Linguistics 201A Winter 2023
Phonological Theory I B. Hayes

Class 18, 3/14/23: Tone III; Stress I

1. Bureaucratic

- I'm better but not all-better.
- I can do appointments; Email queries would also be fine.
- Future "one-person talks": we can schedule, hopefully I'll be fine by then.
- Due date for such talks is Wed. Mar. 22 (mid Finals Week)

2. Protocol for today

- Be warned my laptop has sudden-shutdown issues, I'll come back as soon as I can.
- If I bail *personally* due to covid, please collectively go through the handout for the rest of the period.

3. Current assignments

- Read: René Kager (1999), *Optimality Theory*, Chapter 4 on stress
- Download from https://www.palisadessymphony.org/temp/
- No summary required

4. Where we are

- The "arguments for autosegmentalism", skeptically reconstrued where possible in light of later developments:
  - OT
  - P-map
- We've done:
  - tonal stability
  - contours look like singletons from each side, respectively (Margi polar tone, English sibilants ✓[st͡ʃ], *[t͡ʃs]
  - the Obligatory Contour Principle
  - a speculation that obsessed the field long ago: is everything autosegmental? Is all assimilation due to spreading?

5. References (missing last time) for extended autosegmentalism

- A representative early paper by me, trying to argue it is right.
  - (1986) Assimilation as spreading in Toba Batak. *Linguistic Inquiry* 17: 467-499.
- Donca Steriade and Barry Schein (1986) "On Geminates"
- The big "everything is autosegmental" paper:
  - Clements, George N. "The geometry of phonological features." *Phonology* 2, no. 1 (1985): 225-252. [2500 citations, but maybe not a lot recently.]

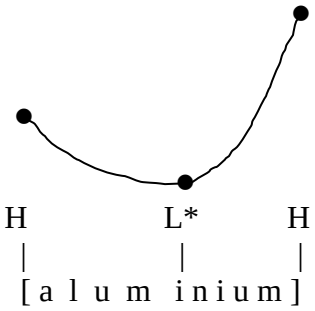
6. We return

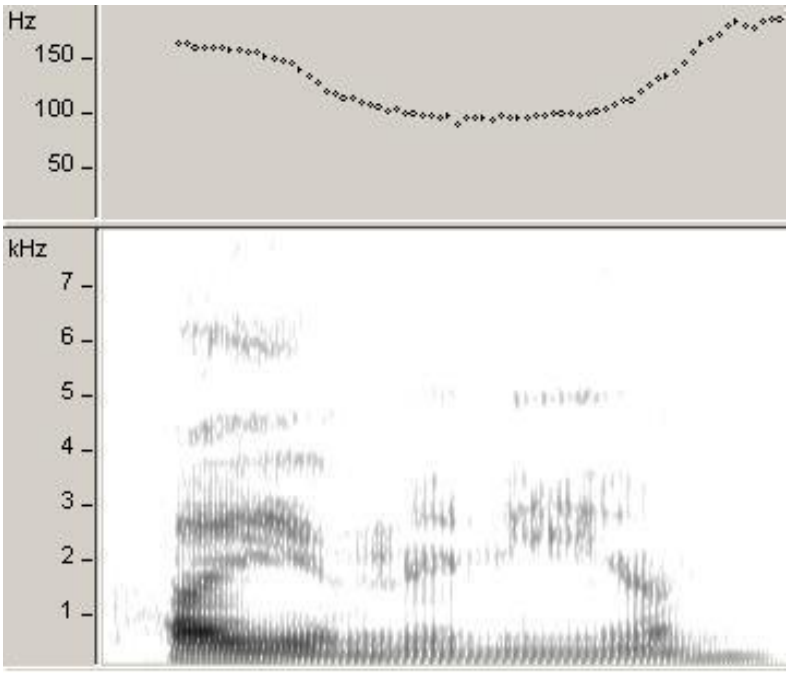
… to arguments for autosegmentalism

TONES THAT BEAR MORPHEMIC CONTENT BY THEMSELVES

7. Targets-and-interpolation representation of *"Aluminium?"*

- For target-and-interpolation theories of phonetics, see references below.





- Intonation characteristically places tones on
  - stressed syllables ("pitch accents")
  - phrasal edges ("boundary tones", "docking to a boundary"
- The present-day theory of intonationology has its origins in mid-1970's autosegmentalism.

8. Grammatical tone in Tiv (Bantoid, Nigeria)

- Reference: Douglas Pulleyblank (1986) *Tone in Lexical Phonology*, Reidel, Dordrecht.

- General Past

	H stems			L Stems		
1 syllable:	vá	H	'came'	dzà	L	'went'
2 syllables:	úngwà	HL	'heard'	vèndè	LL	'refused'
3 syllables:	jévèsè	HLL	'fled'	ngòhòrò	LLL	'accepted'

- Recent Past

	H stems			L Stems		
1 syllable:	vé	H	'came-rec.'	dzé	H	'went-rec.'
2 syllables:	óngó	HH	'heard-rec.'	vèndé	LH	'refused-rec.'
3 syllables:	jévésè	HHL	'fled-rec.'	ngòhórò	LHL	'accepted-rec.'

9. Analysis (approximate)

On the tonal tier:

H stems offer a H tone, left-aligned.
The Recent Past offers a H tone, coming after the stem tone.
The epenthetic tone is L.
A simple system of rules/constraints can map the tones onto the syllables, avoiding contours.

10. More on epenthetic tones

- Epenthetic tones are characteristically
  - L in languages with H and L (Tiv, Kiyaka, but cf. Sekani (Athabaskan, Hargus)[1] with epenthetic H).
  - M in languages with H, L, M (Pulleyblank, Yoruba, *Tone in Lexical Phonology*)

- Formally: DEP(H) >> DEP(L) >> DEP(M)
- I can't see the P-map helping here, but perhaps these choices of tone are articulatorily the cheapest.

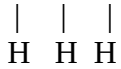
[1] Hargus, Sharon (1988) *The Lexical Phonology of Sekani*. New York: Garland Publishing.

MULTIPLE LINKING EFFECTS

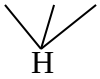
11. Multiple linking

- Autosegmental theory permits two ways to represent the same string:

Shona mbundudzi 'army worms'



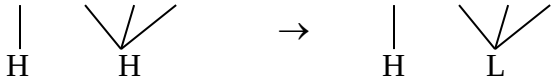
or: mbundudzi



- This is a classic case of **hidden structure**; i.e. multiple ways of representing the same phonetic thing.
  - Payoff in insight/analyzability
  - Cost in learnability

- Behavior in a different context suggests that, at least Shona, the second, obeying the OCP, is correct:

or: se-mbundudzi → se-mbundudzi



12. More on Shona: refs

- See readings for a more extended working out of Shona, relying on research by Scott Myers.
- Myers later worked out an analysis of Shona in OT, which in slower versions of this course I have assigned as readings:
  - Meyers, Scott. "OCP effects in Optimality Theory." *Natural Language & Linguistic Theory* 15, no. 4 (1997): 847-892.

13. More on Shona: P-map

- This is a striking case of "extravagant repair": there is a perhaps-cheaper solution to the OCP Markedness problem. [☞ what is it?]

14. More on Shona: enforcing the OCP in the first place

- We need Stratal OT or OO-correspondence to make sure that "bad" representations for H sequences don't make it into the later phonology.

15. Summary of arguments for autosegmental treatment of tone

a. **Tonal stability**—preservation of tones under vowel loss (Etsako)
b. "**Edge effects"—**contour tones behave as sequences (Margi)
c. Processes that **misalign** tones with respect to segment boundaries (Nupe)
d. **Morphemes with purely tonal content**—intonation, grammatical tone (English, Tiv)
e. **Multiple linking** effects—entire surface strings altered, due to multiple linking (Shona)

- These have pale echoes in other autosegmental domains, esp. nasality.

THE TYPOLOGY OF TONAL PROCESSES

16. Reduction

- From San Duanmu (2000) *The Phonology of Standard Chinese*:

> "Unstressed syllables generally lose their underlying tones. For example in S[tandard] C[hinese] [tuŋ55 tʰʲan55] 'winter day (winter)' can be read as [tuŋ55 tʰʲə̃2]. In the latter case, [tʰʲə̃2] is unstressed (accompanied by rhyme reduction), and it loses its [basic tone] and assumes a low pitch."

- These cases are evidently quite like vowel reduction, based on duration where cue abundance is important.
- Taking a Faithfulness approach to this, we have

MAX(TONE, LINK) ON {STRESSED V, UNREDUCED V, FINAL V}
>>
MAX(TONE, LINK)

with some kind of articulatorily-inexpensive tone allowed by the lowest-ranked DEP(tone *x*)

17. Shifting and leaping

- **Shifting**: several languages shift tone one syllable over from its underlying representation
  - E.g. the first surface tone of Word2 is the last underlying tone of Word 1, etc.
  - Kikuyu—rightward (Clements and Ford LI 1979)
  - Ngamo—rightward (Russell Schuh 2005, http://www.humnet.ucla.edu/humnet/aflang/ngamo/Papers/GNTS.pdf)
  - Chaga—rightward (Brian McHugh, 1990 UCLA diss.)
  - Kyongsang Korean—leftward (Russ Schuh, http://www.linguistics.ucla.edu/people/schuh/Papers/ms_2010_tone_accent_SKS_verbs.pdf)

This seems to be an interesting challenge for OT; I need to search more for literature on this.

- **Leaping**: unbounded distance
  - Often the landing site is an accented position:
  - Bantu: H's leap rightward to the penult (stressed) or (more surprisingly) to the pre-penult. Xhosa (Cassimjee and Kisseberth 1998[2])

    Low Stems, Present Tense

ndi-ya-caciisa	'i am explaining'
ndi-ya-xoleela	'i forgive'
ndi-ya-chukumiisa	'i am provoking'
si-ya-lindeela	'we are waiting for'
si-ya-moneela	'we are jealous'
ni-ya-shukumiisa	'you plural are shaking'
ni-ya-khohlakaleela	'you plural are being cruel for'
ni-ya-qonondiisa	'you plural are making clear'

    Low Stems, Present Tense, 3rd Plural

ba-ya-cáciisa	'they explain'
ba-ya-móneela	'they are jealous'
ba-ya-xóleela	'they forgive'
ba-ya-chukúmiisa	'they provoke'
ba-ya-qononóndiisa	'they emphasize'

  - Intonational tones the worlds over gravitate to stressed syllables; these are called **pitch accents**. See "aluminium" example above.
- To **edges of words and phrases**:
  - In tone languages: Shanghai Chinese is a well-known case
  - In intonation languages: many edges are marked by **boundary tones**.

18. Spreading

- This is a companion to leaping, and often occurs in the same languages.

19. An alternation due to spreading: Chaga (Bantu) xxx get real tones

- Source: Brian McHugh (1990) *Cyclicity in the Phrasal Phonology of Kivunjo Chaga*, UCLA dissertation.

Ngeciizima	iulra	nyama	ya	umbe	ya	msulri
he-can	buy	meat	of	cow	of	nobleman

'He can buy the meat of a nobleman's cow'

[2] Farida Cassimjee and Charles Kisseberth (1998) "Optimal domains theory and Bantu tonology: a case study from Isixhosa and Shingazidja," in Theoretical Aspects of Bantu Tone (eds. L. Hyman and C. Kisseberth). Stanford: CSLI.

Underlying:

```
                                                    *
Ngeciizima      iulra   nyama ya    umbe   ya    msulri
      | |
S     HH
```

Rule: attach H to accented V

```
Ngeciizima      iulra   nyama ya    umbe   ya    msulri
      | |                                          |
S     HH                                         H*
```

Rule: Default L

```
Ngeciizima      iulra   nyama ya    umbe   ya    msulri
   | | |                                         | |
 S LHH                    L                      H*L
```

Rule: Unbounded leftward H* spread

```
Ngeciizima      iulra   nyama ya    umbe   ya    msulri
   | | |                                        |
S  LHH                   L                     H*L
```

The "floating L" actually has phonetic effect, making the following H lower in pitch.

Tone Shift: Relocate every tone one syllable later than its current location.
Dock verbal clitic S on the vacated initial (other forms: default L)

```
Ngeciizima      iulra   nyama ya    umbe   ya    msulri
  | | \ \                                        |\
  S  LH H                  L                     H*L
```

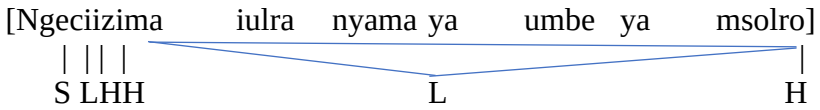
20. Comparison form without H* Spreading

```
[Ngetciizima    iulra   nyama ya    umbe   ya    msolro]
he-can          buy     meat  of    cow    of    man
'He can buy the meat of a man's cow'
```

Underlying: no accent on msolro, so no H*, no leftward spread

```
[Ngeciizima     iulra   nyama ya    umbe   ya    msolro]
      | |                                          |
S     HH                                         H
```

All that applies is default L and Tone Shift, yielding

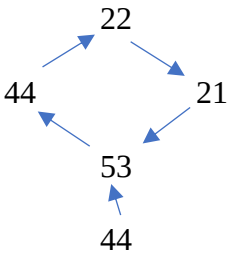


21. Arbitrary-seeming tonal replacement

- Typically local, structure-preserving.
- Chinese tonal sandhi in many "dialects" is the canonical case.
- Many of these are "telescoped" (Kenstowicz and Kisseberth 1997[3], pp. 64-65)
  - ➢ They were natural tonal processes, but rode along with subsequent context-free sound changes, becoming unnatural.
- Xiamen (= approx. Taiwanese, Southern Min) tone sandhi (Chen 1987[4]):

tsin pʰang 'very fragrant'		pʰang tsui	'fragrant water'
44 44		44 53	
22		**22**	
pʰe we	'leather shoes'	we tua	'shoe laces'
24 24		24 21	
22		**22**	
wi pih	'stomach ailment'	pih lang	'sick person'
22 22		22 24	
21		**21**	
kʰi tsʰu	'build a house'	tsʰu ting	'roof top'
53 21		21 53	
44		**53**	
tua hai	'big ocean'	hai kih	'ocean front'
22 53		53 24	
21		**44**	

22. These changes imply a "tone circle"



[3] Michael Kenstowicz and Charles Kisseberth (1977) *Topics in Phonological Theory*. New York: Academic Press.
[4] Matthew Chen (1987) "The syntax of Xiamen tone sandhi," *Phonology Yearbook* 4: 109-149.

[Discuss the implications of a circle for deriving alternation by Markedness-Faithfulness ranking.][5]

- The Xiamen case has attracted much attention and is now the object of a large literature.
  - What is the syntactic conditioning?
  - Does the bizarre opacity situation reduce productivity?

23. Arbitrary tonal replacement and diachrony

- For possible diminished productivity resulting from this, see
  - Zhang, Jie, Yuwen Lai, and Craig Sailor. "Modeling Taiwanese speakers' knowledge of tone sandhi in reduplication." *Lingua* 121, no. 2 (2011): 181-206.

STRESS AND METRICAL STRESS THEORY

24. A separate branch of phonology?

- Not really, but it has its own
  - Representations
  - Constraints
  - Literature

25. Perhaps still worth reading?

- Hayes (1995) *Metrical stress theory: principles and case studies*
- The analyses are pre-OT (and sometimes beg for OT) but lots of examples, with background and typology
- The approach of "analyze a bunch of languages with the same theory" was taken further, with online stress typologies.
- I got out of this field because I no longer trust the data!
  - Sketchy extracts from grammars
  - Often no phonetics or other experimentation

STRESS HAS A SPECIAL TYPOLOGY

26. Culminativity

- Every utterance has a stress.
- Usually, every content word (potential free form) has a stress.

[5] Refs: Moreton, Elliot (2004). Non-computable functions in Optimality Theory. In: John J. McCarthy(ed.), *Optimality Theory in Phonology*. Blackwell Publishing, Malden, MA. 141-164.

- This seems reliable enough that people build it into the representations (GEN) rather than letting it be the result of strong constraints.

27. Principles of metrical form

- **Culminativity**: The domain of stress (usually word) *must* form a headed constituent.

```
(           x  )
(x . )(x .)(x .)
Recon cili ation
```

- **Continuous column constraint:** The head of a higher metrical level must rest upon (be aligned in time with) the head of a lower level.

```
(        x     )
(x . )(x .)(x .)
Recon cili ation
```
is ill-defined; not just a bad candidate

Consequences:
  - We can "promote one of the secondaries to main", but never any other syllable.
  - Rhythm Rule: *Vàticanese spéech* vs. *Makàssarese cústoms*

- **Syllables are terminals**
  - Rarely claimed that moras or vowels within a syllable bear distinctive stress
  - So metrical structure is built on syllables.

28. Frequent appearance of rhythmic spacing of stress

- Stressed syllables separated by one or (occasionally) two stressless.
- We've already seen this in
  - Many long English words
  - Indonesian
  - Finnish

29. A brave move

- It dominates the field to assign constituency, rather than just a grid of x's.
- We could have favored rhythm just with constraints.
- We will examine this fundamental issue.

STRESS RULE TYPOLOGY

30. Trivial edge systems

French and Persian are final, Korean and Bengali are initial
..without secondary stress
We can do this with ALIGN(x, Word, Left) and ALIGN(x, Word, Right)

31. "Morphological" stress

- Often called accent
- Let stress be phonemic property, morphemes can contrast for it, or for which syllable has stress.
- So there is IDENT(stress).
- There are adjudicating constraints Leftmost and Rightmost
- Leftmost:
  - Place the actual stress on the leftmost possible place (penalize by counting pretonic syllables)
  - If dominated by Ident, the "leftmost accented else leftmost" — Indoeuropean, Cupeño

32. Complications

- We need something for "preaccenting" and "postaccenting" affixes.

33. Languages

- They are all over the world
- Ancient Greek, Sanskrit, Slavic, Baltic
- Russian, Modern Hebrew
- Japanese — but since it's not stress, there can be unaccented words.

34. Literature

- Work of John Alderete
- Work of Morris Halle and Paul Kiparsky on Indo-European languages (modern pursuer of these ends: Tony Yates of UCLA)
- Purely-analytic work on the made-up "Paka" language family, invented by Bruce Tesar (see 2014 book)