VOLUME IV

Phonological Interfaces

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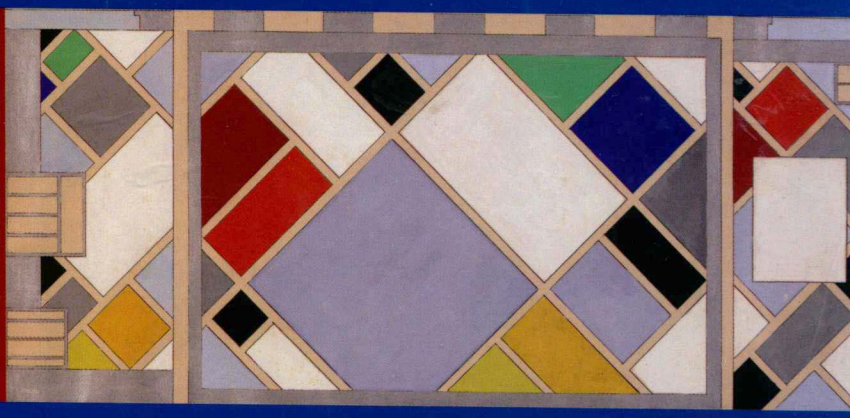

THE BLACKWELL COMPANION TO Phonology

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Edited by Marc van Oostendorp, Colin J. Ewen, Elizabeth Hume, and Keren Rice

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Brief Contents

Full Table of Contents

Volume I

Volume II

Suprasegmental and Prosodic Phonology

Volume III

Phonological Processes

Volume IV

Phonological Interfaces

Volume V

Phonology across Languages

82 Featural Affixes

AKINBIYI AKINLABI

1 Characteristics of featural affixes

Featural affixes are phonological features that function as grammatical morphemes. The most commonly found cases are tonal (Akinlabi 1996). An example is the associative marker in Bini (Amayo 1976), exemplified in (1). (The forms before the arrow indicate the isolation forms of the nouns and the forms after the arrow are associative constructions. For clarity, the tones in the examples in (1) are indicated with both tone marks and the letters L, H for Low, High respectively. ↓ indicates a downstepped tone on the following vowel.)

(1) *Bini* (Amayo 1976)

òwɛ̀	ɔ̀sà	→	òwɛ́ ɔ̀sà	[òwɔ́↓sà]
L L	L L		L **H** L L	'a chimpanzee's leg'
leg	chimpanzee			
àmɛ̀	èhj̃ɛ́	→	àmɛ́ èhj̃ɛ́	[àmɛ́↓hj̃ɛ́]
L L	L H		L **H** L H	'solution of water and pepper'
water	pepper			
òwɛ̀	ɔ̀nà	→	òwɛ́ ɔ̀nà	[òwɔ́↓nà]
L L	L L		L **H** L L	'this one's leg'
leg	this one			

However, several cases of non-tonal features functioning as grammatical morphemes have also been described in the literature. A representative list is given in (2).[1]

[1] See the references cited here for additional examples. Reviewers have pointed out a number of other examples which might have been included here. Two of them are: (a) in Coatzospan, the 2nd person familiar is marked by nasality (Gerfen 1999: 127), and (b) in Shuswap, glottalization is a floating feature (Kuipers 1974; Idsardi 1992). The list in (2) is not intended to be exhaustive.

(2) *Non-tonal examples of featural morphemes*

a. In Chaha, the 3rd masculine object is indicated by labialization.
(Johnson 1975; McCarthy 1983; Hendricks 1989; Archangeli and Pulleyblank 1994; Rose 1994, 2007)

b. Nuer indicates tense/aspect distinctions with the features [continuant] and [voice].
(Crazzolara 1933; Lieber 1987; Frank 1999)

c. In Zoque, the 3rd person singular is marked by palatalization.
(Wonderly 1951)

d. [nasal] is the 1st person possessive marker in Terena.
(Bendor-Samuel 1960, 1966)

e. The feature of "uncontrolledness" is signaled by palatalization in Japanese.
(Hamano 1986; Mester and Itô 1989; Archangeli and Pulleyblank 1994; Alderete and Kochetov 2009)

f. Noun class 5 is marked by voicing the first consonant of the root in Aka (Bantu, Zone C).
(Kosseke and Sitamon 1993; Roberts 1994)

g. Noun class morphemes in Fula include the features [continuant] and [nasal].
(Arnott 1970; Lieber 1984, 1987)

h. The Athapaskan D-classifier consists solely of the feature [–continuant].
(Rice 1987)

i. In Seereer Siin, an Atlantic (Niger Congo) language, consonant mutation (involving the features [voice] and [continuant]) constitute all or part of the noun class prefix in nouns and dependent adjectives, and number in verbs.
(Mc Laughlin 2000, 2005)

j. In Mafa, a central Chadic language of Cameroon, imperfectives of verbs ending in a consonant are formed with a palatal featural affix.
(Ettlinger 2003, 2004)

The features in (2), like segmental morphemes, often refer to specific edges of stems, and thus are featural affixes (e.g. Chaha labialization and palatalization, Aka voicing, Zoque palatalization). While the fact that phonological features may function as grammatical morphemes is uncontroversial, the status of such features as prefixes or suffixes often remained muted in spite of traditional intuition, with some scholars contented with referring to the morphemes simply as "floating autosegments."[2] The reason why the status of featural affixes as prefixes or suffixes is often problematic is that, while segmental affixes may be phonetically realized independently, featural affixes are always phonetically realized as part of some other segment or segments of the stem. The question therefore is why featural affixes get realized as part of the stem. The answer to this is that features have to be "licensed" (i.e. their occurrences have to be sanctioned) in order to get phonetically realized, therefore featural affixes must associate with a licensor in the stem or elsewhere.

[2] Most studies on tone are exceptions to this generalization (see Clements and Goldsmith 1984; Pulleyblank 1986; Anderson 1991; van der Hulst and Snider 1993).

In this chapter I am assuming a feature geometry in which all segments have a root node, which "gathers" the features into one unit (CHAPTER 27: THE ORGANIZATION OF FEATURES). In addition, I assume that vowels (and all syllable peaks, including syllabic nasals) are dominated by a mora (CHAPTER 33: SYLLABLE-INTERNAL STRUCTURE). Finally, I assume that class nodes, such as those for place of articulation, are monovalent. However, terminal features, such as aperture features, are bivalent. Since this chapter has a constraint-based, optimality-theoretic bias, I will not be assuming underspecification here (CHAPTER 7: FEATURE SPECIFICATION AND UNDERSPECIFICATION).

Universally, feature licensors can (only) be either a mora or a root node (Itô 1989; Itô and Mester 1993; etc.). Therefore, while edges in tones refer to the initial or final mora, edges in nasal harmony and the like may refer to the first or last root node; i.e. a real morphological edge, since the last licensor also coincides with the last segment of the morpheme (see Archangeli and Pulleyblank 1994).[3] But, with featural affixes, an edge does not necessarily mean a morphological edge; an edge is defined for a feature on the basis of a possible licensor in a language.

Another characteristic of featural affixes, as distinct from segmental affixes, is their domain. While most segmental affixes occur at the beginning, middle, or end of a base, featural affixes often occur throughout the base, or span it. Features that commonly have this characteristic are the "prosodic" features, in the Firthian sense of the word. As is well known, such features may include pitch, nasality, roundness, palatalization, and the like (see Firth 1948). Since these are the featural spell-out (or content) of the morphological categories in question, they are featural affixes.

In their study of alignment in (regular) segmental affixation, McCarthy and Prince (1993b: 103) observe that an alignment constraint, such as one that aligns the left edge of one morpheme with the right edge of another (as in Tagalog *-um-* prefixation) may be violated when dominated by a prosodic constraint, such as one that disallows a coda. This may force a prefix to be realized as an infix. The Tagalog affix *-um-* "falls as near as possible to the left edge of the stem, so long as it obeys the phonological requirement that its final consonant *m* not be syllabified as a coda" (McCarthy and Prince 1993b: 79). Therefore, it appears as a prefix before a vowel-initial word: /um + aral/ → [um-aral] 'teach', but as an infix when the word is consonant-initial: /um + sulat/ → [s-um-ulat] 'write', /um + gradwet/ → [gr-um-adwet] 'graduate'.

A similar characteristic is found in featural affixes. One important distinction from segmental prefixes/suffixes is that featural affixes often behave like "infixes," because they frequently do not occur at an edge of the stem. A feature may be forced away from an edge when the feature cannot co-occur with another feature(s) of the segment at the edge (see Pulleyblank 1993), leading to

[3] It should be noted that the accounts in this chapter allow for affixes which involve more than one autosegmental feature, though we do not discuss such cases here. For example, in Mokulu (Eastern Chadic, Chad Republic) the completive aspect marker consists of the features [voice] and [high] (Jungraithmayr 1990; Roberts 1994). The first consonant of the stem becomes voiced while the first vowel becomes high, even if it was a low vowel in the input. In the approach taken here, both features constitute parts of a featural prefix. However, such features may be realized on the same segment in the stem or on different segments, depending on licensing. In the case in question, licensing forces [voice] and [high] on different segments.

misalignment. A featural suffix may for example be realized elsewhere in the stem, resulting in featural infixation. However, featural affixes occur as "infixes" more often than segmental affixes.

Finally, one characteristic that has recently been observed in featural affixation is one in which a grammatical category is marked by a feature which has both segmental and featural allomorphs, as in Mafa (Ettlinger 2003, 2004).

In the following sections I illustrate each of the above characteristics of featural affixes. Each case study discussed below has been selected because it illustrates a particular characteristic or characteristics of featural affixes.

In the discussion of Chaha (§2.1), I show that a featural suffix [round] is realized as a featural infix, or even as a featural prefix, when the featural suffix is forced away from the edge. The opposite effect is illustrated with Nuer mutation (§2.3).

Tonal data from Etsako, an Edoid language, and nasalization data from Terena show situations in which featural morphemes span the entire base of affixation. In the discussions of Terena nasalization and the Etsako tone, I suggest that these are still cases of prefixation and suffixation respectively, but in conjunction with harmony. Therefore there are no special treatments of featural affixes required.

Mc Laughlin (2000, 2005) notes that, taking into consideration featural affixes, a morphological category can be expressed in one of three ways: as a segmental affix, as a featural affix, or as a combination of both segmental and featural affixes (CHAPTER 103: PHONOLOGICAL SENSITIVITY TO MORPHOLOGICAL STRUCTURE).

In summary, the primary focus in this chapter will be illustrating the characteristics of featural affixes. To do this, I will provide short descriptions of several of the featural affixes listed in (2). The characteristics include (a) marking morphological categories (like segmental affixes), (b) occurring as part of other segments rather than independently, (c) varying between prefixes and suffixes, (d) occurring elsewhere in the stem (because of feature co-occurrence constraints), (e) spanning the entire base of affixation, and (f) varying occurrence as a feature or a segment in the same language. I will argue that these characteristics of featural affixes do not require any new type of morphology, because the same machinery already developed for segmental affixes can handle them as well.

I discuss seven case studies in all, divided into four groups. The first group, Chaha and Zoque, illustrates the most basic characteristics of featural affixes mentioned above, that of directionality. Chaha illustrates suffixation and Zoque shows prefixation. The second group, Nuer and Seereer Siin, combines featural affixes with consonant mutation. Nuer is suffixal, and Seereer Siin is prefixal. The third group, Etsako and Terena, shows featural affixes that span the whole stem domain. They illustrate featural affixation combined with "harmony." Again, Etsako shows the harmony from the right (suffixal), and Terena shows it from the left (prefixal). The fourth group contains only one language, Mafa. Mafa shows a special case of affixation, in that the segment involved is at the same time a segment and a feature. I refer to this as segmental realization of a featural affix.

2 Directionality

The first case studies illustrate the need to consider featural morphemes as either prefixes or suffixes, a property that is formally accounted for by the directional

component of alignment. In this light, Chaha illustrates prefixation, and Zoque illustrates suffixation.

2.1 *Chaha labialization*

In Chaha, a Gurage language of Ethiopia, the 3rd person masculine singular object is indicated by labialization (with the suffix /n/) (Johnson 1975; McCarthy 1983; Hendricks 1989; Archangeli and Pulleyblank 1994; Rose 1994, 2007). Labialization surfaces on the "rightmost labializable consonant" of the stem. Labializable consonants in Chaha include labial and dorsal consonants, but not coronal consonants.[4] The data in (3) (from McCarthy 1983: 179) show the surface realization of this morpheme.

(3)

	without object	with 3rd masc sg object	
a.	*Rightmost consonant of the stem is labializable*		
	dænæg	dænæg^{w}	'hit'
	nædæf	nædæf^{w}	'sting'
	nækæb	nækæb^{w}	'find'
b.	*Medial consonant of the stem is labializable, final is not*		
	nækæs	næk^{w}æs	'bite'
	kæfæt	kæf^{w}æt	'open'
	bækær	bæk^{w}ær	'lack'
c.	*Only the leftmost consonant of the stem is labializable*		
	qætær	q^{w}ætær	'kill'
	mæsær	m^{w}æsær	'seem'
	mækʲær	m^{w}ækʲær	'burn'
d.	*No labializable consonant*		
	sædæd	sædæd	'chase'

A number of observations are important here. Labialization must be realized only on the rightmost labializable consonant, and on no other. This is obvious from the third example in (3a), /nækæb/ → /nækæb^{w}/. Both of the last two consonants of the verb root in this example are labializable, but only the root-final consonant is labialized. The medial consonant is not labialized, because of this requirement of rightmostness. In the forms in (3b), all of the final consonants of the verb roots are coronal, e.g. /nækæs/, therefore only the root-medial consonants, which are either labial or dorsal, are rightmost; and so only these receive the labialization feature. Note further that the initial consonants in the last two examples, /kæfæt/ and /bækær/, are labializable, but again are not labialized, because of the requirement of rightmostness. In (3c) the only labializable consonants of the verb root are the leftmost consonants, /qætær/ → /q^{w}ætær/, and so by rightmostness they receive labialization. Finally, in (3d) none of the consonants is labializable and so the feature is not realized.

An explanation of the above facts is as follows. Following earlier analyses we assume that the 3rd person masculine singular object marker in Chaha is

This statement is from McCarthy. Rose (2007) states the labialization rule as "labialize the rightmost velar or labial consonant, unless already palatalized." The key point in both definitions is that labialization targets dorsal and labial consonants.

the feature [round]. It must be a featural suffix, as indicated by the insistence on rightmostness. The 3rd person masculine singular object [round] aligns with (or coincides with; Zoll 1996) the right edge of the stem. In Chaha, [round] may be licensed by any consonantal root node. The position explicitly treats the morpheme as a suffix, but the segmental content is a feature [round], hence what the constraint aligns is the feature [round]. The right edge of the stem has to coincide with the feature [round], the featural content of the affix. Thus the feature [round] seeks out the rightmost consonantal root node in the verb root for licensing, given the discussion of licensing and edges above. As noted in our description of the facts, coronal consonants cannot receive the labialization feature. This means that the feature [round] cannot be articulated with a coronal consonant in Chaha. We can bar this with a feature co-occurrence constraint, which forbids [round] from linking to a root node associated to [coronal].

To conclude, there are several characteristics of featural affixes, which this affix illustrates. First, it marks a morphological category, the 3rd person masculine singular object. Second, the realization is a feature, the feature [round]. Third, it must be realized as part of another segment, a consonant, because it is not a segment. Fourth, like any affix, it has a position. However, like a featural affix it seeks the rightmost dorsal or labial consonant for licensing. Therefore it is a suffix. Fifth, like segmental affixes, it can be pushed from the suffix position. As it is ā featural affix, however, co-occurring with other features is what matters. It cannot co-occur with a coronal consonant; therefore it gets pushed more and more inwards until it finds the right consonant to co-occur with. Sixth, if it does not find the right licensor, it simply does not get realized. This is comparable with the null realization of certain segmental morphemes in language, as for example where a segmental affix is not realized for some phonotactic reason. One example is Dutch, which does not have geminate consonants. Here the 3rd person singular ending [-t] is not realized on verbs which end in a coronal plosive.[5]

(4) *Dutch 3rd person suffix* [-t] *absent after verb-final* [t]

a.	*ik lees*	[ɪk les]		'I read'
	hij leest	[hɛi lest]		'he reads'
b.	*ik zie*	[ɪk zi]		'I see'
	hij ziet	[hɛi zit]		'he sees'
c.	*ik eet*	[ɪk et]		'I eat'
	hij eet	[hɛi et]	*[et:]	'he eats'

2.2 *Zoque palatalization*

In this section, I consider the process of morphological palatalization in Zoque (Zoque-Mixe of southern Mexico). Zoque palatalization contrasts with Chaha labialization (§2.1) in some crucial senses. First, while Chaha labialization illustrates a case of long-distance realization of an affix, Zoque palatalization illustrates local realization; i.e. the affix must be realized at the edge, and nowhere else (Akinlabi 1996). Second, Zoque differs from Chaha in the sense that the featural affix is a prefix as opposed to a suffix.

[5] I am grateful to Marc van Oostendorp for this example from Dutch.

Wonderly (1951: 117–118) describes a process of palatalization (CHAPTER 71: PALATALIZATION) in Zoque, which marks the 3rd person singular. He represents this morpheme as a prefix [j],[6] and treats this process of palatalization as "metathesis" of [j] and the following consonant. A rule-based treatment assuming metathesis is proposed in Dell (1980). The relevant examples are listed in (5), with the morpheme transcribed as [j], following Wonderly.[7] My interpretation here is that Wonderly's [j] is a palatal feature, which I will assume is [–back].

(5) *Zoque 3rd person singular*

a. *With labial consonants*

j - pata	pʲata		'his mat'
j - pʲesa	pʲesa		'his room'
j - buro	bʲuro		'his burro'
j - faha	fʲaha		'his belt'
j - mula	mʲula		'his mule'
j - wakas	wʲakas		'his cow'

b. *With alveolar consonants*

j - tatah	tʲatah	[catah]	'his father'
j - tih	nʌ tʲihu	[nʌ cihu]	'he is arriving'
j - duratsʌhk	nʌ dʲuratsʌhku	[nʌ ɟuratsʌhku]	'it is lasting'
j - tsʌhk	tsʲahku	[ʧahku]	'he did it'
j - sʌk	sʲʌk	[ʃʌk]	'his beans'
j - swerte	ʃwerte	[ʃwerte]	'his fortune'
j - nanah	nʲanah	[ɲanah]	'his mother'

c. *With palatal consonants (no change)*

j - ʧoʔngoja	ʧoʔngoja	'his rabbit'
j - ʃapun	ʃapun	'his soap'

d. *With velar consonants*

j - kama	kʲama	'his cornfield'
j - gaju	gʲaju	'his rooster'

e. *With laryngeal consonants*

j - ʔatsi	ʔʲatsi	'his older brother'
j - hajah	hʲajah	'her husband'
j - huj	hʲuju	'he bought it'

All words in Zoque are consonant-initial. The data in (5) show that the 3rd person singular morpheme produces secondary palatalization of the first consonant of the stem if it is labial (5a), velar (5d), or laryngeal (5e); it turns alveolars into

[6] Wonderly used the symbol [y]. I have re-transcribed Wonderly's examples to be as close as possible to the IPA.

[7] The transcription here (from Wonderly 1951) is somewhat misleading, because one can be led to believe that the morpheme here is indeed /j-/, and not a feature. However, if this were a full segment as opposed to a feature, it would be completely unnecessary for the segment to seek licensing from another segment. It would also be completely accidental that metathesis is limited to glide–consonant sequences in this language. Note that this cannot be blamed on the sonority rise in an onset (i.e. [jC] → [Cj]), because the so-called metathesis also occurs in a sequence of two glides (which in many accounts are equal in sonority); /j - wakas/ → /wʲakas/ 'his cow'.