

# Principles of Linearization and Subtractive Morphology

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Raimy, (2000) *The Phonology and Morphology of Reduplication*

**Linear Representations:** The linearity of the phonological underlying representations has been implicitly assumed in the field so far, being expressed only through our left-to-right writing convention. Raimy notes that "there are non-trivial and non-derivable ordering relationships between segments in phonology". (2000; 12)

**Explicit Representations:** Raimy's proposal includes explicit representations of the precedence relationships between the segments and the possibility that some underlying strings and intermediate forms be non-linear. That is, one segment may precede more than one other segment in an underlying form.

## *Linearization*

Linearization is an essential restriction on the system imposed by the physical world (the articulators, time...). The real claim of the theory is about non-linear underlying structures. Furthermore, the process of linearization is not only needed for cases of reduplication, a way of reconcatenating the segments is clearly necessary for what is usually understood as cases of affixation.

## *Principles Guiding Linearization.*

Several principles govern linearization, one of which is *economy*. *Economy* ensures that the linearization is done in a minimal way, that is, no links are to be taken more than needed. Other principles, like *completeness*, might entail the violation of *economy*. *Completeness* ensures that all the links and segments are maximally spelled-out.

The status of the different principles is not at all clear. Fitzpatrick (*to appear*) suggests that the choice between two of these principles, *Non-stem* and *Completeness*, is of an empirical nature. On one hand, completeness relies on the comparison of different possible linearizations and finally opts for the one which preserves the maximal amount of links and segments present in its input. The principle takes effect every time a choice between different links is possible. In such cases, the backward-pointing links or the links which provide a more complete spell-out are favoured. These backward-pointing links are identified through a verification of the output tape. On the other hand, non-stem<sup>1</sup> selects the links that are leading to affixal material over the ones that lead to root segments whenever a crossroad is met.

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<sup>1</sup> The term recency is used in Raimy and elsewhere in the literature; we simply use the term non-stem to address the issue raised by Fitzpatrick.

If the two alternatives seem extensionally equivalent in most of the present literature, *subtractive morphology* points, in our opinion, towards the non-stem principle. The process involves forward-pointing links, or jumping-links, which would not be selected under the assumptions of completeness. If the latter principle was to be chosen, the observed forms would never surface. For this reason we prefer non-stem over it.

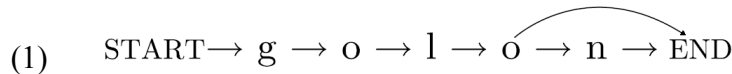
### ***Subtractive Morphology***

Subtractive morphology is realised through the non-pronunciation of some segments present in the underlying form of a string. It is a productive morphological process claimed to take effect in many languages. It is to be differentiated from *truncation* which involves the stray erasure of some segments following templatic restrictions on forms as in the case of hypocristics.

Using the anchor points proposed by Fitzpatrick (to appear), it is possible to imagine the addition of links that would "go over" some segments in a string and leaving them unpronounced if these added links are to be favoured when linearization takes place.

### **Tohono O’odham (Papago)**

Take for instance the Tohono O’odham perfective which, we contend, is formed through the subtraction of the *last segment* in a string. Hence, the imperfective form [golon] surfaces as [golo] in the perfective. Represented as a directed graph, the form would be as in (1).



(2)	<i>Imperfective</i>	<i>Perfective</i>	
	hi:nk	hi:n	‘bark(ed)’
	ñeid	ñei	‘see/saw’
	ñeok	ñeo	‘speak/spoke’
	golon	golo	‘rake’
	si:sp	si:s	‘nail’

### ***Problematic Cases***

Some cases of vowel-final forms have been problematic to most of the earlier approaches; these forms either lose their final vowels or remain as they were. A very small amount of them is found in the literature, and these have been assumed to be lexicalised in earlier works. We abide to such a possibility for the forms that remain unchanged; the subtracting vowel-final forms can, though, be accounted for in the present proposal without any additional apparatus.

(3) *Subtracting Vowel-final Stems*

ʔi:i	ʔi:	‘drink’
híwa	híw	‘rub against object’
mo:to	mo:t	‘carry on head or in vehicle’

(4) *Non-subtracting Vowel-final Stems*

cicwi	cicwi	‘play’
gagswua	gagswua	‘comb’
ka:	ka:	‘hear’

(Zepeda 1983 : 59-60)

An account of the subtracting vowel-final stems is possible here due to the manner in which the phonological exponent of the subtraction morpheme is defined. In both the **Prec** and **Fol** positions reference is made to the final segment of the stem without relying on the prosodic status of the subtracted elements. Following Martin (1988), Horwood (2001) assumes that subtractive morphology is presenting cases of allomorphy in certain languages, where either a *word final Coda* or a *word final Rhyme* gets subtracted. This is not the position taken here, though we do not deny the effect of prosody over morphological processes. Some cases of VC deletion are also found in Tohono O’odham. It is said that few of them are lexicalized as in the case of *cipkan* ‘work (impf.)’ *cipk* (perf.) and that there is a more general and regular pattern where the final consonant is preceded by a high vowel and a coronal consonant. In this latter situation, the final consonant along with the high vowel disappear. It is claimed by Fitzgerald (1997) that this high vowel deletion is motivated by a constraint that restrict COR HiV sequences which is translatable in a derivational framework as the rule;

(a) [+hi]V → Ø / [+cor]C \_ #

Here the vowel that remains after the naturally subtracted consonant is deleted according to rule (a). Its deletion is not part of the morphological process *per se*, though its application bleeds in the phonology allowing rule (a) to apply. The [+hi] vowel is required to be at the end of the word since the sequence [+cor] [+hi] is attested word internally elsewhere in the language. Rule (a) would thus be found after the linearization procedure.

One last apparent problem occurs when a word ends in the sequence VʔV where the internal glottal stop is the subtracted segment in the perfective.

(5)

gíʔa	gía	‘grasp’
húʔa	húa	‘rake together’
múʔa	múa	‘kill (sg obj)’
báʔa	bá:	‘swallow’
síʔi	sí:	‘suck’

Hill and Zepeda (1992) solve this problem by suggesting that the glottal stop is underlyingly word final and metathesizes with the preceding vowel because the language does not allow word final laryngeals. We adopt the position advocated by them on this matter, allowing for the metathesis to take place after linearization, potentially at the phonology-phonetics interface as the metathesis phenomenon is often believed to be phonetically driven.

### ***Recency (Non-stem) Vs. Completeness***

Recalling the above mention of the two competing principles legislating the linearization procedure (*Recency (Non-stem) Vs. Completeness*) it becomes clear that the non-stem principle is needed in cases of subtraction. Non-stem would ensure that the affixal links (or more recently added links) be chosen over the links leading to segmental material which is part of the stem. Furthermore, Completeness would produce the wrong results, striving for the greatest spell-out, thus rendering subtractive morphology impossible. Some empirical support is thus provided and permits the choice of Non-stem over Completeness in our typology of the principles guiding the linearization procedure.

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