
Weeks 10 – Non Linear Representations: Tone

November 11, 2008

1 Representations

1.1 Representing words with features

- (1) So far we have worked with linear representations, where words are strings of feature bundles. So [mãjâb] =

+nas	+nas	+nas	+nas	-nas
+cons	-cons	-cons	-cons	+cons
+lab	+low	+high	+low	-labial
...

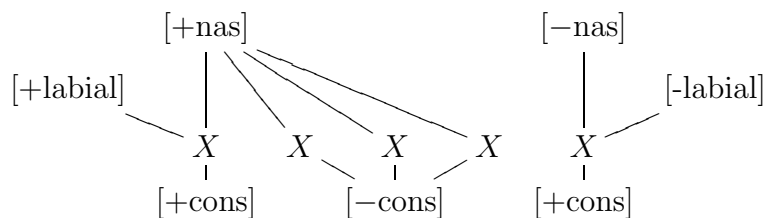
- (2) However there are other logically possible ways we might represent words. For example, we might put the feature [nasal] on it's own 'tier'.

+nas				-nas
+cons	-cons	-cons	-cons	+cons
+lab	+low	+high	+low	-labial
...

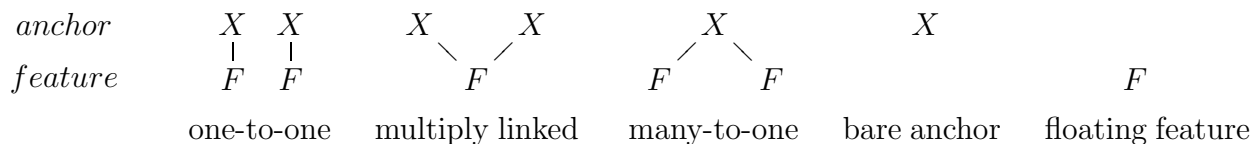
- (3) We might put every feature on its own tier.

+nas				-nas
+cons	-cons			+cons
+lab				-labial
	+low	-low	+low	
	-high	+high	-high	

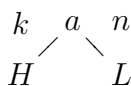
- (4) We might even adopt a skeletal structure like the following:



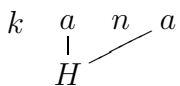
(5) When we adopt representations like the ones above, we have to be able to interpret representations like the following.



★ In the context of tone, where H indicates a high tone and L a low tone, what could the following representation mean?



How about this one?



1.2 How can we decide?

- (6) Changing the theory in this way is a good idea only if the new theory does a better job than the old at correctly distinguishing highly valued from lowly valued grammars (or grammar fragments).
- (7) As before, the claim is that rules that can be expressed in a simple form (though we will not spend time spelling out how rule simplicity is to be calculated) are highly valued. So, we are interested in
 - rules that look relatively complicated (relative to other rules, that is) in the old theory but relatively simple in the new one—new theory predicts they are highly valued
 - rules that look relatively simple in the old theory but relatively complicated in the new one—new theory predicts they are lowly valued

1.3 Some History

- (8) Theories that invoke the kinds of representations above are often called “Autosegmental” because the tiers are autonomous to the central tier which anchors the timing of the word (the X tier above).
- a. It was first called this by John Goldsmith in his 1976 dissertation, who was the first to invoke such autosegmental representations to describe tonal patterns. Tones were on a tier separate from the segmental tier.
- (9) The theory where each feature is on its own tier has been called the *Bottlebrush* theory (Hayes 1988?), presumably because words begin to resemble bottlebrushes, where the features and associations all radiate outwards from the center line of the bottle brush.
- (10) In this class, we only focus on autosegmental application to Tone. Next semester you may see the theory develop with respect to feature-based tiers.

1.4 Tonal Association

- (11) Kikuyu (Niger-Congo language from Kenya with about 5.3 million speakers; discussed here based on Goldsmith 1990, whose data come from Clements & Ford).

tò ròr ìré	‘we looked at’	má rór ìré	‘they looked at’
tò <u>mò</u> ròr ìré	‘we looked at him’	má <u>mó</u> ròr ìré	‘they looked at him’
tò <u>mà</u> rór ìré	‘we looked at them’	má <u>má</u> rór ìré	‘they looked at them’
tò tòm íré	‘we sent’	má tóm íré	‘they sent’
tò <u>mò</u> tòm íré	‘we sent him’	má <u>mó</u> tòm íré	‘they sent him’
tò <u>mà</u> tóm íré	‘we sent them’	má <u>má</u> tóm íré	‘they sent them’

- ★ Take a minute to ascertain the basic facts—on what does the tone of the tense suffix ìré/íré depend? On what do the tones of the two verb roots (in bold) depend? On what do the tones of the object suffixes (underlined) depend?

- ★ Ideas for how we can account for this with linear representations and rules (assume a feature [hi tone])?

- (12) In the “autosegmental” notation proposed by Goldsmith, we can write a rule thus (“T” stands for any tone, such as H or L in this language):

$$\textit{peninitial association} \quad wd \left[\begin{array}{c} C_0 \quad V \quad C_0 \quad V \\ T \text{---} \text{---} \text{---} \end{array} \right]$$

- (13) Yes, this is a rule! Its structural description is

$$wd \left[\begin{array}{c} C_0 \quad V \quad C_0 \quad V \\ T \end{array} \right]$$

(i.e., everything except the dashed line) and the structural change it requires is insertion of the association line.

- (14) We need two more rules for the rest of the tones:

$$\begin{array}{c} \textit{association convention} \\ \begin{array}{c} V \quad C_0 \quad V \\ | \quad / \\ T \quad T \end{array} \\ \textit{initial association} \quad wd \left[\begin{array}{c} C_0 \quad (V) \quad C_0 \quad V \\ T \text{---} \end{array} \right] \end{array}$$

The circle is part of the structural description, and means “not associated to anything on the other tier”.

- (15) For Goldsmith, association conventions actually derive from universal principles, and don’t need to be specified on a language-particular basis.

★ Let’s apply this grammar fragment to derive ‘we looked at them’—what must we assume about the association of tones in underlying forms?

- (16) All three rules are typical of the kind of thing you see in tone languages, and all three rules are some of the simplest that could be written in this notation.

★ Compare this to the linear analysis we developed above: do the linear rules look simple compared to other, less plausible linear tone rules we could write?

1.5 Key aspects of Autosegmental Analysis

- (17) To the extent possible, all association lines are determined by rules. I.e. in the UR, tones are linked to individual vowels only if it is otherwise unpredicable from the (language-particular) association conventions.
- (18) Association lines are not allowed to cross.
- (19) The Obligatory Contour Principle:

1.6 Review

- (20) Last time we saw the following kind of metric to decide when faced with two possible grammar formalisms. The formalism which ‘highly values’ ‘natural processes’ is to be preferred.
- (21) Of course we have to be explicit about what ‘highly valued’ and ‘natural processes’ mean.
 - a. Intuitively, ‘highly valued’ means simple.
 - b. Intuitively, ‘natural processes’ means those we find across many (unrelated) languages—i.e. those processes that make us realize language variation is not arbitrary.
 - c. Rigorous notions are hard to find (e.g. see discussion in Kracht (forthcoming)).
- (22) This idea above helps justify the autosegmental representation of tone because
 - a. the tonal rules needed in this formalism to explain typical tonal patterns (e.g. Kikuyu) are more highly valued than other logically possible rules we could write (which describe less common, or unattested patterns)
 - b. the SPE style rules needed to explain typical tonal patterns are less highly valued than other logically possible rules we could write (which describe less common, or unattested patterns)
- (23) Autosegmental representation of tone:
 - a. tonal features exist on a ‘tier’ separate from the words.
 - b. They are associated with particular vowels by virtue of being ‘linked’ with them.
 - c. One facet of this representation is that an element on a tier can be linked to more than one element on another tier.
 - d. ‘No crossing line’ convention