Suprasegmentals (and syllables)

Syllables

- General idea of syllable is easy
- Phonetic details are not so clear
  - May be as much about phonology as phonetics
- Easy to harder questions:
  - How many syllables?
  - Where are syllable boundaries?
  - What are the phonetic (physical) properties of syllables?

How many syllables?

- Often pretty clear : ‘dad’ 1 , ‘banana 2
- What about these 1 or two syllables?
  - ‘tower’ vs. ‘hour’; ‘hire’ v. ‘higher’
    - /ˈtɑwɹ/ or /ˈtɑwər/ , /ˈhɑj(ə)ɹ/?
  - ‘feel’ : [ˈfiɬ] or [fiəɬ] ?

Syllable boundaries

- We have rules for English… but that seems more like phonology than phonetics
  - Native speakers can disagree
- But we seem to need to refer to syllables for understanding occurrences of some allophones
  - E.g. dark [ɬ] at end of syllable, clear [l] elsewhere
- Chicken and egg phenomenon?
  - Hard to do detailed phonetics without reference to phonology

Phonetic properties

- Hypothesis: Syllable centers are sonority or (loudness??) peaks
  - Maybe, but we need to exclude sibilants or ‘spa’ will be two syllables
  - No accepted phonetic interpretations (physical definitions) of sonority work
- Breaks down when we consider ‘lightning’ vs. ‘lightening’
  - Ladefoged suggests we need a measure of ‘prominence’ that includes duration as well as sonority

Morae

- The mora:
  - Some languages may have ‘timing units’ intermediate between syllables and segments (Cs and Vs)
- Japanese seems to care about the mora
  - A single short vowel with or without an onset consonant (C)V is one mora
  - But (C)V: with long vowel or
  - (C)VN with coda nasal count as 2 morae

Rogers haiku example p 271

/ha-ru-ta-tsu ja
ʃi-n-ne-n fu-ru-ki
ko-me-go ʃo-o/

‘Spring starts;
new year, old rice
five quarts’

Isochronicity (equal timing)

- Persistent claims of differences among languages of ‘equally timed units’
- Claim: Roughly equal time interval between
  - Syllables in syllable-timed languages (French, Spanish)
  - Morae in mora-timed languages (Japanese, Finnish??)
  - Stressed syllables in stress-timed languages (English, other Germanic languages)
- Measurements show rough tendencies
- Experiments with speaking in time to metronome seems to be consistent

Suprasegmentals

- Roughly 5 things referred to as suprasegmental
  - **Length** or quantity (long v. short Cs and Vs)
  - **Tone** (pitch differences mark word differences)
  - **Pitch accent** (somewhere between stress and tone)
  - **Stress** (some syllables more ‘prominent’ than others)
  - **Intonation** (pitch patterns associated with whole phrases)

Length (quantity)

- Many languages have systematic difference between long and short consonants and vowels with same ‘quality’
- Long ones sometimes called ‘geminates’ (twins)
- Examples:
  Italian long vs. short consonants
  – /fato/ v. /fatto/ = [fɑtːo] ’fate’ v. ’done’

Finnish C(:) and V(:)

- saattaa [sa:t:a:] ‘to be able’
- saata [sa:ta] ‘be able’
- sata [sata] ‘one hundred’
- sataa [sata:] ‘it is precipitating’
- kuka [kuka] ‘who’
- kukka [kuk:a] ‘flower’
- kuukausi [ku:kausi] ‘month’

Lexical tone

- Tone languages: languages that use stylized pitch differences to signal different words
  - The majority of the worlds languages are tone languages
  - The mechanism that accomplishes this can be called:
    - ‘tone’, ‘lexical tone’ or ‘lexically distinctive tone’

Two major types

- Register tone languages
  - A few ‘steady’ or level tones
    - High v. low
    - High v. mid v. low
- Contour tone languages
  - Some level tones (low, high, mid
  - Some that have ‘contours’ i.e., they change pitch (e.g.. Low -rising, high falling’)
  - May have quite a few patterns: 4-7 not uncommon

Nupe: (Nigeria)
A Register Tone Language

- Word IPA Tone Meaning
- bá ba ˥ high to be sour
- ba ba ˧ mid to cut
- bà ba ˩ low to count

Ways to mark tone

- Several variations
  - Numbers in pitch range is popular
  - E.g. a high tone might be 5, a low tone 1,
    - A low mid rising tone might be 3-5
- Official IPA is via ‘tone glyphs’
- Vertical line (trunk) at right represents range
  - Horizontal line to left (branch) indicates level tone
  - More complex tones suggested by position and shape of the left branch

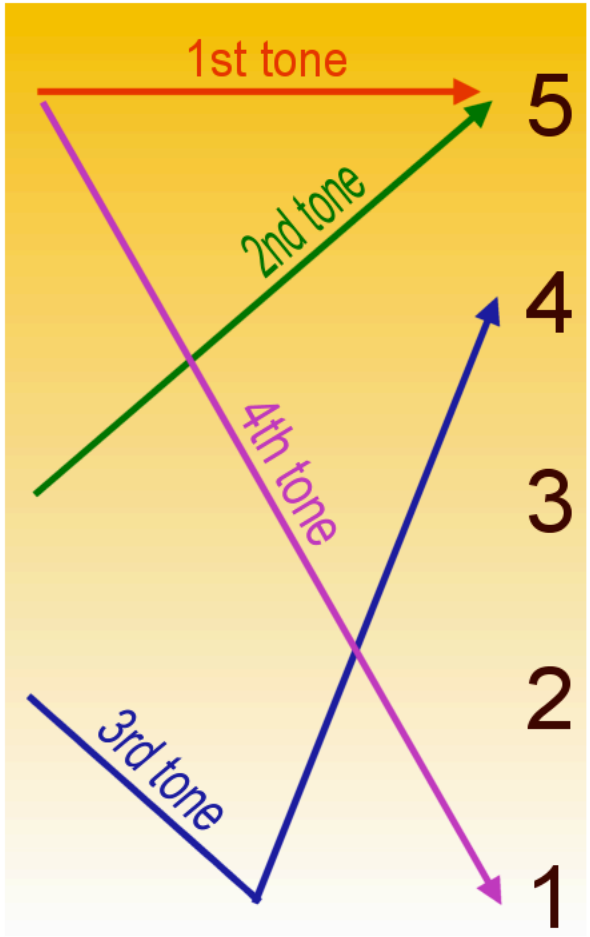
Mandarin /ma/ + tone

Famous example one more time

Description	Wade-Giles	IPA		Pinyin	gloss	
High level	ma^{1}	mɑ ˥		mā	‘mother	
High rising	ma^{2}	mɑ ˧˥		má	‘hemp’	
Low-falling rising	ma^{3}	mɑ ˨˩˦		mǎ	‘horse’	
Low falling rising	ma^{4}	mɑ ˩˧		mà	‘scold’	

Wikipedia's tone chart for mandarin Tones 1-4

http://upload.wikimedia.org/wikipedia/commons/7/76/Pinyin_Tone_Chart.png



High range of speaker's pitch

Low range of speaker's pitch

Modifications of tone

- Not just a fixed musical pitch or melody
  - Relative to speaker's range (soprano vs. basso)

- Several other phenomena complicate the realization of tone
  - Language specific phonological patterns
    - Downdrift-- gradual lowering of pitch of all tones
    - Downstep- specific syllables trigger shift of pitch range
  - Intonation can affect pitch patterns globally

Pitch Accent

- Pitch accent is a phenomenon somewhere between lexical tone and stress systems
- Lexical tone: any syllable can have almost any tone
- Pitch accent: only certain specific syllables in a word get special tone (e.g. one high level pitch per word)
  - Japanese pitch accent somewhat more complex
    - Pitch accent roughly determines where in a word certain tone switches take place (see Rogers p 277)

Stress

- Stress prominence tied to word or phrase
- Some languages have predictable stress,
  - E.g. Finnish always on first syllable.
  - Can be tied to end of word
    - Ultimate, penultimate, antepenultimate
  - Can be more complex but still fully predictable
- Some (English) have stress as a distinctive property
  - ‘insult’ noun vs.. verb.
- Some languages may have only phrasal stress
  - E.g. French: last syllable of a phrase is stressed

What is stress?

- Ladefoged says it involves extra effort on part of speaker
  - Push air out harder
  - Laryngeal adjustment to raise pitch
  - Hold vowel longer
- Has complex set of acoustic cues
  - Not fully understood

Intonation

- Intonation is use of pitch to signal meaning differences at the level of an entire phrase or sentence
- Study of intonation is almost a separate branch of phonology
  - Phonetic details are hard to grasp
  - I can't explain what I don't understand.

Summary

- Suprasegmentals are an important part of language
- The phonetics of the phenomena is not well understood yet
- Many distinct phenomena involve overlapping acoustic properties (pitch, amplitude, duration)
- Not clear what the articulatory source is nor how to parse out the acoustic consequences