1983

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1983

proceedings of the west coast conference on formal linguistics

edited by
Michael Barlow
Daniel P. Flickinger
Michael T. Wescoat

published by
Stanford Linguistics Association
Department of Linguistics
Stanford University
Stanford, California 94305

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1. Introduction

1.1. The Argument

In the Gurage (Ethiopian Semitic) language Chaha, erstwhile phonological processes of palatalization and labialization have been morphologized as part of the inflectional system. Specifically, under certain morphological conditions we find palatalization of a root-final velar or coronal obstruent, labialization of the rightmost labial or velar consonant in the root, or a conjunction of these two processes. The most striking aspect of this morphological system is that labialization and palatalization apply across the board to all copies of a reduplicated root consonant.

Hetzron (1971: 194) has claimed that Chaha palatalization and labialization must be considered a case where morphemes consist of less than whole segments -- that some morphemes are composed solely of the palatal or rounded property superimposed on root consonants. Almost exactly this notion has developed in work on an autosegmental theory of nonconcatenative morphological systems like Chaha's. This theory covers a wide range of data that have been otherwise neglected in conventional morphological research: consonant mutation (Lieber 1982, this volume; McCarthy 1981a, forthcoming), root-and-pattern morphology (McCarthy 1979, 1981b), echo-word and ideophone formation (McCarthy 1982, 1983), and language games (Lieber forthcoming; McCarthy 1982, forthcoming). The morphologically-governed alternations obtaining in Chaha are, as we will see in section 2.1, a case where the feature matrices [+high, -back] (for palatalization) and [+round] (for labialization) are morphemes which are expressed phonologically by autosegmental association with root consonants.

The other aspect of Chaha palatalization and labialization -- across-the-board application to reduplicated root consonants -- is of equal theoretical significance, as emerges in section 2.2. Investigation of this phenomenon, based on data whose significance was first noted by Johnson (1975), yields two results: it confirms in considerable detail the analysis of Semitic roots in McCarthy (1979, 1981b), particularly the characterization of reduplication as one-to-many association of a root consonant with the CV-skeleton; and it shows that the feature complexes characterizing palatalization and labialization must be autosegmentally associated with the root itself.

1.2. Theoretical Background

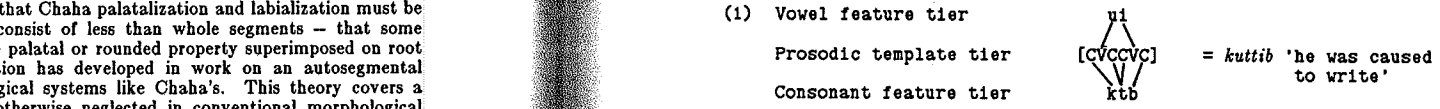
The classic item-and-arrangement model of morphological description has usually been predicated on a particularly restrictive definition of **morphemes**, the fundamental analytic units of morphology. Under this definition, a morpheme is a string of one or more segments with constant meaning. Word formation then consists of simple concatenation of morphemes into higher level strings of segments.

From recent research (Broselow 1983; Halle and Vergnaud 1981, forthcoming; Lieber 1982, forthcoming, this volume; Marantz 1982; McCarthy 1979, 1981a&b, 1982, 1983, forthcoming; Yip 1982) has emerged a new theory of morphology that is designed around the problems of nonconcatenative morphological phenomena. Two aspects of this new theory are particularly relevant to the problems addressed here. First, the definition of **morpheme** is weakened from that of the classical I-A theory to allow a morpheme to consist of a matrix of one or more distinctive features or of a string of such underspecified feature matrices. That is, a morpheme can consist of as little as a single phonological distinctive feature, while morphemes composed of segments (as in the familiar languages) are a special case in which the feature bundles happen to be fully specified. Second, word

formation is generalized from simple concatenation of morphemes to the assembly of forms by the association procedures of autosegmental phonology. The feature-sized morphemes receive surface phonetic expression through their autosegmental association with other morphological units that go into making up the fully-specified utterance.

This theory was originally developed in connection with the root-and-pattern morphology of the Semitic languages, a system that heavily exploits morphemes composed of feature matrices that are less than whole segments, a property that I have analyzed in considerable detail elsewhere (McCarthy 1979, 1981b). For example, in Classical Arabic the perfective aspect of the inflectional passive is indicated morphologically by an alternation in the quality of the stem vowels: all nonfinal stem vowels become *u* and the final one becomes *i*. In other words, the features for vowel quality function as morphemes marking voice and aspect. Likewise, lexical entries consist of consonantal roots -- essentially bundles of features distinguishing point and manner of articulation. Word formation involves autosegmental association of these vowel and consonant feature bundles with appropriate slots of a prosodic template or skeleton made up of units C and V. The skeleton indicates the number and distribution of segments in the surface form, and in verbs it itself functions as a morpheme of the derivational system:[1]

(1)



The morphemes in (1) are made up solely of features for vowel quality and consonant point and manner of articulation; only for convenience do we indicate them by the apparently segmental notation [ui] and [ktb]. One important aspect of (1) is the expression of different morphemes on different autosegmental levels or tiers. This is postulated to be a fundamental property of the theory, granting a kind of independence of association to the different morphemes.

1.3. Phonological and Diachronic Preliminaries

The consonant system of Chaha lexical representations appears in (2):

(2)

b, p	d, t ṭ	g, k q
m	n, r	
f	z, s	x
w	y	
	d^y, t^y (=ǰ, č) $ṭ^y$ (=čʼ)	g^y, k^y
	z^y, s^y (=ž, š)	x^y q^y
b^w, p^w f^w		g^w, k^w x^w q^w

The palatalized coronals are subject to a context-free and exceptionless rule turning them into the palatoalveolar strident parenthesized in (2) (Johnson 1975). For clarity I will systematically abstract away from the effects of this rule in the transcriptions, using the superscript *y* notation for palatalized coronals and velars alike. Similarly, all labialized consonants are indicated simply by superscript *w*, although postvocalic b^w is generally

spirantized to *w*.[2]

This consonant system has two important properties that bear directly on the problem here: it contains plain and palatalized versions of all nonlabial obstruents and it contains plain and labialized versions of all noncoronal consonants. These distributional regularities are expressed by the lexical redundancy rules in (3):

(3) a. $\begin{bmatrix}\text{-son}\\ \text{+high}\\ \text{-back}\end{bmatrix} \rightarrow \begin{bmatrix}\{\text{+cor}\\ \text{-ant}\}\end{bmatrix}$

b. $\begin{bmatrix}\text{-cons}\\ \text{+round}\end{bmatrix} \rightarrow [\text{-cor}]$

That is, only velar or alveolar obstruents may be palatalized (i. e., [+high, -back]) while only labial or alveolar obstruents may be labialized (i. e., [+round]). These redundancy rules not only characterize the distribution of consonant types at the lexical level but also govern the palatalizing and labializing morphology. We shall have occasion frequently to refer in the discussion of the morphology below to a palatalizable or labializable consonant. These notions are given an independent characterization by the redundancy rules in (3). The output of word-formation (that is, of the autosegmental rules of association) must be structure-preserving in the sense that it conforms to these redundancy rules.

The data below have been taken from Hetzron (1971, 1977), Johnson (1975), Leslau (1950, 1966, 1967-1968, 1979), and Polotsky (1938, 1951), with specific sources noted below. The data have been systematically adjusted for typographic convenience and to make the alternations more perspicuous. Unless otherwise noted, verb forms are cited in what I take to be their stems, the minimal contiguous strings containing the root and any associated derivational affixes, without inflectional affixes or clitics.[3]

2. Analysis

An important aspect of Chaha verbal morphology is the historical residue of what were apparently phonological processes of palatalization and labialization. Palatalization and labialization are clearly morphologized, however, as Hetzron (1971) observes and as Hudson (1974) has argued for a related set of alternations that I will not discuss here. Separately and together, with and without concomitant affixes, these processes mark several morphological categories. We shall consider first their basic formal properties in verbs of an uncomplicated sort and then we shall turn to the relationship between verb and root structure and across-the-board palatalization and labialization.

2.1. Basic Properties

Palatalization of the last root consonant, if it is palatalizable, marks the verb for agreement with a second person feminine singular subject; a root with a nonpalatalizable final consonant receives no special indication of this category:[4]

(4)

Imperative		
2nd m. sg.	2nd f. sg.	
gʸækʸət	gʸækʸətʸ	'accompany'
nəmæd	nəmædʸ	'love'
nəqət	nəqətʸ	'kick'
nəkəs	nəkəsʸ	'bite'
gəræz	gəræzʸ	'be old'
wətæq	wətæqʸ	'fall'
fərəx	fərəxʸ	'be patient'

The forms in (4) are all imperatives, equivalent to the bare jussive stem. The sole difference between the two genders in the singular lies in the palatalization of the final consonant of the root. If the root-final consonant is not palatalizable (i.e., it is a labial or *r*/*n*), then no gender distinction is made in the 2nd singular.

Labialization, on the other hand, has a more unbounded character; it is applicable to any labializable root consonant, regardless of its distance from the end of the root. If the root contains more than one labializable radical, then the rightmost one is labialized. Among other categories, labialization marks (with the suffix +*n*) a third person masculine singular object, as in the examples in (5):

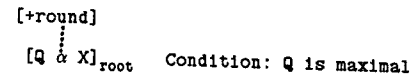
(5)

Perfective 3 m. sg.		
Without Object	With 3 m. sg. Object	
dænæg	dænægʷ	'hit'
nædæf	nædæfʷ	'sting'
qænæf	qænæfʷ	'knock down'
nækæb	nækæbʷ	'find'
sʸæfær	sʸæfʷær	'cover'
nækæs	nækʷæs	'bite'
kæfæt	kæfʷæt	'open'
bækær	bækʷær	'lack'
qətər	qʷətər	'kill'
mæsər	mʷæsər	'seem'
mækʸər	mʷækʸər	'burn'

If there is no labializable consonant in the root (that is, if all the radicals are coronal), then no labialization takes place: *sædæd, sædæd* 'chase'.

Since the effects of morphologically-induced palatalization and labialization are confined to root consonants, we will analyze these processes as affecting the root tier directly.[5] We will further say that palatalization and labialization are effected by docking appropriate autosegmental feature bundles onto segments in the root tier. That is, the feature complexes [+high, -back] and [+round] are morphemes marking various properties of the verb (an idea already present in much this same form in Hetzron (1971)), and these morphemes are realized phonetically by docking onto compatible root consonants. It is evident that the locality of the docking procedure is an area subject to parameterization, since palatalization may affect only the final radical while labialization is subject to the more general canon of the rightmost root consonant subject to rounding. The two docking rules appear in (6):

(6) a. **Rightmost Labialization**

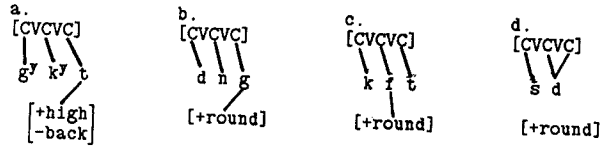


b. **End Palatalization**

The rules in (6) provide for the association of the autosegmental morphemes of palatalization and labialization with units on the root tier under appropriate morphological conditions. This association is controlled by a requirement that the result be structure-preserving in the sense that no new segment types may be created. Thus, the underlying characterization of possible palatalized or labialized segments by the redundancy rules in (3) governs the units to which these morphemes may dock. If the final radical is nonpalatalizable (that is, a coronal sonorant or a labial), then no palatalization takes place even when the appropriate morphological conditions are fulfilled. If the final segment is nonlabializable (a coronal), rule (6b) retreats through the root until it encounters a segment to which [+round] may licitly dock. Lacking one, it too fails to dock.

Representations of some examples after the docking rules have applied appear in (7):

(7)



gʸækʸətʸ *dænæg*ʷ *kæfʷæt* *sædæd*

There are several points worth noting about the representations in (7). First, the phonetic interpretation of these structures is governed by a principle granting priority to the features docked by (6). All root consonants must be fully specified in lexical representations for the features [high], [back], and [round] because underlyingly palatalized and labialized segments contrast with plain ones.[6] Therefore we must say, following Marantz (1982) and Lieber (1982), that in this case the autosegmental feature specifications override those inherent to the root segments themselves.

Second, it is demonstrable that the docked feature complexes do not spread to other accessible root segments. Thus, neither the *g* nor the *k* in (7a) are palatalized (though this is unsurprising in view of the restriction of palatalization to the final radical), and the *k* in (7c) is not labialized.

Third, the representation in (7d) has the feature [+round] not associated with any element of the root. This failure of [+round] to dock is simply a consequence of the structure preserving character of these associations. Since [+round] has nowhere to go when the root contains only coronal consonants, it remains phonetically uninterpreted. A similar situation can be noted with root-final coronal obstruents, which are not palatalizable; in this case as well the feature complex [+high, -back] remains unassociated.

A number of further observations, some quite significant and surprising, confirm this overall approach to Chaha palatalization and labialization. First, palatalization and labialization may occur jointly in a single form; this, along with suffixal object pronouns,

is the characteristic morphology of the agentless verb form called the impersonal, exemplified in (8):

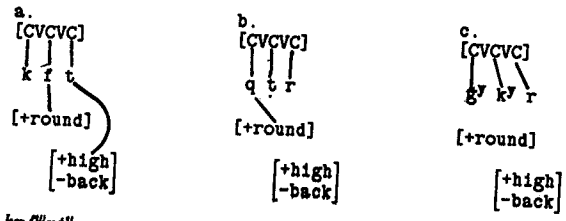
(8)

Personal	Impersonal	
a.		
kæfæt	kæfʷætʸ	'open'
nækæs	nækʷæsʸ	'bite'
tæbæs	tæbʷæsʸ	'fry'
dæmæd	dæmʷædʸ	'join'
tæzrabæt	tæzrabʷætʸ	'have hope for s.'
b.		
bænær	bʷænær	'demolish'
qætær	qʷætær	'kill'
sʸægær	sʸægʷær	'change'
nækæb	nækæbʷ	'find'
sænæb	sænæbʷ	'spin'
c.		
tʸafʷær	tʸafʷær	'scratch & mark'
gʸækʸær	gʸækʸær	'straighten out'

When the final root consonant is a coronal obstruent and any nonfinal one is a labial or velar, we find simultaneous palatalization of the former and labialization of the latter (8a). When the final radical is not palatalizable (in (8b), because it is a coronal sonorant or a labial), then only labialization may mark the impersonal. In (8c), personal and impersonal are identical because the root-final consonant is not palatalizable and no other consonant of the root is labializable (in these cases because of underlying palatalization or labialization).

It is not difficult to understand why this conjunction of palatalization and labialization should figure in Chaha morphology. The autosegmental feature complexes [+high, -back] and [+round] are distinct morphemes and therefore must appear on separate autosegmental tiers by the assumptions of McCarthy (1979, 1981b). They cooccur only through the intermediation of the root, to which both are docked. The representations, then, will appear essentially as in (9):

(9)



kæfʷætʸ *q*ʷ*ætær* *gʸækʸær*

Those features which have no place to dock remain unassociated, as in (9b & c), and so they have no overt phonological realization.

There is another, related property of the impersonal verb form. It will be recalled that the velar consonants alone are at the intersection of the two classes of consonants, palatalizable and labializable. This fact means that we could, in principle, expect two

quite different outcomes for the impersonal of a root with a final velar. Either the final velar would palatalize and some earlier consonant in the root would labialize (if possible), or else the final velar would labialize, blocking palatalization entirely (since it is limited to final position and palatalization and labialization are mutually exclusive in a segment).

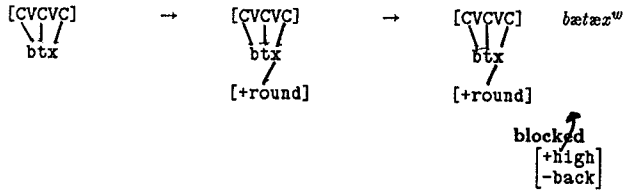
In the impersonal form of such a root, labialization takes precedence to the exclusion of palatalization:

(10)

Personal	Impersonal	
bætæx	bætæx^{w}	'dig out'
ax^{w}ænæq	ax^{w}ænæq^{w}	'take off the clothes'
dænæg	dænæg^{w}	'hit'

As Hetzron (1971) notes, the grammar must stipulate this precedence relation between palatalization and labialization when both are applicable, and the analysis presented here provides a ready means for doing this. We need only say that the rule docking the feature [+round] (rule (6a)) is ordered before the rule docking [+high, -back] (rule (6b)). A final velar will therefore be labialized, a result which, by the structure-preserving character of the Chaha associations, blocks subsequent palatalization. This situation is illustrated by the derivation in (11):

(11)



As usual, the unassociated feature complex remains without a phonetic interpretation.

2.2. Palatalization, Labialization, and Root Structure

There is a close relationship between the structure of the root -- properly, the pattern of association of root with template -- and the distribution of labialization and palatalization in a form. In all instances of association of a root segment with more than one C-slot of the template (that is, in all cases of one-to-many association), palatalization or labialization affect all surface "copies" of the segment. That is, because the root tier is affected directly, the segments that instantiate a root element in a word are all palatalized or labialized together, across the board. Various sources of one-to-many associations are represented among the examples in (12):[7]

(12)

a. **Biliteral roots with [CVCVC] template**

Masculine	Feminine	
bætðt	bæt^{j}ðt^{j}	'be wide'
fætðt	fæt^{j}ðt^{j}	'be partial'
nðzæz	nðz^{j}æz^{j}	'dream'
nðqðq	nðq^{j}ðq^{j}	'take apart'
sðkðk	sðk^{j}ðk^{j}	'plant in ground'

Personal	Impersonal	
sækæk	sæk^{w}æk^{w}	'plant in ground'
gæmæm	gæm^{w}æm^{w}	'chip the rim'

b. **Triliteral roots with [C(V)CVCVC] template**

Personal	Impersonal	
gðrædæd	g^{w}ðræd^{j}æd^{j}	'cut in big pieces'
mðræqæq	mðræq^{w}æq^{w}	'scratch in a straight line'
bðrægæg	bðræg^{w}æg^{w}	'be startled'

c. **Frequentative triliterals**

Personal	Impersonal	
z^{j}ðbapær	z^{j}ðb^{w}ap^{w}ær	'turn upside-down'
tædbapær	tædb^{w}ap^{w}ær	'make a mistake'
qðmamær	qðm^{w}am^{w}ær	'cheat'
tægm^{w}æm^{w}æt	tægm^{w}æm^{w}æt^{j}	'rinse'

d. **Reduplicated biliterals**

Personal	Impersonal	
nðsænæs	nðs^{j}ænæs^{j}	'sprinkle powder'
gðzægæz	g^{w}ðz^{j}æg^{w}æz^{j}	'cut a living being with a blunt knife'
qðtæqæt	q^{w}ðt^{j}æq^{w}æt^{j}	'hammer'
fðtæfæt	f^{w}ðt^{j}æf^{w}æt^{j}	'crumble bread'
fðræfær	f^{w}ðræf^{w}ær	'produce worms'
bðtæbæt	b^{w}ðt^{j}æb^{w}æt^{j}	'dissolve powder'
tðmætæm	tðm^{w}ætæm^{w}	'wind down'
sðbæsæb	sðb^{w}æsæb^{w}	'gather'
dðfædæf	dðf^{w}ædæf^{w}	'press slightly'
nðqænæq	nðq^{w}ænæq^{w}	'shake'
sðxæsæx	sðx^{w}æsæx^{w}	'shell by grinding'

e. **Uniliteral roots**

Masculine	Feminine	Imperatives
ædðd	æd^{j}ðd^{j}	'cut peas/lentils'
æsðs	æs^{j}ðs^{j}	'sweep'

Objectless	3rd M. Sg. Object	
akæk	ak^{w}æk^{w}	'scratch'

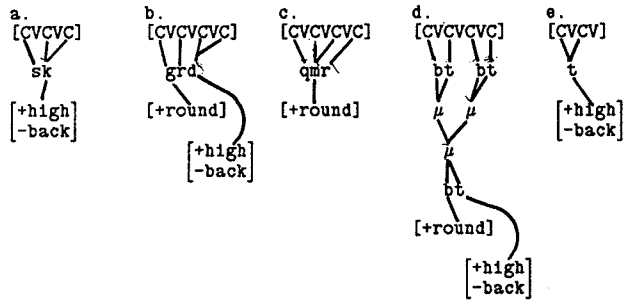
Personal	Impersonal[8]	
tata	t^{j}at^{j}e	'twist a rope'
atata	at^{j}at^{j}e	'rinse'
qaqa	q^{w}aq^{w}a	'tie tightly'
zasa	z^{j}as^{j}a	'act mad'

The generalization underlying (12) is that all copies of a reduplicated root consonant are affected across the board by palatalization or labialization. That is, although only one consonant can meet the structural description of palatalization or labialization (a final palatalizable consonant or the rightmost labializable consonant), all copies of that consonant are affected as well. This observation holds true regardless of the source of the reduplication. Thus, in (12a) reduplication is a consequence of the purely automatic expansion by autosegmental spreading of a biliteral root to fit a template with three C-slots. Similar sorts of automatic spreading are responsible for the reduplication in (12b&e). The reduplication of a medial radical in (12c) is a morphological fact -- it is a

hallmark of the triliteral frequentative and is attributable to a special association rule invoked in this derivational class. The reduplication in (12d) is also morphologically governed -- it is the characteristic reduplication of whole biliteral roots, seen in all the Semitic languages, usually with an iterative or repetitive meaning. In all of these cases some affected segments do not meet the criteria (final or rightmost) for palatalization or labialization, but rather they are palatalized or labialized as copies of segments which do meet the criteria. That is, there is a sort of overapplication or persistence of these two morphological processes.

The explanation for this across-the-board application is straightforward with the mechanism we have already developed. Palatalization and labialization involve docking the feature complexes [+high, -back] and [+round] onto appropriate units of the root tier. From this it follows that these features will be realized on all instantiations of a given root consonant -- that is, they will affect all surface "copies" of a root consonant simultaneously. This result is clear from the representations in (13), illustrating one form of each type in (12):

(13)

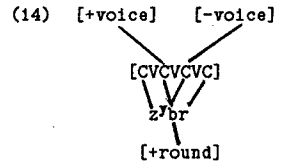


$s\partial k^{\gamma}\partial k^{\gamma}$ $g^{w}\partial r\ae d^{\gamma}\ae d^{\gamma}$ $q\partial m^{w}am^{w}\ae r$ $b^{w}\partial t^{\gamma}\ae b^{w}\ae t^{\gamma}$ $t^{\gamma}at^{\gamma}a$

The effect of palatalization and labialization on reduplicated forms is particularly remarkable in (13d), involving as it does reduplication of the entire biconsonantal root. The mechanism for this root reduplication, including specification of a [μ μ] morphemic template, is argued for extensively in McCarthy (1981b, 1982). For our purposes here it is crucial that there be a level of representation in which a single copy of the biconsonantal root appears. It is this basic, unadorned root with which the feature matrices [+high, -back] and [+round] are associated, thereby affecting both noncontiguous copies of the root consonants in the ultimate segmental representation.

There is another important property of palatalization and labialization that involves rather different aspect of Chaha consonantal morphology dealt with in some detail in McCarthy (forthcoming). Consider forms like $z^{\gamma}\partial b^{w}ap^{w}\ae r$ and $z^{\gamma}as^{\gamma}a$, in which the copied consonants differ in voicing on the surface. This voicing difference is determined morphologically -- it is arguably an attribute of the perfective and imperfective aspect and the frequentative. Since the voicing of medial root consonants is determined morphologically in the derivational/aspectual system, it can be specified morphologically at the prosodic template level. These voicing alternations therefore have no effect on the palatalization and labialization rules, which are applied to the root tier, as is evident from the representation in (14):

(14)



$z^{\gamma}\partial b^{w}ap^{w}\ae r$

The representation in (31) explains why the surface nonidentical consonants *b* and *p* are both affected by labialization -- they stem from a single consonant which is labialized and then itself associates with C-slots of the prosodic template bearing different values for the feature [voice]. This representation also explains why labialization (and palatalization) applies across the board, altering both copies of a reduplicated segment, while the voicing alternations do not. Since labialization and palatalization have contact with the root tier directly, the affect all surface copies of a root consonant. The specification of voicing, however, is intermediated by the prosodic template, because voicing, with the template itself, is a mark of aspectual or derivational class. Thus, the determination of voicing in medial root consonants is strictly local, without the overapplication that is a familiar property of reduplication systems. Similar observations hold for the verb $z^{\gamma}as^{\gamma}a$, which is a uniliteral root with "automatic" reduplication.

There is an alternative account of this overapplication phenomenon offered by Johnson (1975). Johnson's analysis is that palatalization and labialization proper affect only a single consonant of a conventional segmental representation, but then a purely phonological rule of consonant harmony spreads the effect of palatalization or labialization to a preceding identical consonant, providing only vowels intervene. Since consonant harmony rules exist in the languages of the world (the strident harmony rules of Navajo and Moroccan Arabic are prominent examples), and since Johnson incorporates his analysis into an insightful theory that anticipates most recent work on the notion of projection (Vergnaud 1977), it is of some interest to explore the consequences of this analysis.

There are two sorts of evidence that show the superiority of the nonphonological account presented here over Johnson's phonological analysis, and there is also one additional test that could in principle be applied to the issue, were the relevant data forthcoming.

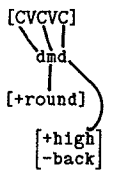
First, the phonological treatment is unable to deal with the overapplication in biliteral roots like (12d). Only the rightmost occurrence of each consonant is directly affected by labialization or palatalization. The consonant harmony rule, however, cannot spread the appropriate features to the preceding identical consonant because nonvocalic material intervenes -- specifically, the other root consonant. It is impossible, though, to modify the harmony rule by permitting it to skip over intervening nonidentical consonants because, in verb forms without reduplication, no overapplication of palatalization or labialization occurs. Roots of the form $C_iC_jC_i$ labialize or palatalize only the rightmost C_i:

(15)

2nd m. sg. impv.	2nd f. sg. impv.	
tədbt	tədbt$^{\gamma}$	'grasp'
Personal	Impersonal	
dæmæd	dæm$^{\gamma}$æd$^{\gamma}$	'join'

In such cases there is no across-the-board application because there is no one-to-many association of a single root consonant with two C-slots of the template:

(16)



dæm^{w}æd^{y}

One-to-many association is impossible in a case of this sort because of the prohibition against association lines crossing.

A second difference is that the phonological consonant harmony rule is committed to a phonological account of the voicing alternations as well, while the autosegmental analysis presented here is not. Since the consonant harmony rule affects only identical consonants, the medial *b^{w}* and *p^{w}* of *z^{y}ə b^{w}ap^{w}ær*, for example, must have the same voicing specification in underlying representation if they are to be subject to rounding harmony. As I show in McCarthy (forthcoming), based on the behavior of loan words as well as the pattern of synchronic voicing alternation in Chaha, it is very difficult to maintain a phonological account of voicing over a morphological one like that illustrated in (14).

The third distinction between the two analyses is only a potential one, though possible in principle. A search of the texts published in Leslau (1950) as well as the entries in Leslau (1979) has not yielded any instances of the crucial form. The verb *tata* regularly palatalizes both consonants in the impersonal (cf. (12e)), as expected under both the phonological and morphological accounts. If this verb were to occur with the passive/reflexive prefix *tæ* (which is presumably incompatible with the impersonal) or the factitive prefix *at*, the two analyses make different predictions about the result. With the phonological rule of consonant harmony, we expect palatalization of the prefixal *t*, since it is identical to the root consonants and no nonidentical consonants intervene -- in effect, we should get iterative palatalization. The morphological account of palatalization here would not extend palatalization to the prefixal *t* because the [+high, -back] specification is associated autosegmentally with a root segment; prefixal *t* and root *t* appear on different autosegmental tiers.

3. Conclusion

I have argued here for two aspects of the analysis of Chaha verbal morphology. First, palatalization and labialization are accounted for by autosegmentally docking feature-sized morphemes onto compatible elements of the consonantal root tier. Second, from this root-docking and the independently motivated structural possibilities of Semitic roots developed in McCarthy (1979, 1981b), across-the-board application of labialization and palatalization emerge as direct consequences.

Footnotes

The nature of Gurage verbal morphology and some measure of its significance for the prosodic aspects of morphology were first brought to my attention by Anthony Aristar in an unpublished paper "Nasal Alternations in Innæmor: Evidence for a Non-rule-based Phonology".

This research was supported in part by the National Science Foundation under grant number BNS-8121002.

[1]Here and subsequently I have suppressed much structure when it is irrelevant to the discussion.

[2]Generally, *b* is also spirantized to *β* in postvocalic environments. This spirantization of *b* and *b^{w}* is at least in part morphologized and is dealt with in McCarthy (forthcoming).

[3]This is the representation adopted for the Arabic paradigms in McCarthy (1979, 1981b).

[4]Examples in (4) and following are taken chiefly from Leslau (1966, 1967-68) and Johnson (1975).

[5]Although essentially all published discussions of Chaha palatalization and labialization describe them as processes affecting root consonants only, there is some evidence that nonroot, suffixal material can be affected as well. Hetzron (1971: 196) notes the labialization of a suffixal consonant in the 3 m. sg. obj. form *gætær+x^{w}æ* from *gætær+xæ* 'you put to sleep'. He also observes that the failure of the *g* to labialize in the 3 m. sg. obj. form *gætær+x^{w}u* 'I put him to sleep' (cf. *g^{w}ætæræ* 'he put him to sleep') can also be attributed to (vacuous) labialization of the suffixal labiovelar *x^{w}*. If these facts, taken from Polotsky (1938, 1951) can be confirmed, and if no morphological account of them is forthcoming, then we will have to allow labialization to analyze nonroot material in its search for the rightmost labializable consonant, although we will still maintain that the feature value [+round] is docked onto the consonantism itself rather than onto the CV-template.

[6]A further consideration is the fact that lexically labialized or palatalized consonants apparently must vacuously labialize in the appropriate morphological circumstances: cf. personal *tægm^{w}æm^{w}æt* vs. impersonal *tægm^{w}æm^{w}æt^{y}* 'rinse'. If the lexically labialized *m^{w}* were not vacuously labialized, we would expect [+round] to dock onto the *g*, incorrectly yielding *g^{w}* in the impersonal form. It follows that the features [+high, -back] and [+round] cannot simply dock onto segments unspecified for them, or else we would not find this vacuous application, so these observations indicate that lexical underspecification is inappropriate here. It should be noted, however, that the relevant facts are somewhat in dispute; see Johnson (1975: 11) for discussion.

[7]Most of these examples are from Johnson (1975) or Leslau (1966).

[8]The final vowel alternation in these forms results from coalescence of *a* with suffixal *i*. With regard to the voicing difference in the form *zasa* 'act mad', see the discussion below of (14).

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Reflexives and Reciprocals in English: An Alternative to the Binding Theory

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1. Introduction

Reflexive pronouns (e.g. *herself, themselves*) and reciprocal pronouns (e.g. *each other*) share an intriguing set of distributional regularities that have been of much concern in the theoretical literature over the past decade. A seemingly unquestioned assumption made in this literature is that the principles determining these regularities are purely *syntactic* in nature. Hence we have seen proposals such as the "clausemate" constraint (Postal [1971,1974]), the "specified subject" constraint (Chomsky [1973]), and clauses of Chomsky's [1981] "binding theory" which stipulate that reflexives and reciprocals must be "bound" in their "governing category".

In this paper, we present a radically different analysis of reflexive and reciprocal elements (which, following Reinhart [1983], we will refer to as "r-pronouns"). Taking rigorous semantic analysis as our point of departure, we demonstrate that essentially all constraints on the distribution of r-pronouns that have been discussed in the literature follow from a single semantic principle. Moreover we explain an array of facts involving r-pronouns in dislocated constituents (e.g. in cleft, pseudocleft, and topicalization constructions) which stand as blatant counterexamples to current, widely-accepted treatments within Chomsky's "binding theory".

We will couch our presentation here in terms of a version of Generalized Phrase Structure Grammar based upon a mild extension of context-free grammar. (The extension is mild in the sense that it retains low-order deterministic polynomial time complexity for the class of languages it defines.) The theory we put forth, however, is compatible with context-free versions of Generalized Phrase Structure Grammar (Gazdar [1981,1982]), and with other closely related frameworks, such as the various versions of Generalized Categorial Grammar (e.g. Bach [1981]; Dowty [1982a, 1982b]), and Phrase-Linking Grammar (Peters and Ritchie [1982]). More specifically, we assume a Montague-like system containing finitely many rules of the form:

(1) $\langle X \rightarrow F(X_1, \ldots, X_n);\ \mathsf{F}(X_1', \ldots, X_n') \rangle$

Here the X_i are categories (feature bundles), F is a syntactic (string) operation, the X_i' are variables ranging over the denotations of the X_i, and F is a set-theoretic or algebraic operation on the X_i'. Allowable F's include concatenation, as well as *head wrapping* operations, which allow one constituent to be inserted to the left or right of the head of another constituent.[1] When F is simply concatenation, we omit any mention of it in the rule, simply listing the daughter constituents. For convenience, we represent the denotational rules by intensional logic schemata (translation

1. The theory of such systems, called *head grammars*, is developed in Pollard [forthcoming, in preparation].