24.961   Tone-1: African Languages

1. Main theme
   • the study of tone in African lgs. raised serious conceptual problems for the
     representation of the phoneme as a bundle of distinctive features.
   • the solution to the problem (autosegmental representations) became a model for
     all other features
   • tone exhibits the widest range of phonological behavior, perhaps reflecting fact
     that F0 is separated from rest of signal at an early point in auditory processing

2. Phonetic correlates of tone
   • F0; stiffen and slacken vocal folds
   • typically realized on modal voicing
   • domain: often larger than single segment (syllable, word)
   • Tone-Bearing Unit: typically syllable, mora also possible (Lithuanian, Makua,
     Japanese); often spills over syllable boundary (peak delay)
   • often accompanied by voice quality features like creaky and breathy voice
   • can be affected by laryngeal features of adjacent consonants (tonogenesis)

3. notation
   • Two-way contrast: á vs. à (or a) most Bantu languages
   • Three-way contrast: á vs. ā (or a) vs. à (Yoruba, Buli syúk H 'path', syūk M
     'navel', syùk 'fish sp.'
   • Contours: ǎ (rise) â (fall)
   • Features for H, M, L
   • Goldsmith: [+highpitch, -lowpitch], [-highpitch, -lowpitch], [-highpitch,
     +lowpitch] (3-way height contrast; cf. vowel height)
   • Yip: [+upper, -high], [-upper, +high], [-upper, -high] ([+upper, +high] for raised
     H) (4-way height contrast)

4. descriptive problems with tone motivating a novel conception of feature organization
   • decomposition of contour tones Rise into LH and Fall into HL
   • tonal melodies and tonal polarity

5. Margi (Chadic, Nigeria): H, L, R (Williams 1973, Hoffmann 1963)

   • rising tone behaves phonologically as combination of Low plus High
   • derivational source from syllable coalescence

        sál   sál-árì   'man'
        kùm   kùm-árì   'meat'
        tágú   tágw-árì   'horse'
        ú?ù   ú?w-**ǎ**rì   'fire'

   • tonal melody in verbs

sá	ndábyá	H	HH
ghà	dzà?ù	L	LL
hǔ	ŋgùsú	**R**	**LH**

in a language with tonal melodies, the number of tonal contrasts does not increase with the length of the lexical item; rather the melody is extended to encompass additional syllables

- tonal polarity: affix takes the opposite tone from the root: [tense-root-subject]

  à sá gù   'you go astray'
  á wì gú   'you run'
  á vǎl gù   'you fly'

5. adding features of [±rise], [±fall] does not express the equivalence with LH and HL

6. Goldsmith (1976) *Autosegmental Phonology*

- tonal features are represented on a separate level (**tier**) from segmental features
- the temporal relation between the tonal tier and the segmental tier is represented by **association** lines
- rules of tonal phonology define and modify the associations as well as changing the feature coefficients

7. Margi analyzed autosegmentally

   devocalization

   ```
   u ? u - a r i          u ? w - a r i   ->  u ? w - a r i       segmental tier
   |  |  | |               |     | |          |     / |  |
   H  L  H L               H  L  H L          H     LH  L         tonal tier
   ```

- tonal stability: while vowel deletes or devocalizes to a glide and hence loses its ability to hold a tone, the tone does not disappear but is reassociated with an adjacent syllable

8. Goldsmith's (1976) **Well-Formedness Condition** on autosegmental representations (rules apply to maximally satisfy it; early example of rules driven to satisfy a constraint)

- every tone is associated with a tone-bearing unit (TBU = syllable, mora)
- every tone-bearing unit is associated with a tone
- association lines do not cross (for locality)

9. Margi tonal melodies

- verb roots belong to one of three tonal classes: H, L, LH

- tones are associated with tone-bearing units (syllable) one-to- one, left-to-right
- tones spread to satisfy the first condition of the WFC
- tones associate to satisfy the second
- implication that asymmetric location of plateux and contours should correlate
- subsequent research fails to support this prediction
- Zhang (UCLA diss) and others: contours prefer right edge of word; reflex of phonetic duration in citation, phrase-final position

8. Leben (1978): further work by Dweyer finds that LHH melody of Hausa ndàvúlá 'sling' is counter-exemplified by more numerous LLH of làsìmó 'amulet'. Leben suggests that H is mapped to right edge for majority class while left-to-right is default

      similar asymmetry for Kukuya (Paulian 1974)

kâ 'to pick'	kárà 'paralytic'	káràgà 'be entangled'
sǎ 'knot'	sàmí 'conversation'	mwàgə̀gî 'younger brother'

9. Zoll 2003
- *Spread-H >> *Spread-L (Clash >> Lapse)
- eliminates gradient alignment as vestige of directional rule mapping

/lasimo, LH/	Max	Dep	*Spread-H	*Spread-L
LLL	*!			
LHL		*!		
LHH			*!	
-> LLH				*

10. tonal polarity:

    a particle has opposite tone of root: V -> [-@hitone] // ___ Co [+syll, @hitone]

11. some other useful properties of autosegmental notation

- common tone sandhi rules expressed as addition of association lines (tone spread)

L -> F / H __	Yoruba bá	'meet'	ó bá	'he meets'
	bà	'perch'	ó bâ	'he perches'
H -> R / L ___	Buli zúk	'head'	wà zǔk	'his head'

  - Yoruba and Buli are three-tone languages: H, M, L
  - the sandhi rules apply to tones at the F0-extremes
  - tone sandhi rules are typically perseverative reflecting fact that F0 coarticulation is normally delayed; cf. vowel height coarticulation, which is typically anticipatory (Hyman 2006); cf. Italian metaphony

- addition of association plus deletion of original association line (tone shift)

Kikuyu (Kenya)

to- 'we'   -aɣ   'habitual'   a- past   -a verb

to-rɔr-aɣ-a	'we look at'	to-tom-áɣ-a	'we send'
to-mo-rɔr-aɣ-a	'we look at him'	to-mo-tom-áɣ-a	'we send him'
to-ma-rɔ́r-aɣ-a	'we look at them'	to-ma-tóm-áɣ-a	'we send them'
to-a-rɔ́r-a	'we looked at'	to-a-tóm-á	'we sent'
to-a-mó-rɔr-a	'we looked at him'	to-a-mó-tom-á	'we sent him'
to-a-má-rɔ́r-a	'we looked at him'	to-a-má-tóm-á	'we sent them'

```
V  V
┗  /
H
```

- across-the-board tonal change: Meeussen's Rule in Shona (Odden 1981)

H -> L / H ___   Shona: mbwá 'dog'   né#mbwa   'with a dog'
                              badzá 'hoe'   né#badzá   'with a hoe'
                              hóvé 'fish'   né#hove   'with a fish'
                              mbúndúdzí 'worms'   sé#mbundudzi 'like worms'

➢ multiple linking of tone required
➢ imposed by Obligatory Contour Principle (OCP): adjacent identical trones are banned: successive H tones as in hóvé 'fish' and mbúndúdzí 'worms' analyzed with one multiply-linked H

```
H    H       H      H
|   / \      |     / | \
ne  hove    ne  mbundudzi
```

- tonal particle: a grammatical morpheme whose only exponent is a tonal effect on neighboring word

Angas (Nigeria)

Citation	Case	Modified	
téŋ	téŋ	têŋ	rope
mús	mús	mûs	cat
ʔàs	ʔăs	ʔàs	tooth
ǰólì	ǰólì	ǰólì	ape

```
      L   H        H   L
      |╱            |  ╱
      ?as          mus
```

12. automatic downstep (aka delination, catathesis)
    - high tone is realized at a lower F0 value that a previous H when preceded by a L
    - found in many diverse languages: Japanese, English list notation

    Yoruba: Laniran & Clements (2003)
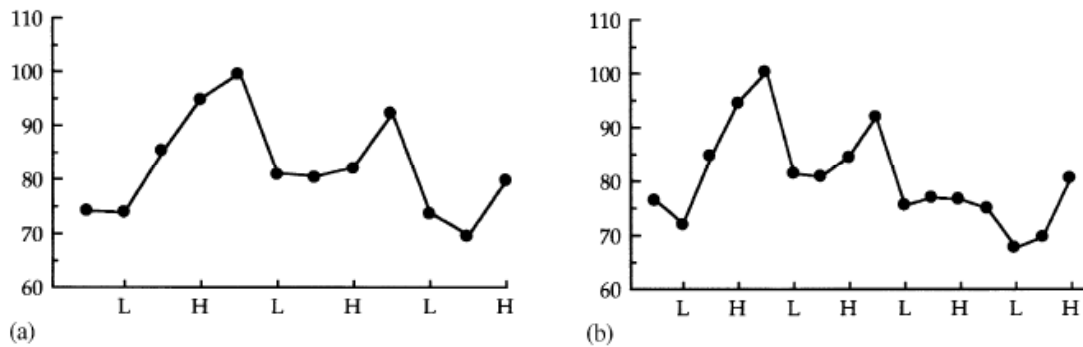
Laniran, Yetunde O., and G. N. Clements. "Downstep and High Raising: Interacting Factors in Yoruba Tone Production." *Journal of Phonetics* 31, no. 2 (2003): 203–50. © Elsevier. This content is excluded from our Creative Commons license. For more information, see http://ocw.mit.edu/help/faq-fair-use/.

    - phonetic value of H could be lower than value of earlier L
    - grammaticalization of natural lowering of subglottal pressure across breath group as speech is articulated from "left-to-right"

13. Moore (Gur, Burkina Faso)
    - H á vs. L a; has automatic downstep
    - has non-automatic downstep: second of two high's realized at a lower level: á! á
    - cf. English vocative: declarative Susan [¨ ˍ] vs. vocative Oh Susan! [¨ --]

ko sá:ga	'give a broom'	kor béda	'big sacks'
ko korgó	'give a sack'	kor ke:gá	'green sacks'
zá sá:ga	'bring a broom'	sá béda	'big brooms'
zá kór!gó	'bring a sack'	sá ké:!gá	'green brooms'

```
    za korgo
     |/ ǂ  |
     H L  H
```

14. data from Lama problem (PGG 7.10)

- develop an OT analysis for the data from this problem
- you may postulate Max and Dep constraints on tone as well as markedness constraints contolling the formation and location of contour tones

7.10 Lama (Ourso 1989)

Lama is a two-tone language of the Gur family (related to Moore) spoken in Togo. Three contrasting surface tones occur before pause: high (e.g., *ná* 'see!'), low (e.g., *na* 'with'), and falling (e.g., *nâ:* 'cow'). Phrase-medially only high and low tones occur phonetically; falling tone is systematically barred except before pause. Monosyllabic nouns fall into four distinct classes in terms of their tonological behavior. However, before pause the four classes merge into three distinct phonetic types and phrase-medially into only two. Examples of the four distinct classes appear in (1).

(1)   a.   ci   'father'
           ri   'mother'
           ra   'friend'

      b.   wá:l   'husband'
           yír   'person'
           lé:l   'widow'

      c.   nâ: 'cow'
           sî: 'sheep'
           tî: 'elephant'

      d.   yal   'wife'
           ra:l   'brother'
           nun   'aunt'

A. Develop an analysis to account for the tonal effects of class (1a) and class (1b) nouns on the words *tẹ* 'under' and *ra* 'friend'.

(2) ci   'father'   ri   'mother'
     ci tẹ   'under father'   ri tẹ   'under mother'
     ci ra   'father's friend'   ri ra   'mother's friend'

     wá:l   'husband'   yír   'person'
     wá:l tê   'under husband'   yír tê   'under person'
     wá:l râ   'husband's friend' yír râ   'person's friend'

B. Now consider class (1c) words in the same contexts; formulate a rule to account for the alternation between fall and high. Must this rule be ordered with respect to the one developed for (2)? If yes, why? If no, why not?

(3) nâ: 'cow'   tî: 'elephant'
     ná: tẹ   'under cow'   tí: tẹ   'under elephant'
     ná: ra   'cow's friend'   tí: ra   'elephant's friend'

C. The postposition *tẹ́* means 'chez', 'at the house of'. Can you explain the downsteps in the following paradigms?

(4) ci tẹ́   'chez father'   ri tẹ́   'chez mother'
     wá:l tẹ́   'chez husband'   yír tẹ́   'chez person'
     ná: t'ẹ́   'chez cow'   tí: t'ẹ́   'chez elephant'

     wá:l râ   'husband's friend'
     wá:l rá tẹ   'under husband's friend'
     wá:l rá t'ẹ́   'chez husband's friend'

D. The verb *sewá* 'ran' systematically varies its tone depending on the tone type of the preceding noun. Your analysis should be able to explain each example in (5).

(5) ci sewá   'father ran'
     wá:l séw'á   'husband ran'
     ná: sewá   'cow ran'
     wá:l rá sewá   'husband's friend ran'

E. Now consider nouns from class (1d). In what ways are they similar to and different from the other types? Develop an analysis to explain these differences.

(6) yal   'wife'   ra:l   'brother'
     yal tê   'under wife'   ra:l tê   'under brother'
     yal râ   'wife's friend'   ra:l râ   'brother's friend'
     yal tẹ́   'chez wife'   ra:l tẹ́   'chez brother'
     yal séw'á   'wife ran'   ra:l séw'á 'brother ran'

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