemic feature, i.e. not included in the IPA chart of the language and does not change the meaning of words, e.g. if you pronounce “say” as [sẽi] instead of [seɪ], it’s a bit odd, but it will still be understood as “say”. But:

- in Southern Min, vowel nasalization is **phonemic**, i.e., it produces different words with different meanings,

e.g. 鞋仔 ‘shoes’ [e-a] vs. 嬰仔 [ẽ-a] ‘baby’

- The oro-nasal process: controlled by raising or lowering the velum
→ the distinguishing factor between oral and nasal sounds

c. Classifying consonants according to their manner of articulation

- Manner vs. place: *manner* refers to the **way** in which a sound is produced, and how close the articulators are to each other
- The articulators may:
 - i. close off the oral tract for a very short time or for a relatively long period
 - ii. narrow the space in the oral tract considerably
 - iii. modify the shape of the oral tract by approaching each other
- Terms for sounds formed in different manners

(1) Stop 塞音: two different definitions are current in phonetics

- i. a complete closure which prevents the air from escaping through the mouth
- ii. a complete stoppage of the airflow in both the nose and the mouth

Two types: (from oro-nasal process to articulatory process) 🗣️👃👄

oral stop (aka stop)	nasal stop (aka nasal)
velum raised	velum lowered
articulators in the oral tract approach and make contact	articulators in the oral tract approach and make contact
no air escapes till release of stop	air escapes through the nose throughout the sound
pressure builds up in the mouth	no pressure builds up
when the articulators come apart, the compressed air is released in a small burst of sound through the mouth	when the articulators come apart, there is no burst of sound
there are changes in sound quality (beginning, middle, end) → stop	no quality change throughout the sound → continuant
e.g. <i>pie, buy, tie, dye, key, guy</i> (bilabial/alveolar/velar contact)	e.g. <i>my, nigh, sang</i> (bilabial/alveolar/velar contact)

***A few things to pay attention to:**

- You'll see the word **plosives** in IPA tables. Plosives 爆音 are the ordinary kind of stops we've been discussing so far – they have an egressive airstream mechanism, which means the air leaves the lungs in an **outward** direction. There are also stops in which the air goes **inward** toward the lungs – we'll talk about these next semester.

- In English, the velar nasal (i.e. [ŋ] in *sang*) normally does not appear at the beginning of a syllable; you can, however, find it **between** words, e.g. in *sing a song* [sɪŋ ə sɔŋ] due to linking, and in the Vietnamese family name *Nguyen* [ŋ^wiəŋ] 阮, though it's usually pronounced something [nə'wɪn] in English.

*A comparison of **bilabial stops** in English and Mandarin



English	[b]: voiced (when following a voiced sound), unaspirated e.g. <i>abide</i> (voiceless in <i>bye</i> [b̥]) (diacritic: [̚] devoicing)	[p ^h]: voiceless, aspirated e.g. <i>pie</i> (unaspirated in <i>spy</i> [p])
Mandarin	[p]: voiceless , unaspirated (ㄆ) e.g. 拜 [pɑɪ]	[p ^h]: voiceless, more strongly aspirated than in English e.g. 派 [p ^h ɑɪ]

*Compressed air in the articulation of stops

- The holding in of compressed air behind an obstruction can be viewed as a key defining feature of stops; under this condition, **nasals** do not qualify as “stops”

*Voicing of stops

-In English, voiced stops tend to be devoiced when at the beginning of an utterance or of a word; they are voiced when they follow another voiced sound.

e.g. **bout* (一陣、一回合), *guy*, *day* vs. *about*, a *guy*, a *day*

-In Mandarin, all stops (ㄅ ㄆ ㄇ ㄊ ㄋ ㄌ) are voiceless. Stops that share the same place and manner of articulation differ only in the feature of **aspiration**.

-In Southern Min, there are two voiced stops, /b/ and /g/ (but not /d/), e.g. /b/ as in 醜 [bai], though it is not exactly the same sound as [bar] in English

*Minimal pair

-a pair of words that differ only in one sound 最小對比的一對詞; if there are more than two such words, it is called a **minimal set**.

e.g. English [pɑɪ] (voiceless) vs. [bar] (voiced)

*Nasal-sounding voice vs. nasal

-Often your voice sounds nasal when you have a cold. Why?

→When people have a stuffed nose, the spongy tissues in the nose are filled with mucus 鼻涕 and swell 變得更飽滿, which produces different resonances in the nasal cavity, and this changes the quality of speech sounds. Some people may say you're speaking in a nasal voice, but you're actually using a kind of anasal voice 非鼻音, if you're so congested you can't breathe normally through your nose.

- (2) Fricative 擦音: close approximation of two articulators → airstream partially obstructed
→ **audible turbulent airflow**
e.g. *fie*, *vie* (labiodental), *thigh*, *thy* (indertental), *sigh*, *zoo* (alveolar), *shy* (palate-alveolar)
- **Sibilants** 嘶音: produced by a narrowing between the blade of the tongue and the (back part of the) alveolar ridge → higher-pitched sounds with a more obvious hiss 嘶聲/咝音
e.g. /s, z, ʃ, ʒ, tʃ, dʒ/. (/tʃ, dʒ/ are classified as **affricates**; see (5) below)
- (3) Approximant 接近音: one articulator is close to another, leaving space for the air to pass through without causing a turbulent airflow
e.g. *yacht* (palatal), *we* (bilabial and velar), *raw* (alveolar)
- (4) Lateral 邊音: obstruction of the airstream by the tongue tip at a point along the center of the oral tract, with incomplete closure between one or both sides of the tongue and the roof of the mouth; the air escapes through one or both sides of the tongue
e.g. *lie*

*Do we always use both sides of the tongue when producing a lateral sound?

-Not necessarily, because the human body is not completely symmetrical.

(5) Additional Consonant Gestures

- i. Trill (or “rolled r”) 顫音: the tongue is in free vibration, striking the alveolar ridge at least three times
e.g. *rye*, *raw* (in some forms of Scottish English)
- ii. Tap (or “flap”) 閃音: the tongue makes a single tap against the alveolar ridge
e.g. *pity*, *city*, *butter* Although this sound is often called a “flap” in other texts, and especially in ESL materials, we will consistently call it a “tap”, because we will need the term “flap” next semester for a quite different kind of sound.
- iii. Affricate 塞擦音: combination of a stop immediately followed by a fricative; the tongue tip or blade and alveolar ridge come together for the stop and separate only slightly
→ a fricative is made at approximately the same place of articulation
e.g. *church*, *judge*

*The affricate [tʃ] in phonetics and in phonology

- in phonetics, the affricate [tʃ] (as in *church*) is analyzed as two separate sounds, i.e. it is a composite sound 複合音 → often excluded in many IPA consonant charts
- in phonology, [tʃ] is structurally one sound because it often represents a single **phoneme**, and is often represented with a single symbol with a diacritic: /č/ (˘ is a diacritic called a “háček”; this word and the symbol are from Czech; /č/ is read as “c-“háček”)

- iv. Glottal stop 喉塞音: a complete stoppage of the airflow in the **glottis** 聲門 (the cavity between the two vocal folds); the tip of the tongue does **not** touch the alveolar ridge, or anywhere else.



Distribution:	at the beginning of words that start with a vowel	As an allophone of /t/
e.g.	<i>ee<u>k</u>, oa<u>k</u>, a<u>r</u>k</i> (easy to overlook) <i>flee <u>e</u>ast</i> (sometimes obvious)	<i>bu<u>t</u>ton, im<u>p</u>ort<u>a</u>nt <i>i<u>t</u> may, hi<u>t</u> me</i></i>

➔ See more about the production of glottal stop in **handout for unit 5, Sept. 24.**

➔ For more details about the terms **phoneme** and **allophone**, please read this page of the course website: <http://homepage.ntu.edu.tw/~karchung/intro%20page%2014.htm>

2. Homework:

- a. Make and print out waveforms with WASP:

<http://homepage.ntu.edu.tw/~karchung/intro%20page%2016.htm> (\$)

Record: (1) "My two boys know how to fish." and (2) "Tom saw nine wasps."

Use the audio recordings together with the waveforms to check the sentences in the book.

- b. Start working on the ch. 1 exercises, p. 25-32.

- c. Read webpages 11. Romanization I and 12. Romanization II

<http://homepage.ntu.edu.tw/~karchung/intro%20page%2011.htm>

<http://homepage.ntu.edu.tw/~karchung/intro%20page%2012.htm>

Pronunciation corrections: framed syllables are stressed; * = tonic stress

Longman	['lɒŋmæn]	→ ['lɒŋmən] (reduced vowel)
consider	[kən'sɪdə]	→ [kən'sɪdə] (reduced vowel; vowel)
When you say these	When you say these	→ When you say these (pronouns → function words → no stress)
sequence	['sɪkwəns]	→ ['sɪkwəns] (the [w] was missing)
velum	['vɪləm]	→ ['vɪləm] (vowel) similar: velic [ɪ]
soft	[sɒft]	→ [sɒft] (vowel)
consonant	['kənʃənənt]	→ ['kənʃənənt] (in Midwestern US English; [kan] sounds like 咖+恩 not like 康 [kaŋ])
Raising or lowering the velum_controls...	no pause	→ pause after the subject
oral	['ɔʊ-ɹəl]	→ ['ɔʊɹəl] (AE: r-coloring)
articulation	[ɑrtɪku'leɪʃən]	→ [ɑrtɪkju'leɪʃən] (the [j] was not clear)
considerably	[kən'sɪdəjəbli]	→ [kən'sɪdəjəbli] (reduced vowel; alveolar nasal)

they	[leɪ]	→ [ðeɪ] (stick out the tongue)
each other	<u>each</u> * <u>other</u>	→ each other (pronouns → no stress)
other	['aðə]	→ ['lðə] (vowel)
modify	['mɒdɪfaɪ]	→ ['mɑdɪfaɪ] (vowel)
of	[ɒf]	→ [əv] (vowel and consonant) (<i>of</i> may be the only word in modern English in which the /f/ is pronounced as a [v])
stop	[stɒp] (BE)	→ [stap] (AE; stick to one variety)
articulatory	[ɑː'tɪkjʊlətɔːɹi]	→ [ɑː'tɪkjʊlətɔːɹi] (reduced vowel)
raised	[reɪsɪd]	→ [reɪzɪd] ("s" is voiced, vowel lengthening); contrast with <i>race</i> [reɪs]
blocked off,...	flat	→ <u>blocked</u> * <u>off</u> ,...(tonic stress; continuation rise)
completely	[kəm'plɪtli]	[kəm'plɪtli] (vowel)
...will build up_and	no pause	→ pause before conjunctions and punctuation
kind	[kaɪnd]	→ [kaɪnd] (tongue tip touches the alveolar ridge) similar: <u>sound</u>
alveolar	[əl'vɪlə]	→ [əl'vɪlə] (vowel) similar: <u>velar</u> [i]
these	[ðɪs]	→ [ðɪz] (vowel; consonant)
sounds	[saʊnz]	→ [saʊndz] (consonant; [dz] sounds like ‘字’) → similar: <u>words</u>
oral cavity	<u>oral</u> * <u>cavity</u>	→ * <u>oral</u> cavity (adjective ending in ‘-al’ + noun → often pronounced as a compound noun)
cavity	['keɪvəri]	→ ['kævəri] (vowel)
the one	[ði wʌn]	→ [ðə wʌn] (one [wʌn] does not begin with a vowel)
close	[klaʊz] (v.)	→ [klaʊs] (the /s/ is voiceless in the adjective form)
illustrate	['ɪləstreɪt]	→ ['ɪləstreɪt] (first syllable is stressed)
alveolar ridge	al* <u>veolar</u> ridge	→ al <u>veolar</u> * <u>ridge</u> (phrasal stress)
called	[kɔld]	→ [kɔld] (vowel)
fricative	['frɪkətɪv]	→ ['frɪkətɪv] (the /t/ in this word is not a tap)
without the	[wɪ'θaʊðə] (no stop)	→ [wɪ'θaʊðə] (glottal stop)
the	[də]	→ [ðə] (stick out the tongue)
consonants	['kʌnsənənt_]	→ ['kʌnsənənts] (the final plural [s] was missing)
region	['rɪʒən]	→ ['rɪdʒən] (consonant)
incomplete	['ɪnkʌm'plɪt]	→ ['ɪnkʌm'plɪt] (vowel)
status	[stæəs]	→ both [stæəs] and [steɪəs] are used
tongue	[tuŋ]	→ [tʌŋ] (vowel)
that matter	[ðætə'mæərə] (no stop)	→ [ðætə'mæərə] (glottal stop)
in_English	in/English (no linking)	→ link the final [n] in <i>in</i> to the initial [ɪ] in <i>English</i>
roll and tap	no pause	→ pause before conjunctions

the alveolar ridge,...	flat	→ the alveolar *ridge, ... (tonic stress; continuation rise)
pity	['pɪtɪ]	→ ['pɪrɪ] (vowel, and /t/ becomes a tap)
the production of some sounds	the production of some *sounds	→ the production of *some sounds (when <i>some</i> means 'certain', which implies there is a contrast, it is stressed)
stop closure	stop *closure	→ *stop closure (compound noun)
combination	[kambə'nɛʃən]	→ [kambə'neɪʃən] (vowel)
affricate	['æfɹɪkət]	→ ['æfɹɪkət] (vowel; -ate: nouns and adjectives: [-ət]; verbs: [-ɪt])
for the stop and then...	no pause and flat	→ pause before conjunctions and after the transitional words; continuation rise
separate (a.)	['sepəreɪt]	→ ['sepɹət] (the schwa [ə] in the middle is omitted when the word is an adjective)
EEK	[eɪk]	→ [ɪk] (vowel)
, etc. (=et cetera)	[ɛk 'setʃərə]	→ [ɛt 'seɹərə] (there should be no [k], should be [t]; tap; even very educated native speakers often make a similar mistake and say [ɛk 'seɹərə])
glottal	['glɒtəl]	→ ['glɑrəl] (vowel; tap)
beginning	[bɪ'gɪnɪŋ]	→ [bɪ'gɪnɪŋ] (vowel; nasal)

*Stress in phrasal verbs think through

-In phrasal verbs, the tonic stress is on the final particle,

e.g. take *off, dream *up, come *on, think *through

-If it is just a verb followed by an ordinary preposition, the preposition is not stressed, e.g.:

e.g. The books were put on the *desks. The bird flew through the *air.

*tonic stress: the final stress of the utterance (or thought group) is very high and signals the end of the utterance. (See Unit 3 handout)

*Pronunciation of words that end in -ate



Function as a	verb	noun or adjective
-ait	[-ɪt]	[-ət]
e.g. separate	['sepəreɪt]	['sepɹət]
affricate	--	['æfɹɪkət]
graduate	['ɡrædʒueɪt]	['ɡrædʒuət]

*r-coloring in American English

-In General American English, vowels before /r/ generally have r-coloring.

e.g. hero [hɪr-ɪoʊ], zero [zɪr-ɪoʊ], oral [ɔr-əl]

-In some pronunciation styles, not all V + /r/ words have r-coloring.

e.g. ICRT DJ Mike Woodward pronounces *hero* as [hi-ɹoʊ] and *zero* as [zi-ɹoʊ].

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***Pronunciation of words that end in -ate**

Function as a	verb	noun or adjective
-ate	[i-ent]	[i-at]
e.g. separate	[ˈseɪpənt]	[ˈseɪpət]
affiliate	—	[əˈfɪliət]
graduate	[ˈɡrædʒuət]	[ˈɡrædʒuət]



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