Introduction to Phonetics I

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8. Waveforms of Consonants

I. Outline for today:

1. Issues found in students' notes and dictations
2. Quiz on compound stress
3. *A Course in Phonetics*: Chapter 1: Articulation and Acoustics
4. Homework

II. Notes

1. Issues found in students' notes and dictations

a. Some people have trouble distinguishing [e], [eɪ], [ɛ], and [æ]

(1) bet [bɛt] is often mispronounced as either [bæt] or [beɪt]

→ to correct, raise your jaw and barely open your mouth; put your hand under your jaw and push up to create a tactile memory to remind yourself of the correct place of articulation for this vowel

(2) bat [bæt]: Taiwan students usually have no problem with this vowel

→ lower your jaw a lot

(3) bait [beɪt] often mispronounced as [bæt] or [bɛt]

→ spread your lips; pronounce [eɪ] just like how you pronounce 注音 ㄟ, emphasizing the second part of ㄟ, the 「ㄧ」

(4) The phoneme [e] does not exist in English as a monophthong! In English, it appears as part of the diphthong [eɪ]. In a similar way, the monophthong [o] is also a component of the diphthong [oʊ]. [e] and [o] are used in KK symbols to represent [eɪ] and [oʊ], which can be misleading for Taiwan students, because these sounds are **diphthongs** in General American. (The sounds are however more monophthongal in some *dialects* of US English.)

b. What fonts should you use for your notes?

(1) **Times New Roman 12 pt** – for **text** (for titles, it's OK to use Arial)

(2) **Lucida Sans Unicode 10.5 pt** – for **IPA symbols** (Lucida Sans Unicode is a large font so it needs to be reduced in size to more closely match the size of New Times Roman 12 pt)

c. Be more complete in writing your notes! Although there is no need to make your notes into an essay, still please do not be too telegraphic. Your notes should be understandable to another reader.

d. How do you say 美國南部 in English?
- the southern part of the U.S. OR: "the U.S. South": 美國南部 (**NOT** South America 南美洲)

e. How do you say 沒有重音 in English?
- unstress 不放重音 or destress 拿掉重音. (**NOT** distress 使沮喪)

f. How do you write the abbreviation of *versus*?
- vs. – **add a period** after the *s* (**NOT** v.s. or v.s) The period just means "this is an abbreviation"; it doesn't mark the exact *place* where letters have been omitted.

g. Where do you leave spaces when using parentheses?
(1) Space **before and after** the parentheses, i.e. **outside of** the parentheses, e.g. Put_(the spaces)_in these positions.
(2) No space after the right parenthesis just before punctuation e.g. Omit it (before a period).
(3) Leave **NO** spaces inside the parentheses, i.e. don't do this: Don't leave (spaces) inside of parentheses.

h. Easily confused terms:
- epiglottis 會厭 vs. oesophagus (British spelling) or esophagus (American spelling) 食道

2. Quiz on compound stress

a. Instructions:
(1) Circle the stressed **syllable(s)** of the compound or phrasal noun and indicate the **tonic stress** of the item by adding an asterisk * in the upper left-hand corner of **the last stressed syllable** of the item.
e.g. *con***venience store* or *con***venience store* (in this case, the *n* is both part of the second syllable and part of the third syllable, so both are OK; this is called "ambisyllabicity")
(2) Rule for **compound noun stress**: When two nouns are put together, the first of which modifies the second, the modified noun (on the right) receives **no stress**.

If there are more than two nouns, find the two with the closest relationship to each other, apply the above rule, then treat the result as a **single word**. Then apply the rule to that result and the remaining noun(s).

The basic rules for compound noun stress can be found in CET article #5:
http://homepage.ntu.edu.tw/~karchung/pubs/73_hello_et.pdf

Links to all of the CET articles can be found here:
http://homepage.ntu.edu.tw/~karchung/Karen/Karen_Chung_publications.htm#CET

b. Answers, corrections, and explanations:

Students' answers	Class	Corrections or explanations
(1) *urban area	compound[1]	urban (or urban) *area (or *area)
(2) stringed *instrument	phrase[2]	stringed: past participle 過去分詞 → adjective cf. gerund 動名詞 → noun
(3) *paper clip	compound	*paper (or *paper) clip
(4) *can opener	compound	
(5) serious *error	phrase	serious *error (or *error/ *error)
(6) *beach towel	compound	
(7) *shadow boxing	compound	or *shadow boxing (more natural)
(8) silly *joke	phrase	silly *joke (monosyllabic word→ circle the whole word)
(9) *restaurant manager	compound	or *restaurant (more natural) / *restaurant manager
(10) sticky *fingers	phrase	or sticky *fingers (*ck* → digraph → do not separate)

*Footnotes: [1]compound (compound noun): noun + noun [2]phrase: adjective + noun

c. More about compound nouns and syllables:

- Sub-rules for compound noun stress: (1) When the modifying noun is the main material or ingredient of the latter, both nouns are stressed, e.g brick *wall, glass *door.
- When the modifying noun is an (2) a time, (3) a place, or (4) some kind of organization, then very often both nouns are stressed. Note that you will not find these rules in many textbooks, and also that there are many exceptions to them. Pay attention when people are speaking to pick up the correct stress of items like these. Examples: (2) Monday *evening; (3) kitchen *sink; (4) world *leader (*world* can also be interpreted as a "place"), family *meeting.
- Ambisyllabicity: the ability of a sound to be part of both the previous and the following syllable (*ambi-* means 'both'), e.g. the "l" in *melon*

3. *A Course in Phonetics*: Chapter 1: Articulation and Acoustics (p. 17-20)

a. Glottal stop **[ʔ]**: a closing (and often an opening immediately after) of the glottis
(glottis 聲門: a space between the vocal folds)
e.g. *hit Robert* ['hɪʔ 'ɹɑbɚt] (the vocal folds are held together tightly, temporarily interrupting the airstream)

b. Address these five parameters when describing a consonant:

(1) **State of the vocal folds**: whether the vocal folds are vibrating or not, i.e. whether the consonant is **voiced** or **voiceless** 有聲/無聲 or 帶音/不帶音

(2) Place of articulation: bilabial, interdental, alveolar, palatal 舌面音 (e.g. [j]), velar 舌後音, uvular 小舌音, retroflex 捲舌音, palato-alveolar 顎齦音 (cf. alveolo-palatal 齦顎音: Mandarin ㄐㄑㄒ)

(3) **Central** 中央音 or **lateral** 邊音 articulation: [l] – the only lateral consonant in English

(4) **Soft palate**: raised → velic closure → **oral** sound; lowered → no velic closure → **nasal** sound
(5) **Manner of articulation**: stop 塞音, fricative 擦音, affricate 塞擦音, approximant 接近音
→For (3) and (4), **central** and **oral** are the default → usually we don't need to mention them
e.g. [s] is a voiceless alveolar (central) nasal (stop)

*Discussion in Facebook group "NTU Phonetics"

- Please go ahead and post anything interesting
- Rich environment – there are lots of former phonetics students and high profile linguists and phoneticians in the group
- Topics brought up by students:
  i. Video: The woman who says 'biscuit' 900 times an hour: Listen to an interview with a Tourette's sufferer (submitted by Jamie Yu)
  ii. Nasalization in Mandarin: Some Taiwan Mandarin speakers, especially from the South, have a nasalized vowel when saying 怕 [pʰã] and 把 [pã]
  - Excellent observation. There's a reason for everything, and we should try to collect relevant data and find out more about phonetic variations like these.
  - In English, there's something similar, especially in British English. American English is a rather nasal dialect of English, and many "extra" nasalized sounds are present (at least true for many Americans). British English, on the other hand, is generally "drier", or less nasal, but if you listen to the BBC, you will notice that the announcers may use nasalization to *emphasize* certain points or to sound more authoritative.
    → Start listening to BBC and you can collect data like this.

*Clarifying: [ɔ] before *–l* and *-r*

- In American English, the [ɔ], although generally described as a monophthong (and it is indeed a monophthong in standard British English), is actually diphthongal in nature. Its pronunciation is similar to Southern Min 芋仔 contracted into a **single syllable**. e.g. law, draw
- Before *-l* and *-r*, the second part of the "diphthong" is cut off. e.g. or [ɔɹ], oral ['ɔɹəl]

c. The waveforms of consonants:
- One thing that can't be seen from a waveform: the **place** of articulation of a sound
- What is **usually visible** in waveforms:
  (1) the principal **manners** of articulation – stops, nasals, fricatives, and approximants
  (2) whether a sound is **voiced** or **voiceless**

- Waveform for illustration:

[m] voiced nasal produced behind the closed lips → smaller amplitude (muffled and less loud)
[aɪ] voiced diphthong vowel → larger amplitude (louder); longer duration (longer)
[t] voiceless stop
→(1) flat line (a silence or pause before the stop when holding and compressing air in the oral tract)
(2) a burst (the articulators open and forcefully release the compressed air in the mouth, which explains why oral stop consonants are called "plosives" in the IPA chart)
(3) friction (air released through the mouth)
[b] voiced stop → small voicing vibrations from the vocal folds; these have a small amplitude; they are produced in the larynx and with closed lips and are thus less loud
[z] **voiced fricative:** it has both **evenly spaced lines** due to **voicing**, and also **irregular lines**, due to the **noise** made by the turbulent air
[n] voiced nasal produced behind the alveolar ridge → it has evenly spaced lines and a smaller amplitude than vowels (it is muffled and thus less loud)
[h] short aspiration → with hardly any voiceless interval
to: first element of an infinitive 不定詞的第一個成分 → it carries little information value
→(1) [t] is pronounced with hardly any closure and has a very short duration
(2) [ə] is a reduced vowel (= a schwa) → only a few vocal fold pulses
[f] voiceless fricative → smaller amplitude
[ʃ] voiceless fricative → smaller amplitude (larger however than [f])

*Vocabulary: to flatline (v.)
- in a medical context, "to flatline" can mean somebody is dead (= no more brain waves display on an encephalogram)

*Voiced stops
- voiceless when word-initial with no preceding voiced sounds
- voiced when preceded by a voiced sound (the [u] in *two* before *boy*, in this case)

*the [h] sound
- has no specified place of articulation; its place of articulation depends on the vowel that

follows it

- not even included in some consonant charts
- not a fricative; it is simply **aspiration** or **breathing air out**

d. The articulation of vowel sounds

- Main difference between vowels and consonants: the articulators do not come as close together for vowels → there is less obstruction of the airstream in the oral tract

- Description of vowels: vowel sounds can be **roughly** described in terms of
  (1) the position of the highest point of the tongue: it would be difficult to use an articulatory description for vowel sounds because it is hard to know exactly what our tongue is doing in what part of our mouth → we can mark the part of the tongue that sticks up the highest; however, actual measurements are done ***acoustically*** and ***auditorily***, not *articulatorily*!
  (2) the position of the lips

- The tongue and the lips are in continuous motion throughout the vowels in saying words like the following:
  (1) *heed* [i] (2) *hid* [ɪ] (3) *head* [ɛ] (4) *had* [æ] (5) *father* [ɑ] (6) good [ʊ] (7) *food* [u].
  *Homework: Say the vowels and feel where your tongue is (i.e. what part of the vocal tract it is close to), and what it does to form each of these vowels. Train yourself in feeling it (this is called **proprioception**); it is harder to realize what your tongue is doing when producing vowels than it is when producing consonants.

- The positions in the figure below are best considered as the **targets** of the gestures of the vowels → a "target" indicates where our tongue should *theoretically* reach, but we don't necessarily attain the target every time we say the vowel (vowels are easily affected by neighboring sounds)

In all these gestures:

- the tongue tip is down behind the lower front teeth;
- the body of the tongue is domed upward.

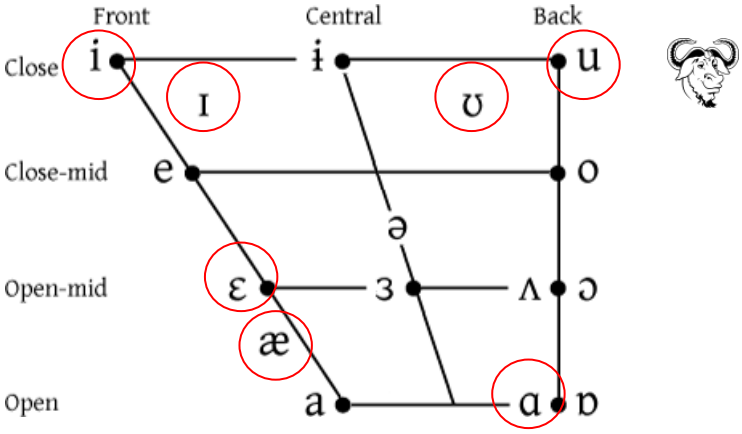
- **Front** and **back** English vowels: 前母音與後母音

  (1) Front vowels (from high to low): [i, ɪ, ɛ, æ]

  (2) Back vowels (from high to low): [u, ʊ, ɑ]

  Although both are classified as high vowels, [u] is not as high as [i] because there is less space vertically at the back of our oral cavity, which is close to the jaw hinge, than in the front.

- The International Phonetic Alphabet vowel chart for English: (circled: sounds discussed here)



4. Homework

   a. Practice feeling where your tongue is when saying the vowels in *heed* [i], *hid* [ɪ], *head* [ɛ], *had* [æ], *father* [ɑ], *good* [ʊ], *food* [u].

   b. Finish exercises for chapter one (will be discussed and marked on Monday, Oct. 8).

   c. Do the Hanyu Pinyin tutorials.

   d. Make and print out WASP waveforms of
   - "My two boys know how to fish."
   - "Tom saw nine wasps."

   e. Make sure you are up to date in your reading.

   f. Hand in class notes by Monday, Oct. 8.

Pronunciation corrections:

framed syllables are stressed; * = tonic stress

oral	['oʊɹəl]	→ ['ɔɹəl] (vowel, with "r-coloring")
articulatory	[aɹ'tɪkjulətɛɹi]	[aɹ'tɪkjulətɔɹi] (vowel)
five	[faɪf]	[faɪːv] (lengthening of vowel before voiced consonant; voicing of [v])
at_the …	rushing through the words, failure to stop at stops	stop at stops (at [ʔ] the/ not [ʔ] necessary/ not [ʔ] lateral)
not_necessary		
not_lateral		
left out,	flat	left *out (tonic stress and continuation rise before punctuation)
at_this stage	[æðɪs]	Stop at stops (at [t] this)
not	[nʌt]	[nɑt] (vowel)
the acoustic	[ðə]	[ðiː] (before vowels)
noting	['nɔtɪŋ]	['noʊtɪŋ] (vowel: diphthong)
articulation	[aɹtɪku'leɪʃən]	[aɹtɪ**kju**'leɪʃə] (vowel: needs a [j] glide)
manners of articulation…	flat	*manners of articulation (to show contrast with *places of articulation* mentioned before)
apparent	[ə'pæɹənt]	[ə'pɛɹənt] (system: Midwestern variety)
bottom	['bɒtəm] (BE)	['bɑɾəm] (system: AE) 底部 cf. button ['bʌtʔn̩] 鈕扣
interval	[ɪn'tə˞vəl]	['ɪntə˞vəl] (word stress)
…of the airstream is	flat	continuation rise (at the end of the long string of subject)
the x-ray_movie	pause	no pause between x-ray and movie (a noun phrase)

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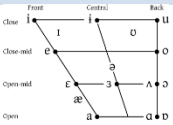
7			WIKIMEDIA COMMONS (http://commons.wikimedia.org/wiki/File:English_vowel_chart.png) 2013.1.12 visited.
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