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CORONAL FRONTING IN THE AKN DIALECT OF ARMENIAN

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0. Introduction

Maxudianz (1911) describes a process in the Armenian dialect of Akn whereby the vowels *o* and *u* become *ö* and *ü* respectively after dental stops, affricates, *ž, š, l, r,* and *f*. Karst (1901:60), the only scholar to attempt an analysis of this phenomenon, interprets it as a type of palatalization, but this is little more than a description of the facts. In this paper I will argue that we are dealing with a simple spreading of the coronal node from coronal consonants to following vowels, a process also attested in Cantonese, Lhasa Tibetan, and Maltese Arabic. This theory crucially depends on the proposal of Clements (1991) that back vowels are dorsal and front vowels are coronal. In section 1 we will examine the Armenian, Chinese, Tibetan, and Arabic data; in section 2 we will see how Clements' theory accounts for these phenomena and consider some broader theoretical implications of his proposal.

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1. Evidence for coronal fronting

Pulleyblank (1988) and Hume (1992) describe several cases of coronal consonants fronting adjacent vowels. In this section we will consider three of these cases, from Cantonese, Tibetan, and Maltese Arabic, and present new evidence from the Akn dialect of Armenian.

1.1. Cantonese

In the historical development of Cantonese from Late Middle Chinese, [-low, +round] vowels are fronted after coronal consonants. Consider the cases in (1):

(1)	Late Middle Chinese	Cantonese	Mandarin
	tuan 'end'	*tü:n*	*duan*
	kuan 'official'	*ku:n*	*guan*
	puan 'half'	*pu:n*	*ban*

The important feature to notice here is that the coronal consonant *t* fronts a following *u*, but *k* and *p* do not. Along similar lines, Cheng (1989) observes that in modern Cantonese, [-low] vowels are obligatorily front in syllables with coronal onsets and codas. In traditional phonological terms, the difference between *u* and *ü* is [±back]: *u* is [+back], and *ü* is [-back]. We might expect, then, that the Cantonese data result from a spreading of [-back] from coronal consonants. Coronal consonants are not distinguished from labials and velars by a [-back] feature, however. In the standard Halle-Sagey model (see Sagey (1986), Halle (1987)), only dorsal segments can be [-back]; dental and palatal consonants are distinguished from labials and velars by having a coronal articulator, labials by having a labial articulator, and velars by having a dorsal articulator. This system would predict that if any consonants fronted vowels, it would be [-back] velars (Turkish front velars are the standard example of this type). Consequently, we must assume either that it is actually a different feature which is spreading, or that the Halle-Sagey model is incorrect.

1.2. Tibetan

In Lhasa Tibetan, the vowels {*u o a*} are fronted before the coronal consonants {*d n s l*}, but not before labials or velars (Michailovsky (1975))[1]. Consider the data in (2) [tones not represented]:

(2)		written Tibetan	pronunciation
	(a)	*bdud* 'demon'	[*tüüü*]
		bod 'Tibet'	[p^h*öö*]
		sman 'medicine'	[*mɛ̃ɛ̃*]
	(b)	*nub* 'west'	[*nuu*]
		goŋ 'price'	[q^h*õõ*]
		g-yag 'yak'	[*yaa*]

In the cases in (2a), *u* and *o* become their front counterparts *ü* and *ö*, as in Cantonese, before the coronals *d* and *n*; *a*, however, is also raised, and surfaces as *ɛ*, because the expected *æ* does not exist in Tibetan. Before labials and velars (2b), vowels are not fronted. Note that final consonants are dropped in spoken Tibetan, so that the triggers for coronal fronting are not present on the surface. In this sense, Tibetan is reminiscent of the Mon Khmer languages, which merge their voiced consonants with the voiceless series, but preserved the original voicing distinction in the tonal register of following vowels.

1.3. Maltese Arabic

Clements (1991:8) mentions the case of Maltese Arabic, in which the imperfective prefix vowel, which normally surfaces as a copy of the following stem vowel (3a), surfaces as [*i*] when the first consonant of the stem is a coronal obstruent (3b):

(3)		perfective	imperfective	gloss
	(a)	*forok*	*yo-frok*	'limp'
		kotor	*yo-ktor*	'abound'

[1] Interestingly, r does not appear to trigger fronting.

	rifed	*yi-rfed*	'support'
	ʔasam	*ya-ʔsam*	'break'
(b)	*daħal*	*yi-dħol*	'enter'
	siket	*yi-skot*	'be silent'
	talab	*yi-tlob*	'pray'
	žabar	*yi-žbor*	'collect'
	dalam	*yi-dlam*	'grow dark'
	čaħad	*yi-čaħad*	'deny'

Though the data in (3) are not as clear-cut as the Cantonese and Tibetan cases, they nevertheless support Clements' proposal that front vowels are coronal. In Clements' analysis, the unspecified imperfective vowel in the (a) forms receives its melodic features from the following stem vowel; in the forms in (b), however, the imperfective vowel instead receives its melodic feature [coronal] from the following coronal obstruent. It is not clear why other place features do not spread as well; for example, we might expect that dorsal obstruents would produce back vowels, and labials would produce round vowels.

1.4. Akn

According to Maxudianz (1911), the vowels *o* and *u* become *ö* and *ü* respectively after dentals (*t, t', d, d'*), affricates (*c, cʿ, j, č, čʿ, ǰ*), *n, ž, š, l, r*, and *f* in the Armenian dialect of Akn (modern Ağın, in central Turkey). [Unfortunately the other grammar of the Akn dialect, Gabrielian (1912), uses standard Armenian orthography, which does not distinguish umlauted vowels.] Maxudianz cites the following forms (1911:28-30):

(4)

Classical	Akn	Classical	Akn
doł 'tremor'	*d'öγ*	*gałt-uk* 'secret'	*g'aγdüg*
ordor 'exhortation'	*ortör*	*aṙewtur* 'trade'	*aṙüdür*
aṫoṙ 'chair'	*aṫöṙ*	*Dunigeankʿ*	*Dünigonkʿ*
gxtor 'oak apple'	*g'əxdör*	*dunčʿ* 'chin'	*d'ünčʿ*
moṙacʿoł 'forgetting'	*moṙcʿöγ*	*ṫukʿ* 'spit'	*ṫükʿ*

čors '4'	*čörs*	*ǰur* 'water'	*ǰ'ür*
aǰoł 'successful'	*ačöγ*	*čuxa* 'cloth'	*čüxa*
nor 'new'	*nör*	*šušma* 'sesame'	*šüšma*
xošor 'large'	*xošör*	*šuk'* 'shadow'	*šük'*
sox 'onion'	*söx*	*žam-u* 'time-gen.'	*žüm*
galoł 'coming'	*g'alöγ*	*lusaworič* 'illuminator'	*lüsavorič*
loys 'light'	*lös*	*heru* 'last year'	*herü*
bareaw 'good'	*b'aröv*	*anun* 'name'	*anün*
ays awr 'this day'	*asör*	*unim* 'I have'	*ünim*
hoł 'ground'	*föγ, feγ*	*utem* 'I eat'	*üdim*
		erdumn 'oath'	*erťüm*
		ťułť 'paper'	*ťüxd*
		sut 'false'	*süd*

Fronting does not occur after other consonants:

(5)

Classical	Akn
boć 'flame'	*b'oć*
port 'navel'	*bord*
pťołk' 'throat'	*pťoxg*
koć 'closed'	*g'oć*
k'oř 'unit of grain'	*k'oř*
goz 'urine'	*g'os*
sałmos 'psalm'	*saγmoć*
ałōťk' 'prayer'	*aγoťg*
xōsk' 'speech'	*xosg*
gud 'grain'	*gud*
ełungn 'nail'	*əγung*
Muš-eł 'person from Mush'	*Mušex*
Vřamšapuh (personal name)	*Fəřanšabu*
xuć 'room'	*xurć*

Maxudianz claims that *o* is only fronted in stressed syllables, but does not give any examples; in my survey of the word list

on which his work was based, I found no cases supporting his analysis. Note in *ünim* 'I have' and *üdim* 'I eat' that the initial vowel has apparently been fronted by a following coronal.

Except for *f*, the consonantal triggers in this process are all coronals (i.e. dentals and palatals), as in Chinese, Tibetan, and Arabic. I propose that *f* is not actually a trigger at all, but functions as the placeless consonant *h*, and the cases where *ö* and *ü* occur after *f* are actually triggered by following coronal consonants.

Akn *f* developed (as in many other Armenian dialects) from an initial *h* followed by *o*; original *ho-* sequences surface as [*fo-*], [*fö-*] and [*fe-*], according to the region (Maxudianz (1911:25-6)):

(6)

standard Armenian	(a) Akn	(b) u. Akn	(c) l. Akn
hos 'here (by me)'	*fos*	*fes*	*fös, fes*
hod 'here (by you)'	*fod*	*fed*	*föd, fed*
hon 'there'	*fon*	*fen*	*fön, fen*
hoł 'ground'	*foɣ*	*feɣ*	*föɣ, feɣ*
hot 'smell'	*fod*	*fed*	*föd, fed*

The standard Akn forms are not problematic. In the upper Akn case, a process of diphthongization has occurred, whereby initial *o-* regularly becomes *ve-*:

(7)

standard Armenian	upper Akn
ov 'who'	*vev*
xałoł 'grape'	*xaveɣ*

I propose that in this subdialect, stressed *o* is diphthongized, and its features split between the two halves of the diphthong: the first half receives the features [+round, +back], and the second half receives [-high]. This case is basically identical to Spanish, which diphthongizes stressed *o*'s in open syllables:

(8) *podér* 'to be able' : *puédo* 'I am able'
[< Latin *potior*]
dolér 'to hurt' : *duéle* 'hurts'
[< Latin *dolēre*]

When this process occurs immediately after an *f-*, the undesirable cluster *fv-* is simplified by deleting the *-v-*, producing the forms in (6b). The stages would then be: *hos* > *fos* > **fves* > *fes*[2].

The umlauted cases in (6c) are more problematic. Observe that the *ö*'s in (6c) are all followed by coronals (I assume that *γ*, which comes from a historical *l*, still behaves as a coronal); when *o* is not followed by a coronal consonant, no umlaut occurs:

(9)

standard Armenian	lower Akn
hog 'worry'	*fokʿ*
**honkʿčʿim* 'I rest'	*fokʿčʿim*

Given that initial *o* and *u* are fronted by following coronals, I propose that *o* and *u* always receive place features from adjacent consonants, from left to right, so that consonants on their right will only determine their place features when there is no consonant to the left. Thus, for example, if an *o* is preceded by a labial, it will be [+labial], and surface as [*o*]; if it is preceded by a dorsal, it will be [+dorsal], and surface as [*o*] (remember that this is equivalent to [+back] in Clements' theory); and if it is preceded by a coronal, it will be [+coronal], and surface as [*ö*]. Assuming that *f* is underlyingly */h/*, or alternatively that the rule of coronal fronting developed before *h* became *f*, we can then say that the forms in (6c) receive the place feature [coronal] from the consonant on their right, because according to current theory (e.g. Halle (1989)) *h* has

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[2] This was first proposed by Bałramyan (1965) and contested by Muradyan (19xx), on the grounds that medial o's are never diphthongized in Armenian dialects. As we can see in (7), Muradyan's generalization was incorrect; I therefore support Bałramyan's original proposal.

no place features, and thus would not be able to spread place features to the following vowel.

The Akn data, then, appear to provide an interesting complement to the cases of coronal fronting in Chinese, Tibetan, and Arabic. Though this process intuitively seems to be a plausible phonetic development, whereby vowels assimilate the position of the tongue involved in the production of adjacent consonants, the current representation of phonological features provides no formal mechanism to express it. In the next section, we will consider how a new proposal by Clements (1991) may allow us to account for the phenomenon of coronal fronting.

2. Place features for consonants and vowels

In the standard phonological framework (Clements (1985), Sagey (1986), Halle (1987), McCarthy (1988, 1991)), consonants may be labial, coronal, dorsal, pharyngeal, or laryngeal, whereas all vowels are dorsal, defined by the dorsal features [back], [high], and [low], though they may also have the labial feature [round] and the pharyngeal feature [ATR][3]. In this system, a standard nine-vowel system would be represented as follows:

(10)	high	low	back	round	ATR
i	+	-	-	-	+
ɪ	+	-	-	-	-
e	-	-	-	-	+
ɛ	-	-	-	-	-
a	-	+	+	-	-
ɔ	-	-	+	+	-
o	-	-	+	+	+
ʊ	+	-	+	+	-
u	+	-	+	+	+

This model encounters many problems. It is not clear how to represent the common phenomenon of palatalization, for

[3] ATR = "advanced tongue root", roughly equivalent to the traditional feature "tense"; see Vaux (1992).

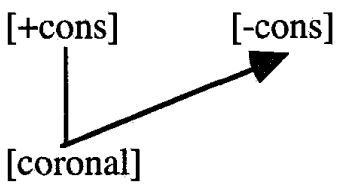
example, which is triggered by vowels which in this system are dorsal, but always produces coronal segments. Similarly, we should expect that processes of vowel assimilation would be blocked by velars, but not labials or coronals, which is not correct (Kenstowicz (1993:9.23)). We should also find cases where the dorsal features [back] and [high] spread together, independently of the labial feature [round]; languages such as Mari (Odden (1991)) indicate that it is actually rounding and backness which group together, independent of height. Finally, the standard model cannot account for the cases of coronal fronting described in section 1. In the standard theory, the coronal node dominates the features [anterior] and [distributed], which serve to distinguish dentals, palatals, and retroflex consonants, but play no role in distinguishing vowels. Consequently, we cannot say that coronal fronting is spreading of [anterior] or [distributed] features, because neither of these serves to distinguish {*o u*} from {*ö ü*}. In terms of standard phonology, these two vowel sets are distinguished by the feature [back], but since this belongs to the dorsal node, we cannot say that it spreads from coronal consonants.

Clements (1991) was led by these shortcomings of the Halle-Sagey model to propose a new system of phonological representation, wherein consonants and vowels are defined by a single set of features. In this new system, labial consonants and round vowels are defined by the feature [labial], coronal consonants and front vowels are defined by the feature [coronal], velar consonants and back vowels are defined by [dorsal], and so on. The Akn vowel system would be represented as follows (N.B. Clements replaces the dorsal feature [high] with an aperture feature [open], for reasons I will not discuss here):

(11)	*i*	*ü*	*ɛ*	*ö*	*a*	*ɔ*	*u*	*ə*
lab	-	+	-	+	-	+	+	-
cor	+	+	+	+	-	-	-	-
dor	-	-	-	-	+	+	+	-
rad	-	-	-	-	+	-	-	-
open	-	-	+	+	+	+	-	+

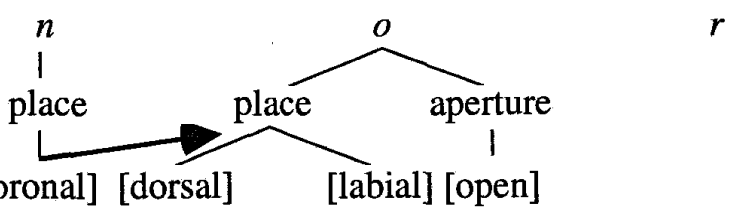
This system resolves the problems encountered by the Halle-Sagey model discussed above, and is formally more elegant, because it uses a single set of features to describe both consonants and vowels, whereas the Halle-Sagey model was forced to employ different features such as [round] and [labial] for labial vowels and consonants respectively. The relevant advantage of the Clements model here, though, is that it provides a simple account for the processes of coronal fronting described in section 1. Within the general framework of current non-linear phonology, these processes can be analyzed as spreading of the feature [coronal] from coronal consonants to following vowels, as in (12):

(12)



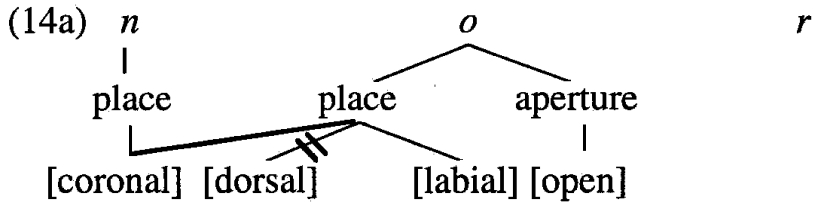
In this analysis, a case such as *nor* > *nör* would be represented as follows:

(13)

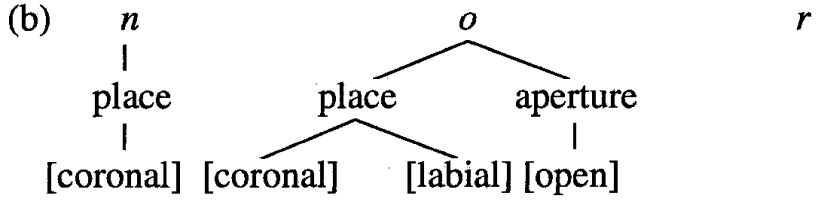


In order to preserve the intuitive notion that segments cannot be both [+back] and [-back], Clements must stipulate that vowels cannot simultaneously be [dorsal] and [coronal], so that the [dorsal] place feature is delinked (14a), producing the configuration in (14b):

(14a)



(b)



As we have seen in (11), the set of features [+labial, +coronal, + open] defines the vowel *ö*; consequently, (14b) represents the Akn form *nör*.

Clements' theory thus provides a relatively straightforward account for the processes of coronal fronting discussed in section 1. Though his proposal is preferable to the standard Halle-Sagey model for this reason, as well as those mentioned above, it also loses a few generalizations captured by the standard model. Perhaps most important of these is the [back] opposition, which plays an important role in the harmony systems of Turkish and Hungarian, as well as numerous other phonological processes in other languages. In the case described in (13-14), for example, the development *o* > *ö* is easily expressed as a change from [+back] to [-back], whereas in Clements' model the change must be expressed as [dorsal] > [coronal], with a stipulation that vowels cannot simultaneously be [dorsal] and [coronal]. Though this stipulation is empirically homologous with the statement that vowels cannot simultaneously be [+back] and [-back], it is formally distinct, because there is nothing inherent in the labels [coronal] and [dorsal] to indicate that they are incompatible, given that each is free to combine with the other place features [labial], [radical], and [pharyngeal]. I do not consider this to be a serious shortcoming of Clements' theory, though, since it is merely a problem of terminology and not one of empirical adequacy.

Another problem with Clements' theory results from his attempt to eliminate the feature [ATR], which in the standard model replaces the feature [tense] used in older phonological frameworks. For some reason Clements finds this feature undesirable, and attempts to absorb its functions within [open] and [pharyngeal]. In order to make this analysis work, however, Clements is forced to postulate three different features [open 1], [open 2], and [open 3]: [open 1] distinguishes [+ATR] and [-ATR] high vowels, [open 2] distinguishes [+ATR] and [-ATR] mid vowels, and [open 3] distinguishes [+ATR] and [-ATR] low vowels, as in (15):

(15)	lab	cor	dors	phar	open1	open2	open3
i	-	+	-	-	-	-	-
ü	+	+	-	-	-	-	-
ɪ	-	+	-	-	+	-	-
e	-	+	-	-	+	+	-
ö	+	+	-	-	+	+	-
ɛ	-	+	-	-	+	+	+
æ	-	+	-	+	+	+	+
a	-	-	+	+	+	+	+
ɔ	+	-	+	-	+	+	+
o	+	-	+	-	+	+	-
ʊ	+	-	+	-	+	-	-
u	+	-	+	-	-	-	-

Formally this system is inferior to the Halle-Sagey model, because it replaces two features ([high] and [ATR]) with three features ([open 1, 2, 3]). It also fails to capture the special behavior of [ATR], which acts as a harmonic feature in many African and Altaic languages, produces uvulars from velars, and interacts with consonant voicing (see Vaux (1992, 1993a, b)). The feature [ATR] actually fits very well within Clements' theory, because it exists in both consonants and vowels, distinguishing voiced stops and tense vowels respectively. Consequently, I propose that Clements' system be revised in the following way (rad = advanced tongue root, phar = pharyngeal):

(16a) vowels

	lab	cor	dor	rad	phar	open
i	-	+	-	+	-	-
ü	+	+	-	+	-	-
ɪ	-	+	-	-	-	-
e	-	+	-	+	-	+
ö	+	+	-	+	-	+
ɛ	-	+	-	-	-	+
æ	-	+	-	+	+	+
a	-	-	+	-	+	+
ɔ	+	-	+	-	-	+
o	+	-	+	+	-	+
ʊ	+	-	+	-	-	-
u	+	-	+	+	-	-

(b) consonants

lab	labials and labialized consonants
cor	dentals, palatals
dors	velars
rad	uvulars, voiced stops
phar	pharyngeals, epiglottals, emphatic and pharyngealized consonants
lar	laryngeals

Clements' theory raises several other questions and problems which remain to be explored. The processes of coronal fronting we have considered in this paper seem to indicate that his proposal may in fact be an improvement over the standard Halle-Sagey model.

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