LING 450/550
14-Tone

Projects

Check out Canvas later to find the identity of your mystery language and a published article about its sound system.

- You may also find additional sound files. You do **not** need to transcribe any additional sound files for this project, but they are provided in case you want to listen to examples mentioned in the article.

In part II, compare your analysis to the one in the article and comment on the differences.

- More detailed instructions are given in the project guidelines.
- Your analysis is not necessarily wrong! The published article is just one analysis. Some of the IPA charts are especially subpar.

Project Languages

Now that you've turned in part I of the project, we can talk more freely in class about your assigned languages.

- I've been holding off so as to not give answers to some people but not others.
- If your language involves a good example of something that we're discussing in class, let me know! We can pull up Praat and listen to your sound files together.

Tone

THE EFFECTS OF PITCH ON MEANING

READ LADEFOGED & JOHNSON, CHAPTER 10 (PP. 264-271)

adapted from slides by Richard Wright, Dan McCloy, and Valerie Freeman

Pitch

Recall that *pitch* is the perceptual correlate of the fundamental frequency (f_0) of a speech signal.

Different people can have very different pitches.

- People with larger vocal folds (e.g., men) are generally perceived to have lower pitch, as large things tend to move slowly. Slow vocal fold vibration → low f_0 → low pitch.
- People with smaller vocal folds (e.g., children) are generally perceived to have higher pitch, as small things tend to move quickly. Fast vocal fold vibration → high f_0 → high pitch.

Pitch

Even within a single person's speech, pitch can change.

- Singers provide the most obvious example of changing pitch, but even regular speech is rarely monotonous.

Pitch (f_0) is primarily modulated by changing the tension in the vocal folds. Higher tension yields faster vibration and thus higher f_0.

- Pitch is also affected by the rate of airflow through the glottis. A faster rate of airflow causes the vocal folds to vibrate faster.
- To some extent, the position of the vocal folds also affects pitch. For example, creaky-voiced sounds tend to have a slower rate of vibration (and thus lower pitch) than their modal-voiced counterparts.

Pitch affects meaning in all languages, in one way or another.

Lexical Tone

In some languages, the pitch of a sound can change the lexical meaning of the word it is part of.

- The phenomenon is called *lexical tone*; such languages are called *tone languages* (or *tonal languages*).
  - Some examples of tone languages are Mandarin, Vietnamese, Hausa, and Zulu.
  - About 49% of the world's languages are tone languages.

Canonical example from Mandarin:

- ma 55 (媽) "mother" ma 35 (麻) "hemp"
- ma 214 (馬) "horse" ma 51 (罵) "scold"

http://corpus.linguistics.berkeley.edu/acip/course/chapter10/chinese/chinese.html

(Here tone is transcribed using numbers. More on that shortly!)

Grammatical Tone

Pitch can also act as an inflectional element, so that the basic meaning of the word stays the same but grammatical features like tense or case are affected. This is called *grammatical tone*. Grammatical tone is common in the tonal languages of Africa.

Example from Edo:

- [ì mà] “I show”
- [ì má] “I showed”
- [í mà] “I am showing”

(Here tone is transcribed using diacritics. More on that shortly!)

Level Tones and Contour Tones

Tone is usually considered a characteristic of syllables, with the tonal information most clearly audible on the syllable nucleus (i.e., the vowel or syllabic consonant).

- In some languages, tone appears to operate at the word level, so that multisyllabic words will always show the same tone on all syllables.
- *Level tones* (or *register tones*) have a relatively stable pitch for the duration of the syllable.
  - http://corpus.linguistics.berkeley.edu/acip/appendix/languages/ibibio/ibibio.html
- *Contour tones* change pitch noticeably over the course of the syllable.
  - http://corpus.linguistics.berkeley.edu/acip/course/chapter10/chinese/chinese.html

http://www.youtube.com/watch?v=foImPuD_bKc

Transcribing Level Tones: Diacritics

The simplest tone languages (e.g., Shona, Zulu) have just two level tones (high and low). High tones are transcribed with an acute accent [á] and low tones with a grave accent [à].

- In languages with three level tones (e.g., Yoruba), the high and low tones are transcribed as above. The middle tone is often left unmarked, but can also be marked by a macron [ā].
- In languages with more than three level tones, the additional tones are transcribed as extra-high [a̋] or extra-low [ȁ].

Transcribing Contour Tones: Diacritics

Contour tones can be transcribed by combining level tone accents into new diacritics.

- Rising tone combines low+high: ̀+́ → ǎ
- Falling tone combines high+low: ́+̀ → â
- Low-rising tone combines low+mid: ̀+̄ → a̰
- High-rising tone combines mid+high: ̄+́ → a̋

Transcribing Tone: Lines and Numbers

Tones can also be transcribed with line graphics following the syllable, or sequences of numbers showing the beginning and ending points of the tone (1=extra-low, 2=low, 3=mid, 4=high, 5=extra-high).

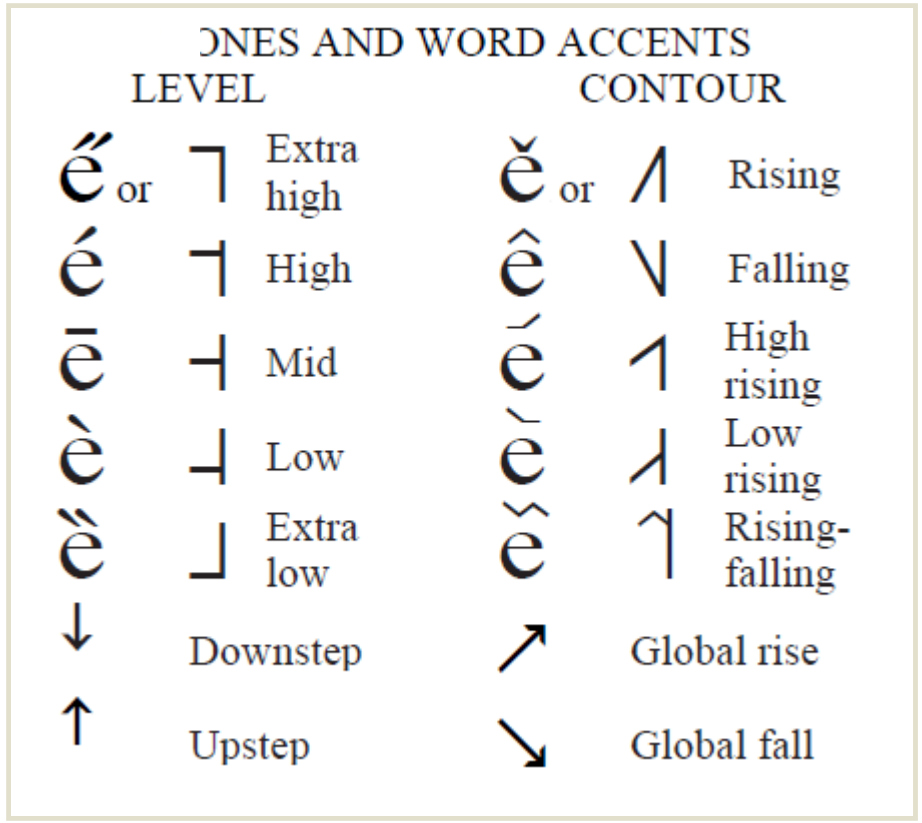
Examples (imaginary words):

- Extra-low tone: da˩ (da^{11})
- Mid tone: da˧ (da^{33})
- Falling tone: da˥˩ (da^{51})
- High rising tone: da˧˥ (da^{45})
- Low dipping tone: da˨˩˧ (da^{214})

Transcribing Tone: IPA Chart

The IPA uses two of these systems: diacritics and lines (*tone letters*).

Contour tone letters can generally be typed by combining level tone letters.



Tone Overlap and Tone Sandhi

Just as neighboring segments influence each other through coarticulatory processes, neighboring tones can also influence each other.

- Pitch changes during speech tend to be continuous; we don't abruptly jump from one pitch to another, but glide smoothly between pitches. So for example, a low tone that follows a high tone will often begin with a downward movement of pitch.
- Systematic changes of neighboring tones are called *tone sandhi*. Common types of tone sandhi:
  - Rules that make neighboring identical tones different:
    e.g., Mandarin "very cold" [xɑʊ^{214}]+[ləŋ^{214}] → [xɑʊ^{45} ləŋ^{214}]
  - Rules that spread the first tone of a multisyllabic word across the entire word:
    e.g., Shanghainese "universe" [tʰi^{51}]+[di^{15}] → [tʰidi^{51}]

Pitch Accent

In some languages, tone is only pronounced on certain types of words or certain words in the sentence.

- Such languages are often called *pitch accent* languages, though this term is not always used consistently in the literature.
  - Confusingly, *pitch accent* is often used to describe a phenomenon of intonation. Today we are concerned with a phenomenon of tone.
- It is thought that tone in pitch accent languages is not truly phonemic, but gives some information about the form of inflected words (e.g., whether its root form is monosyllabic or disyllabic).
- Languages with pitch accent include Japanese, Serbo-Croatian, and some dialects of Swedish.

Example of Pitch Accent: Japanese

Pitch-accent languages allow only one syllable within a word to carry non-neutral tone:

- [háʃi] “chopsticks”
- [haʃí] “bridge”
- [haʃi] “end, edge”

The rest of the tone group will have a neutral tone, which can depend on the pitch pattern of the accented word:

- [háʃionɯɻɯ] “paint chopsticks”
- [haʃíonɯɻɯ] “paint a bridge”
- [haʃionɯɻɯ] “paint the end”

Other Types of Tone

The use of tone in language is not an “all or nothing” phenomenon.

- Some languages have a small number of words that differ only in tone, but which preserve historical information about the language (e.g., low tone indicating the loss of what was historically a syllable-final consonant).
- Scottish Gaelic is one example of such a language.

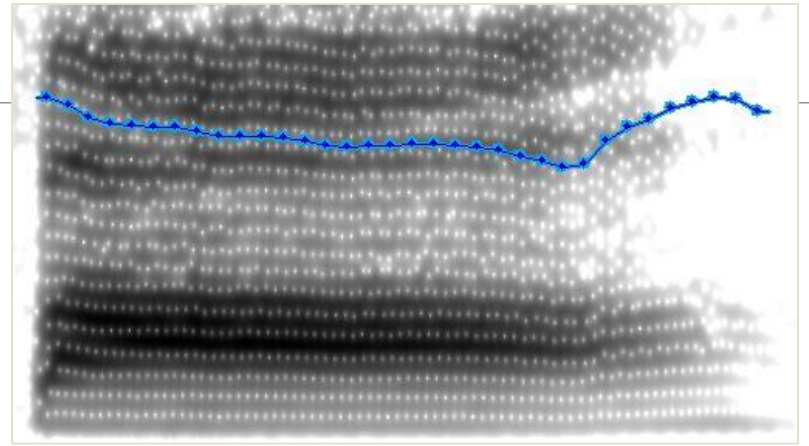
Tone Perception

You've probably noticed that we've been using the term "pitch" today rather than f_0. This is because terms like "high" and "low" are relative to a given speaker's f_0 range and a given context.

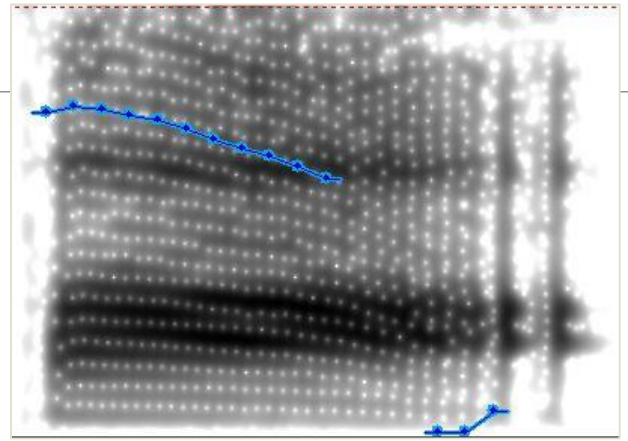
- There are no direct f_0 correspondences for high tone, low tone, etc., even within a single speaker.
- Tone interacts with intonation in complex ways that make direct correspondences problematic.

Tone is an area of phonetics in which auditory analyses still dominate, despite advancing technology in acoustics.

Tones on Spectrograms

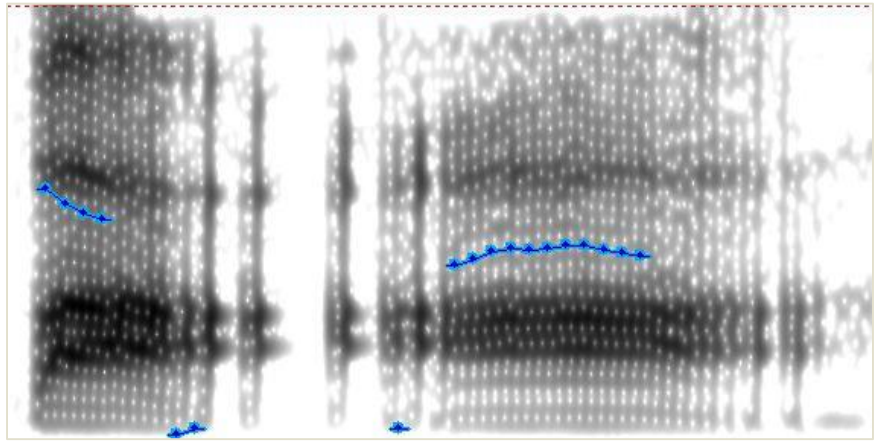


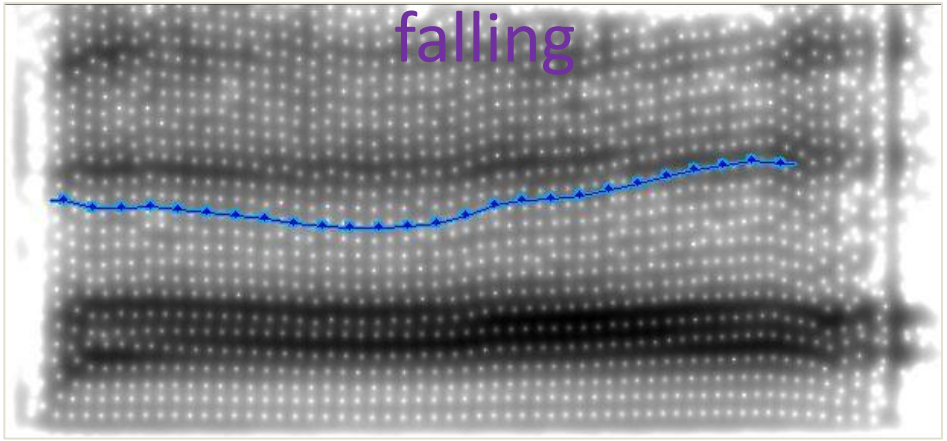
Mandarin lexical tones



‘eight’ [pa˥] high level

‘father’ [pa˥˩] high-to-low falling





‘to hold’ [pa˨˩˦] mid-low-mid dipping

‘to pull out’ [pa˧˥] mid-to-high rising

Practice with Tone

Listening and Transcription Practice

1. Download the section 14 materials folder. It contains 1-3 syllable pseudo-words with different tone contours

2. Practice listening to the tones. Make use of Praat to visualize as you listen.

3. Transcribe the words with the tones starting with the 1-syllable words and check your transcriptions.

4. Now listen again to some of the tones in real words that we heard earlier.

Recordings from Bruce Hayes site: https://linguistics.ucla.edu/people/hayes/103/TonePractice/index.htm

Reminders

For Monday read L&J Ch. 5,2

For Monday: HW 10 and Lab 2