A dependency-based perspective on linearization in phonology

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It is well-known that the kinds of tree structures that linguists use potentially encode two types of information: *grouping* and *linear precedence*. It has also often been recognized, at least in the domain of syntax, that reading linear precedence in the tree is more a consequence of the two-dimensional nature of paper and blackboards than a strict necessity, i.e., given hierarchical grouping linearization can largely (if not completely) be derived from universal or language-specific principles that often make reference to the location of heads with respect to complements and specifiers (generally: dependents). Indeed, in various syntactic traditions, syntactic trees encode grouping only, leaving linearization to independent principles, sometimes located in the 'phonology'. The motivation for this seemingly odd location of linearization principles is that when language is used to communicate thoughts (and not just for thinking as such), words must have perceptible (i.e. phonological) forms that due to their manner of production (and perception) necessarily require sequencing, both internally at the level of segments, and externally, i.e., with respect to each other. All this is not to deny that there is also parallel organization, i.e., sequencing on various tiers or layers. Phonological organization is thus *multi*-leveled and the question is how predictable sequencing is determined on each level/tier/layer.

In early phases of generative phonology, syllabic and higher-level grouping is derived from linear precedence information. The subject of this paper (and conference) is that, given the presence of grouping, linear precedence can be derived from that; a reversal of dependency with respect to the information flow. Anderson (1987) offers an early principled discussion of the predictability of the linear order of segments within syllables (see Anderson 2003 for a more recent discussion). Observing that a lot of intrasyllabic linear information is *non-contrastive* (predictable) to begin with, he develops an explicit account (in the context of his Dependency Phonology model) of the linearization of segments within syllables. Given sub-syllabic grouping, all linearization follows from (a) sequencing statements that refer to 'sonority' and (b) 'subcategorization' properties of segment classes. Dependency Phonology originates and develops the idea that phonological organization is fundamentally based on head-dependency relations (both intrasegementally and extra-segmentally), as well as the hypothesis that the structural organization of phonology and syntax is identical to the extent that this is tolerated by the interfaces for these two modules (semantics for syntax and phonetics for phonology). Government Phonology has developed these same ideas in interesting directions.

Golston and van der Hulst (1999) elaborate on Anderson's hypothesis that linear order is predictable given a prosodic (i.e., hierarchical) affiliation of features, segments and higher-order units. Firstly, this can be shown for intrasegmental structure, despite certain claims about the representation of so-called complex segments. Secondly, they develop the hypothesis at the syllabic level. Golston and van der Hulst supply several reasons (from linguistic and psycholinguistic studies) for the point that syllabic organization must be part and parcel of the lexical representation of words, rather than

being derived through rules of syllabification that infer structure from linear order and major class and manner features. For example, in models such as Government Phonology, syllabic structure that is devoid of segmental content plays a crucial role in accounting for vowel-zero alternations and, in general, phonotactics. With syllable structure necessarily present in lexical representations, redundancy is created and this then invites an exploration of eliminating linear structure which is now no longer contrastive, an idea which, although perhaps self-evident, needs to be developed into explicit accounts of linearization.

An additional gain of assuming syllabic organization as basic, developed in Golston & van der Hulst and more rigorously in Radical CV Phonology (a development of Dependency Phonology; cf. van der Hulst 2004), is that all major class information can now be encoded structurally, rather than in terms of independent features. Exchanging structure for features is an extension of the program that allows, for example, length to be encoded structurally as well (and idea that is crucially based on assuming that at least syllabic terminals are underlying).

I will present the Anderson/Golston & van der Hulst hypothesis within the context of Radical CV Phonology (van der Hulst 2004). It will be shown that, to a large extent, linearization can be dealt with in terms of head first/head last statements. An interesting observation is that the value of this head-parameter flips from level to level: onset/rhyme (head first), syllable (head last), supersyllable/foot (head first). I will then address the question as to whether the suppression of linear information can be extended to the word as a whole and include predicting linear relations between all syllables and feet.

The nature and amount of sequencing is dependent on the channel of communication. It has often been observed that in this respect there may be interesting differences between spoken languages and sign languages, the latter requiring much less sequential organization both at the level of the phonology of words and the 'phonology' of sentence structure. In this talk I will focus on the predictability of sequential organization at the level of the phonology of words for spoken language, and make only a few remarks on differences between spoken and sign languages towards the end.

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