

## Class 17: Structure above the segment, part I

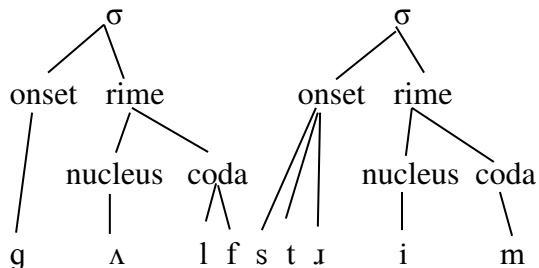
### To do

- Lama HW due Tuesday
- Last study questions due Monday—Hayes 1995.
- No assignment posted tonight—last one will be posted Tuesday night, due Friday, Dec. 2.
- Draft project abstract due by end of Wednesday—upload on CCLE is possible (PDF please).

**Overview** In a lot of ways, stress doesn't look like a feature. Accordingly, a type of representation called a *grid* has been proposed, to which stress rules apply.

### 1. A little background on syllables

- Segments seem to be grouped into syllables, which themselves show evidence (that we won't discuss) of internal structure:



- Although SPE eschewed syllables, they were quickly readopted because they allow simplification of lots of rules and constraints (e.g., all “/\_\_\_{C,#}” rules)
- It's not always clear where the boundaries between syllables are (gi.ven? giv.en? giv.ven?)
- Be skeptical of sources that claim a syllabification as though it were observable data—syllabification is always part of a phonological analysis.
  - E.g. Spanish [kó.pja] ‘copy’
    - explains why the /j/ has its non-syllable-initial allophone ([j] rather than [ɟ])
    - consistent with claim that Spanish forbids [p] in coda (since we don't observe them word-finally or before non-glide/liquid Cs)
    - consistent with claim that Spanish allows [pj] onset, since words can begin [pj]
  - vs. Tagalog [kóp.ja] ‘copy’ (loan from Spanish)
    - explains why suffixed form is [kópja-hin] ~ [kòpja-hín] (only roots with stressed, closed penult show this pattern)
    - consistent with observing lots of words that end in [p]
- Stress seems to be a property of syllables, not segments
  - You can't have a syllable where the onset C is [+stress] and the nucleus V is [-stress], for example.

## 2. What is stress?

- Not all languages have it.
- Among those that do, stress doesn't have a fixed phonetic realization. Stressed syllables tend to...
  - have longer duration
  - be louder
  - support a larger set of vowel contrasts (see Crosswhite 2001; Barnes 2006 for surveys)
  - have longer VOT, more fortition on their consonants (see Lavoie 2001; González 2002 for surveys)
  - attract glottalization and aspiration away from unstressed
  - be associated with pitch excursions (high or low, depending on utterance melody)<sup>1</sup>
- This means stress isn't something you can hear, see in a spectrogram, or ask a speaker to intuit—it's the result of a phonological analysis to explain traits like those listed above.
  - That's why phonologists can disagree about a word's stress pattern, or even about whether a certain language has stress (French, Korean...)
- It's better to define stress as an abstract prominence relation:
  - Some syllables are more prominent (stressed) than others, and this has phonetic and phonological consequences, depending on the grammar, such as those listed above.

## 3. Stress as a feature? (see Hayes reading for more)

- Other features (usually) don't shift from segment to segment based on distance from a word edge:

órigin          oríginal          orìginálicity  
 phótogràph    photógrapher    phòtográphic

- Other features don't (usually) act at long distances across other instances of that feature:

Mìssissíppi    vs. Míssissìppi législàtors

- Languages don't require every content word to have at least one + value of other features (except maybe [syllabic], which not all theories have).
- For just about every other feature, there is some language where it assimilates—but I know of no rules of stress assimilation, only stress dissimilation.

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<sup>1</sup> This is what makes stress different from pitch accent. A pitch-accented syllable always gets the same tone or tone contour. So what makes pitch accent different from tone? Maybe nothing really: see Hyman 2009.

#### 4. The grid

- The prominence relation is often represented as a *grid* (Lieberman 1975).
  - Rows (a.k.a. ‘layers’) represent degrees of stress;
  - columns are associated with stress-bearing units (syllables, typically).

				x					
x				x					
x		x		x					
x	x	x	x	x	x				
<i>re</i>	<i>con</i>	<i>ci</i>	<i>li</i>	<i>a</i>	<i>tion</i>				

*Example from Hayes*

- Grids are assumed to be subject to the (inviolable) Continuous Column Constraint
  - For every grid mark (except on the bottom layer) there must be a grid mark in the same column on the layer below.

#### 5. Payoff I: Locality

- English phrasal stress rule (a.k.a. nuclear stress rule)
  - Place main stress on the last word of a phrase,<sup>2</sup> even though this is sometimes several syllables from the end of the phrase
  - Example from Hayes: *hypothetical imitators*, which could also perhaps be *hypothetical imitators*.
- The grid allows us to state the rule very locally.
  - Any amount of white space is allowed between and on either side of xs on the same layer when matching representations up to the structural description
  - The structural description could match any (adjacent) rows of the grid:

$$\begin{bmatrix} \quad \quad \quad \\ \text{x} \quad \text{x} \end{bmatrix} \rightarrow \begin{bmatrix} \quad \quad \quad \text{x} \\ \text{x} \quad \text{x} \end{bmatrix}$$

= “if the top layer of the grid has exactly two marks, add another mark to the second one”

- Draw grids for *hypothetical* and *imitators* in isolation, then put them together and apply this rule.

<sup>2</sup> This can be overridden by focus. Also, watch out for compounds.

- The optional English rhythm rule (Prince 1983): really an interaction between a constraint NOCLASH and a rule Move-X.

NOCLASH:     \* x x    (if two grid marks are adjacent on their layer, the grid marks under  
                  x x    them can't also be adjacent on their layer)

Move-X:       Move one grid mark along its layer (triggered by NO-CLASH)

- English-specific detail: only leftward movement is allowed here.
- Draw the grids for *Mississippi* and *legislators*. If you put them together, is NO-CLASH violated? A: yes, B: no
- Apply Move-X if necessary—where can X move to without violating the Continuous Column Constraint? A: *Mi*, B: *ssi*, C: *ppi*, D: *gi*
- In what way might this operation appear non-local? In what way is it local?

## 6. Payoff II: Consequences of the Continuous Column Constraint

- The rich get richer: in the rhythm rule, Prince notes that the stress retracts onto the strongest preceding syllable. Here are some of Hayes's examples.
- Draw grids for *Sunset Park* and *Zoo*, and then put them together and apply Move-x to resolve/alleviate the clash. Where can the moved x land? A: *Sun*, B: *set*, C: *Park*, D: *Zoo*



- What are the parameter settings for each of the following four languages (don't worry about primary vs. secondary stress)? [taken from Hayes]

*Maranungku* (aka Maranunggu, Australian lang. from Australia, highly endangered; data orig. from Tryon 1970)

tí.ralk	'saliva'
mé.re.pèt	'beard'
yán.gar.mà.ta	'the Pleiades'
láng.ka.rà.te.tì	'prawn'
wé.le.pè.ne.màn.ta	'kind of duck'

A: peak, beginning
B: peak, end
C: trough, beginning
D: trough, end

*Weri* (Trans-New Guinea, PNG, 4,000 speakers; data orig. H. Boxwell & M. Boxwell 1966)

ŋin.típ	'bee'
kù.li.pú	'hair of arm'
u.lù.a.mít	'mist'
à.ku.nè.te.pál	'times'

A: peak, beginning
B: peak, end
C: trough, beginning
D: trough, end

*Warao* (Language isolate, Venezuela, 28,000 speakers; data orig. from Osborn 1966)

yì.wà.ra.ná.e	'he finished it'
yà.pu.rù.ki.tà.ne.há.se	'verily to climb'
e.nà.ho.rò.a.hà.ku.tá.i	'the one who caused him to eat'

A: peak, beginning
B: peak, end
C: trough, beginning
D: trough, end

*Araucanian* (data originally from Echeverria & Contreras 1965)

Family consisting of Mapudungun (Chile & Argentina, 300,000 speakers) & Huilliche (Chile, 2000 speakers).

wu.lé	'tomorrow'
fi.pán.to	'year'
e.lú.mu.yù	'give us'
e.lú.a.è.new	'he will give me'
ki.mú.ba.lù.wu.lày	'he pretended not to know'

A: peak, beginning
B: peak, end
C: trough, beginning
D: trough, end

- Additional parameter: add a grid mark on the top level at either the beginning or the end of the word.
- Which setting does each of the four languages above have?
- Consider Araucanian *elúmuyù*: how does the extra grid mark end up in the right place?

**Next time:** Adding feet to the grid; ALIGN constraints.

## References

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