

Teaching Fellow:

Jack Isaac Rabinovitch
jrabinovitch@g.harvard.edu

Discussion Section A:

Mondays 10:30–11:30 AM, 2 Arrow St Room 420

Section B:

Tuesdays 12:00–1:00 PM, 2 Arrow St Room 408

Office Hours:

Mondays 2:30–3:30 PM, 2 Arrow St Room 423

Discussion Handout 9

2023 Apr 24/25

(1) Today:

- a. Syllable and Foot Structure
- b. Stress Assignment in Stress Predictable Languages
- c. Tone

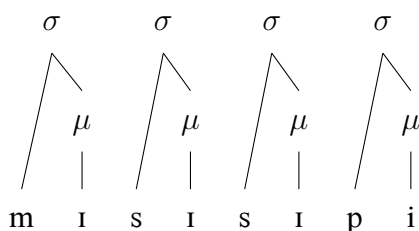
Structure: Segments, Morae, Syllables, Feet

(2) The prosodic word (the phonological word ω) has a structure beyond just the segments or syllables that make it up.

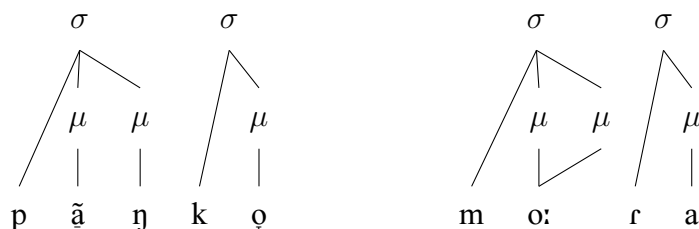
- a. Segments are units of single sounds: they are represented as phonemes (in the head) or phones (in the world)
- b. The mora, plural morae (μ), are units of weight: they are associated with groups of segments which are pronounced (approximately) in the same length of time as other morae.
- c. Syllables (σ) are prosodic units composed of morae: they are associated with syllabic structure (onset, nucleus, coda) and are assigned stress.
- d. Feet (F) are prosodic units composed of syllables: they determine the rhythm of a word and are also assigned stress.

Morae

(3) All languages assign one mora to the nucleus of any syllable:



(4) Some languages assign additional morae to codas or long vowels:



Languages differ in what counts as an additional mora; in general, if a language counts something below as an extra mora, it will count anything to the left of it as a mora as well:

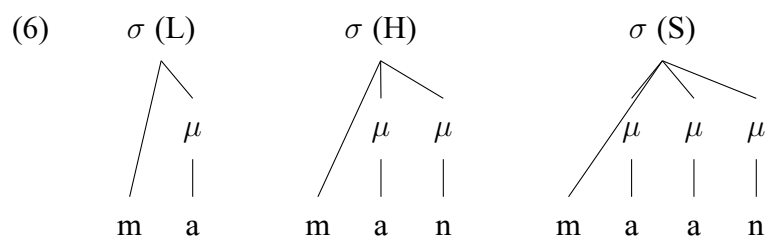
Long Vowels \leftarrow Diphthong Vowels \leftarrow Sonorant Codas \leftarrow Obstruent Codas

How is the above scale similar to the sonority hierarchy?

Syllable Weight

Syllables are made of morae, and the ‘weight’ of a syllable can be determined by how many morae are in a given syllable.

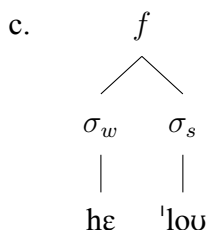
- (5)
 - a. Light syllables (L) have one mora
 - b. Heavy syllables (H) have two morae
 - c. Superheavy syllables (S) have three morae (do not confuse this S with ‘strong’ S)



Feet

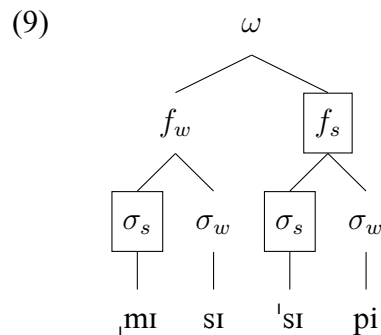
Feet are typically made of two syllables (though there are exceptions, such as one or three syllable feet). Usually feet are forced to be ‘binary’ in some way. Either by consisting of two syllables (disyllabic feet) or by having two morae (bimoraic feet).

- (7) Feet assign stress to one of their syllables
 - a. The stressed syllable is called strong (S) (not to be confused with superheavy S)
 - b. The unstressed syllable is called weak (W)



Feet themselves are also assigned stress within a prosodic word (ω). Words have one stressed foot.

- (8) a. Strong syllables in strong feet have primary stress
b. Strong syllables in weak feet have secondary stress



Stress Placement in Predictable Stress Languages

Languages with stress have a few decisions to make:

- (10) a. For each foot, which syllable do I stress?
b. How do group syllables into feet?
c. For each word, which foot do I stress?

Languages have a lot of variety in the strategy they employ to answer these questions.

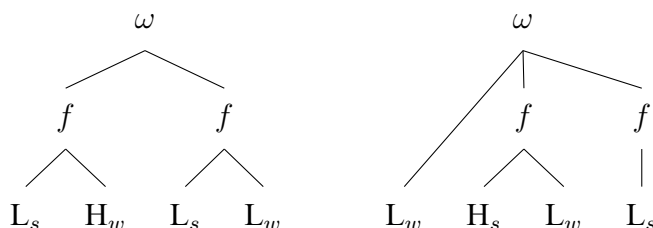
For each foot, which syllable do I stress?

- (11) Trochee and Iamb
a. Trochees are feet where the first syllable is strong
b. Iambs are feet where the last syllable is strong

Some languages only accept trochees, other languages only accept iambs, others are okay with both (but languages with both are relatively rare, for homework assume that the languages only allow one kind).

How do I group syllables into feet?

- (12) Some languages care about weight (weight sensitive languages). They will assign feet so that stress is assigned to heavier syllables. Imagine a trochaic language:



- a. The first structure allows all syllables to belong to a foot, but it means that the heavy syllable is weak!
- b. The second structure gets the heavy syllable in a position where it can be assigned stress, but some syllables don't have feet, or are the only syllable in a foot!

Some languages have 'non-finality' or (more rarely) 'non-initiality' constraints. This means that these languages don't allow the last (or first) syllable in a word to be associated with a foot. No foot, no stress!

Finally, foot assignment (footing) can happen from left-to-right or from right-to-left.

- (13) a. Left-to-right assignment:
 $\sigma \sigma \sigma \sigma \sigma \rightarrow (\sigma \sigma) \sigma \sigma \sigma \rightarrow (\sigma \sigma) (\sigma \sigma) \sigma$
- b. Right-to-left assignment:
 $\sigma \sigma \sigma \sigma \sigma \rightarrow \sigma \sigma \sigma (\sigma \sigma) \rightarrow \sigma (\sigma \sigma) (\sigma \sigma)$

Some languages may assign stress so that heavies are in the right place first, and then assign:

- (14) a. Trochaic Weight Sensitive, Left-to-Right:
 $L H L L L L \rightarrow L (H L) L L L \rightarrow L (H L) (L L) L \rightarrow L H_s L L_s L L$
- b. Trochaic Weight Sensitive, Right-to-Left:
 $L H L L L L \rightarrow L (H L) L L L \rightarrow L (H L) L (L L) \rightarrow L H_s L L L_s L$
- c. Iambic Weight Sensitive, Left-to-Right:
 $L H L L L \rightarrow (L H) L L L \rightarrow (L H) (L L) L \rightarrow L H_s L L_s L$
- d. Iambic Weight Sensitive, Right-to-Left:
 $L H L L L \rightarrow (L H) L L L \rightarrow (L H) L (L L) \rightarrow L H_s L L L_s$

For each word, which foot do I stress?

- (15) Quantity-Insensitive Stress does not care about weight
 - a. Because weight is not a factor, there are no heavy feet to cause unboundedness.
 - b. The only reason why stress could occur in two different positions is due to footing directionality: stress will always occur in at most two places.
 Example: Directionality and Boundedness are opposite:
 $(\sigma \sigma)(\sigma \sigma)$ vs $(\sigma \sigma)(\sigma \sigma)$

(16)	Name	Stress is placed on:	Example Languages
	Initial	First Syllable	Comanche, Irish, Finnish, Czech
	Peninitial	Second Syllable	Dakota, Oñati Basque, Mapudungun
	Postpeninitial	Third Syllable	Winnebago
	Antepenult(imate)	Third to Last Syllable	Plains Cree, Georgian, Greek
	Penult(imate)	Second to Last Syllable	Swahili, Breton, Hawaiian, Indonesian
	Ultima(te)	Last Syllable	Hebrew, Greenlandic, Farsi, Tajik

How do we derive these six positions from non-finality, non-initiality, and foot assignment?

- (17) Bounded systems: either the first or the last foot.
 - a. Stress on Initial foot - stress always on one of the first three feet

- b. Stress on final foot - stress always on one of the last three feet

Not all bounded systems are quantity insensitive: Quantity Sensitive Bounded systems only allow within the first three or last three syllables, but may allow variation in which of those syllables.

- (18) Non-bounded systems: depends on whether or not there is a heavy foot (a foot with a heavy syllable)! Differs across two dimensions:

- a. If there are heavy syllables, is stress on the first heavy foot or the last heavy foot?
b. If there are no heavy syllables, is stress on the first foot or the last foot?

c.	If word has Heavy	If word has no Heavy	Language Examples
	First Heavy Foot	First Foot	Khalkha Mongolian
	First Heavy Foot	Last Foot	Kw'akwala
	Last Heavy Foot	First Foot	Huasteco
	Last Heavy Foot	Last Foot	Golin

- (19) A general guide:

Bounded	Weight Insensitive	Stressed syllable always confined within one or two possible positions, no distinction made by syllable weight
Bounded	Weight Sensitive	Stressed syllable always confined to either the last three or first three syllables
Unbounded	Weight Sensitive	Stressed syllable always on a heavy syllable if there is a heavy syllable (18)

Practice

- (20) a. Is this system weight sensitive? (Is stress not always on the same syllable?)
b. Is this system bounded or unbounded? (Is stress stuck to within three syllables of one side or the other of the word?)
c. Does this system require non-finality or non-initiality? (Can there be final/initial stress?)
d. Does it allow monosyllable feet (remember: monosyllable feet are stressed)?
e. Are feet iambic or trochaic?
f. Does footing occur at the end of the word, or at the beginning (right-to-left or left-to-right)?
g. What is considered a mora (what makes a syllable heavy or not)?

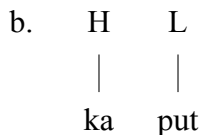
- (21) a. ki'ma.si
b. no'man.di
c. lo'lom.da₁ni
d. ci'kin.so.ba₁kam
e. ti₁ta.jo'ke
f. no'sen.ba₁ci.te
g. ku₁ni.fu'lo
h. ja'bem
i. ke.tu'gan.ri₁to

Tone and Autosegmentalism

Tone shows us that we need more than just a theory of feature sets to account for all languages.

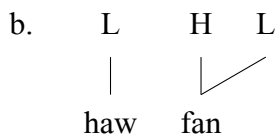
- (22) Autosegmental Tiers: languages may employ different ‘tiers’ for which features can exist on. These tiers are linked to one another, and these links are what determine how segments are pronounced.

a. Most commonly we see this used with tone: a word may have associated links between a word's tones and a word's syllables or morae (Tone Bearing Units).



- (23) Tone values come in three kinds: H(igh), L(ow), and M(id).

a. Rising, falling, and other contour tones are made from multiple links between a syllable and the tone



c. Shorthand for tones: high = á, low = à, mid = ā

- (24) Why use this system? Now different kinds of sound changes and rules can be understood as the linking and de-linking of various features across tiers.

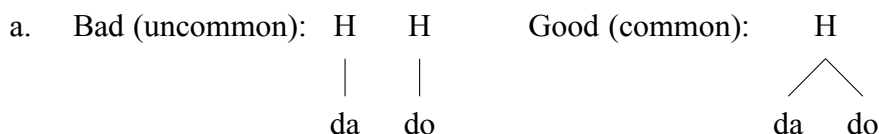
a. Non-underlying linking is shown with dashed lines:



b. Delinking is shown with a double-crossed out line:



- (25) It is common (it almost always it ends up being the case) that two syllables of the same tone are underlyingly linked to one tone, rather than being linked to separate similar tones.



- (26) Autosegmental phenomena:

a. Floating Tones: Tones associated with words or morphemes may be detached from their segments and float

- b. Mobile Tones: Tones may move to different syllables due to phonological pressure
- c. Fixed Melodic Inventories: words are associated with a set of tones, but not with any clear linking; linking will depend on the number of syllables/morae in a word
- d. Independence under Reduplication: reduplication might target non-tonal segments but not tone.

Practice

Find the autosegmental rule that applies in this situation, as well as the underlying forms of the Ergative and Instrumental prefixes, and the words for ‘gemstone’ and ‘vegetable broth’.

(27)	Meaning	Absolutive	Ergative	Instrumental
	peony	kèní	ákéní	kéní
	gemstone	tòstá	átòstá	tòstá
	kidney	wèkèné	áwékéné	wékéné
	marble	ùdùrí	ákùdùrí	kùdùrí
	book	bínì	ábínì	bínì
	vegetable broth	tòstá	átóstá	tóstá