

# [+ATR] Dominant Vowel Harmony Except When It's Not? Evidence from Ethiopian Komo

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## 1. Introduction

The vast majority of documented Advanced Tongue Root [ATR] vowel harmony systems are found in languages of the Nilo-Saharan and Niger-Congo phyla of sub-Saharan Africa (Casali 2008: 247). Traditionally, the terms *root-controlled* and *dominant-recessive* have been employed to categorize ATR harmony systems. In root-controlled (or stem-controlled) systems, affixes assimilate in ATR value to that of the root value (Baković 2000: 7). In dominant-recessive ATR harmony systems, the ATR feature value underlyingly specified as *dominant* systematically causes segments containing the opposite feature value to assimilate, or “harmonize” in particular domains (Halle and Vergnaud 1981, Levergood 1984, Archangeli and Pulleyblank 1994).

This paper aims to describe an unusual, heretofore unattested, ATR harmony system found in Ethiopian Komo. Based on original data, this paper will demonstrate that Komo exhibits two distinct and highly productive ATR harmony processes both of which are directionally constrained. The first process is anticipatory, spreading [+ATR] leftward from a [+high, +ATR] vowel to a preceding [-high, -ATR] vowel. The second process is progressive and spreads [-ATR] rightward from a [+high, -ATR] stem vowel to a following [+high, +ATR] suffix vowel. What is particularly significant about Komo ATR harmony is that the same [+high, +ATR] suffix vowels can serve either as *triggers* of [+ATR] harmony as well as *targets* of [-ATR] harmony as a function of the vocalic environment in a particular domain. The data will attempt to illustrate that Komo exhibits prototypical [+ATR] dominant harmony except when it doesn't. Furthermore, this “exception to the rule” does not appear to be idiosyncratic, but rather phonologically conditioned, calling into question the notion of dominance in ATR harmony systems as well as traditional ATR harmony typologies.

## 2. Language and Background

Komo [xom] is a Koman language spoken along the border between Ethiopia and South Sudan. The most recent population estimates of Komo native speakers (10,000 in South Sudan, 1,500 in Ethiopia) date back to 1975 (Lewis 2009).<sup>1</sup> The internal structure of the Koman subfamily as well as its genetic affiliation within the Nilo-Saharan phylum has been under debate by scholars (e.g. Bender 1997, Ehret 2001) since Greenberg (1963) first classified the Nilo-Saharan family.

Previous work on Komo is limited to a partial grammar (Burns 1947) and an unpublished phonological sketch (Yehualashet 2008). Bender (1994) examined the Komuz family as well as its

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<sup>1</sup> Consultants estimate roughly 5000 native Komo speakers in Ethiopia.

genetic classification within Nilo-Saharan (Bender 1976, 1997).<sup>2</sup> The only mention of any phonological processes resembling ATR vowel harmony in Komo is found in Burns (1947: 2), where he cites, “One of the most trying features to the investigator is the mercurial quality of vowels in different environments; assimilation between vowels is evident everywhere.”

Komo is a relatively isolating language with scant nominal morphology. By contrast, a rich and productive inflectional system is found on the verb. Verb inflection in Komo is strictly suffixal. A finite verb is inflected first with an Aspect/Directional (A/D) suffix followed by Bound Pronominal (BP) suffixes, which may index up to three core arguments.<sup>3</sup> As many of the Aspect/Directional and Bound Pronominal morphemes contain vocalic elements, ATR harmony processes predominantly occur across morpheme boundaries.<sup>4</sup> A position class diagram for an inflected verb is seen in Fig 1. A finite verb indexing three arguments is seen in (1).

Fig. 1

STEM	-A/D	-BP	(-BP)	(-BP)
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- (1) p’úr-ú-r-áp’ì  
 throw-VEN-3SG-1SG-3N  
 ‘He throws it at her’

### 3. Vowel System

The Komo phonemic vowel inventory consists of seven contrastive vowels /i, ɪ, ε, a, ɔ, ʊ, u/. The inventory can be subcategorized into two sets according to the underlying ATR feature, yielding five [-ATR] vowels /ɪ, ε, a, ɔ, ʊ/, and two [+ATR] vowels, /i, u/. Note that [+ATR] is only phonemic in the high vowels while [-ATR] is distributed among the high, mid and low vowels.<sup>5</sup> This seven-vowel system with phonemic ATR contrast in the high vowels is on the whole uncommon, but in East Africa, it is more common than a seven vowel system with phonemic ATR contrast in the mid vowels (Casali 2008: 503).

Burns (1947) proposes a ten vowel system /i, ɪ, ɪ, ε, ẽ, a, ā, ɔ, ʊ, u/ in Komo, which correlates to the present analysis with the exception of three additional nasalized vowels.<sup>6</sup> Yehualashet (1998) on the other hand, proposes a seven vowel system /i, ε, a, ə, ɔ, ʊ, u/, which lacks the two high [-ATR] vowels /ɪ, ʊ/ yet includes two additional vowels /ə, o/. Yehualashet’s analysis appears to be untenable given the current data (see (2) below).

Phonemically, Komo has a seven vowel system but phonetically, a ten vowel system emerges as a result of one particular ATR harmony process. This process, henceforth [+ATR] harmony, spreads [+ATR] to [-high, -ATR] vowels /ε, a, ɔ/ causing the latter to surface as [+ATR] allophones [e, ə, o] respectively. These allophonic surface realizations only occur in domains preceding [+high, +ATR] vowels and do not occur in isolated monosyllabic roots. The full vowel inventory is seen below complete with the allophones in brackets (Fig. 2).

<sup>2</sup> Komuz refers to the inclusion of Gumuz within the Koman family, a topic which is still under debate.

<sup>3</sup> In Komo verbs, Aspect and direction are difficult to tease apart. At present analysis there are three distinct A/D morphemes, which are tentatively being analyzed as the Itive /-i/, Ventive /-ʊ/ and Perfective /-uk/ (tone omitted). The Itive and Ventive (cf. Translocative and Cislocative respectively) morphemes can encode spatial deixis as well as aspectual notions. The Ventive can also describe an event that took place at another location prior to the speech act. A/D suffixes have been collapsed into one category for the current discussion as they occur in the same slot on the verb. Furthermore, A/D morphemes do not exhibit any idiosyncratic behavior with regard to ATR harmony.

<sup>4</sup> This paper will focus mainly on monosyllabic CVC roots, which account for 85% of the 500 verbs in the lexicon, not counting (C)V and disyllabic roots. See Section 6 for disyllabic verb roots.

<sup>5</sup> The set comprising the mid and low vowels will henceforth be referred to as [-high] as these vowels all behave identically with regard to ATR harmony processes.

<sup>6</sup> Burns originally transcribed the vowels /ɪ, ʊ/ as /e, o/ respectively. I have represented them as /ɪ, ʊ/ to maintain consistency with the current proposed inventory. Nasalized vowels are of marginal status at best.

Fig. 2

	[+ATR]		[-ATR]		
+HIGH	i	u	ɪ	ʊ	+HIGH
-HIGH	[e]	[o]	ɛ	ɔ	-HIGH
	[ə]		a		

Evidence for the phonemic status of the seven vowel system is apparent in mono-morphemic noun and verb roots (2). At present, there are no co-occurrence restrictions between consonants and vowels of a given ATR value.<sup>7</sup>

	<u>Noun</u>		<u>Verb</u>	
(2) /i/	gǐʃ	'hole'	píz	'rub'
	p'ín	'ashes'	mìd	'lack'
/ɪ/	bìl	'root'	ʃít	'whistle'
	míʃ	'sky'	yìl	'see'
/ɛ/	ʃɛn	'flute'	tér	'carry in arms'
	lèt	'tongue'	dèn	'count'
/a/	bár	'heron'	ʃàp'	'slap'
	s'às'	'chest'	mal	'frighten'
/ɔ/	màs	'clan'	dól	'yell'
	póg	'back'	k'òʃ	'fight'
/ʊ/	zòg	'guinea fowl'	bóg	'wait for'
	k'úp	'head'	gòs'	'swallow'
/u/	tùʃ	'thread'	k'ús'	'twist'
	kur	'smoke'	sùn	'point'

#### 4. Anticipatory [+ATR] Harmony

Casali (2003, 2008) surveyed 110 Nilo-Saharan and Niger-Congo languages with ATR harmony to examine the correlation between the phonemic vowel inventories and the type of ATR harmony system exhibited. His findings revealed that languages with phonemic ATR contrast in the high vowels overwhelmingly exhibit dominant-recessive ATR harmony where [+ATR] is the dominant feature.<sup>8</sup> Languages that have phonemic ATR contrast only in the mid vowels on the other hand, are prone to be [-ATR] dominant.

Casali's typological evidence suggests that Komo have [+ATR] dominant-recessive harmony given the seven-vowel phonemic inventory with phonemic ATR contrast in the high vowels. By examining one ATR harmony process, Komo appears to exhibit [+ATR] dominant harmony. In this process, [+ATR] spreads leftwards to [-ATR] vowels, causing them to assimilate to [+ATR]. [+ATR] harmony in Komo is strictly anticipatory, occurring in a domain in which a [-high, -ATR] vowel precedes a [+high, +ATR] vowel.

<sup>7</sup> The IPA palatal glide /j/ is transcribed as /y/ in these data.

<sup>8</sup> This includes languages with seven, nine and ten vowel phonemic inventories.

To illustrate anticipatory [+ATR] harmony in Komo, monosyllabic CVC verb stems containing each of the phonemic [-ATR] vowels /ɛ, a, ɔ/ are inflected with a series of suffixes whose vocalic elements vary in ATR value. In (3, 4), the [+high, +ATR] suffix vowels /-i/ and /uk/ cause the [-high, -ATR] stem vowels /ɛ, a, ɔ/ to assimilate to [+ATR], and thus surface as [+ATR] allophones [e, ə, o]. [+ATR] harmony is not restricted to the examples shown, but fully productive in identical phonological environments.

(3)	hám-í	[hámí]	‘You yawn’	(4)	hám-úk	[hámúk]	‘yawn.PFV’
	dàd-ír	[dàdí]	‘He refuses’		dàd-úk	[dàdúk]	‘refuse.PFV’
	kéʃ-í	[kéʃí]	‘You thresh’		kéʃ-úk	[kéʃúk]	‘thresh.PFV’
	yèk-ír	[yèkír]	‘He sows’		yèk-úk	[yèkúk]	‘sow.PFV’
	tóg-í	[tógí]	‘You taste’		tóg-úk	[tógúk]	‘taste.PFV’
	dòt’-ír	[dòt’íp’]	‘She squats’		dòt’-úk	[dòt’úk]	‘squat.PFV’

By contrast, the same stem vowels do not assimilate to [+ATR] as the suffix vowels in (5) are [-high, -ATR] and [+high, -ATR] in (6).

(5)	hám-á	[hámá]	‘I yawn’	(6)	hám-ú	[hámú]	‘yawn.VEN’
	dàd-án	[dàdán]	‘We refuse’		dàd-ú	[dàdú]	‘refuse.VEN’
	kéʃ-á	[kéʃá]	‘I thresh’		kéʃ-ú	[kéʃú]	‘thresh.VEN’
	yèk-án	[yèkán]	‘We sow’		yèk-ú	[yèkú]	‘sow.VEN’
	tóg-á	[tógá]	‘I taste’		tóg-ú	[tógú]	‘taste.VEN’
	dòt’-án	[dòt’án]	‘We squat’		dòt’-ú	[dòt’ú]	‘squat.VEN’

Kutsch Lojenga (2002, 2009) categorizes the environments in which ATR harmony occurs into two types— *static* and *dynamic*. The former refers to mono-morphemic environments and the latter to environments in which harmony spreads across morpheme boundaries. According to Kutsch Lojenga, languages may have distinct ATR harmony processes in these two environments. It was shown above (3, 4) that anticipatory [+ATR] harmony in Komo occurs in dynamic environments from suffix to stem in inflected verbs. The following examples (7, 8) illustrate that anticipatory [+ATR] harmony also occurs in mono-morphemic disyllabic noun and verb roots as a [-high, -ATR] vowel assimilates to [+ATR] when preceding a [+high, +ATR] vowel.

	Noun roots			Verb roots			
(7)	patí	[pətí]	‘liver’	(8)	àmí	[ə̀mí]	‘shake’
	gàbút	[gə̀bút]	‘gruel’		kání	[kə̀ní]	‘embrace’
	mèʔí	[mèʔí]	‘food’		bèzí	[bèzí]	‘be thin’
	kósí	[kósi]	‘bread’		mètí	[mètí]	‘chase away’
	gòdùm	[gòdùm]	‘sow’		bòdí	[bòdí]	‘chase’

The direction of [+ATR] harmony in Komo is strictly anticipatory. Consider the following data that contain polymorphemic environments. Examples (9a-f) illustrate anticipatory [+ATR] harmony from suffix to stem vowel. Notice the lack of rightward [+ATR] spreading from the [+high, +ATR] trigger vowels to potential [-high, -ATR] target vowels /a, ɛ/.

(9)	a.	sas-í-p’-ak	[səsip’ak]	‘She greets me’
		greet-ITV-3SG.F-1SG		
	b.	k’ét-í-p’-ɛ	[k’étíp’ɛ]	‘She grabs you’
		grab-ITV-3SG.F-2SG		
	c.	kɔg-í-r-ɛ	[kɔgírɛ]	‘He fears you’
		fear-ITV-3SG.M-2SG		

- d. kɛ́ʃ-úk-à [kɛ́ʃúkà] ‘We have threshed’  
thresh-PFV-1PL.IN
- e. sas-úk-àn-ar [səsúkànar] ‘We have greeted him’  
greet-PFV-1PL.IN-3SG.M
- f. kɔ́g-úk-àn-ɛ [kɔ́gúkàɛ] ‘We have feared you’  
fear-PFV-1PL.IN-2SG

The data in (10) further illustrate the lack of progressive [+ATR] spreading as verb roots containing [+high, +ATR] vowels do not spread [+ATR] rightwards to [-high, -ATR] suffix vowels. The same lack of [+ATR] harmony occurs in mono-morphemic noun roots (11), which contain an identical phonological domain to (10). As the phonological conditions for [+ATR] harmony are not met, these underlyingly disharmonic domains remain disharmonic on the surface.

	Verbs				Nouns		
(10)	kíʃ-á	[kíʃá]	‘I harvest’	(11)	ḍìbàl	[ḍìbàl]	‘grasshopper’
	gĩz-án	[gĩzán]	‘We enter’		yírók’	[yírók’]	‘bee-eater’
	píz-à	[pízà]	‘I rub’		ʃìgój	[ʃìgój]	‘insect, sp.’
	sun-an	[sunan]	‘We point’		mílɔ	[mílɔ]	‘flute’
	ḍùb-á	[ḍùbá]	‘I break ground’		dúré	[dúré]	‘louse’
	tus-ɛ	[tuse]	‘You are pushed’		ʃùwèn	[ʃùwèn]	‘tree, sp.’

## 5. Progressive [-ATR] Harmony

A careful reader may have observed that the previous section did not include underlyingly disharmonic domains containing just [+high] vowels of contrasting ATR value. The data in the previous section showed that [+high, +ATR] vowels are triggers of anticipatory [+ATR] harmony. Thus one would expect one of two outcomes in domains containing two [+high] vowels of opposite ATR value: either [+ATR] spreading or possibly no spreading at all. The results are altogether unexpected.

In the following data, monosyllabic CVC verb roots containing [+high, -ATR] vowels are inflected with the Itive /-i/ and Perfective /-uk/ suffixes. Recall that these [+high, +ATR] suffix vowels trigger anticipatory [+ATR] spreading to preceding [-high, -ATR] stem vowels (4, 9). The data in (12, 13) show that the [+high, -ATR] root vowels /ɪ, ʊ/, spread [-ATR] *rightward* to the high [+ATR] suffix vowels /i, u/, causing the latter to assimilate to [-ATR]. These data illustrate that the underlyingly [+ATR] *trigger* vowels of anticipatory [+ATR] harmony serve as *targets* of progressive [-ATR] harmony in a distinct phonological domain.

(12)	ʃít-í	[ʃítí]	‘You whistle’	(13)	ʃít-úk	[ʃítúk]	‘whistle.PFV’
	yìl-ír	[yìlír]	‘He sees’		yìl-úk	[yìlúk]	‘see.PFV’
	ḍìl-íp’	[ḍìlíp’]	‘She stamps’		ḍìl-úk	[ḍìlúk]	‘stamp.PFV’
	mòt’-ír	[mòt’ír]	‘He digs’		mòt’-úk	[mòt’úk]	‘dig.PFV’
	p’úr-í	[p’úrí]	‘You throw’		p’úr-úk	[p’úruk]	‘throw.PFV’
	ḍóg-íp’	[ḍógíp’]	‘She waits’		ḍóg-úk	[ḍógúk]	‘wait.PFV’

Progressive [-ATR] harmony is fully productive and not limited to any particular verb or subset of verbs. Any verb containing a [+high, -ATR] stem vowel inflected with a suffix containing a [+high, +ATR] suffix vowel will exhibit progressive [-ATR] harmony. The following examples show that a [+high, -ATR] suffix vowel can also spread [-ATR] to a following [+high, +ATR] suffix vowel. In (14), the Ventive suffix /-ú/ causes progressive [-ATR] assimilation to the following underlyingly [+ATR] 2SG suffix /-i/.

(14)	kíʃ-ú-í	[kíʃúí]	‘You harvest’
	gǐz-ú-í	[gǐzúí]	‘You enter’
	píz-ú-í	[pízúí]	‘You rub’
	sùn-ú-í	[sùnúí]	‘You point’
	dùb-ú-í	[dùbúí]	‘You break ground’
	tus-ú-í	[tusúí]	‘You shove’

What is also noteworthy about these data is that the [+high, +ATR] stem vowels retain the [+ATR] feature. The phonological word as a whole surfaces disharmonic as [-ATR] harmony is progressive and [+ATR] harmony is anticipatory. The following section will expand upon domains of ATR harmony.

## 6. Domains of ATR Harmony

ATR harmony processes in Komo do not extend beyond the phonological word. Consider the following sentences. In (15), the root vowel of the verb undergoes anticipatory [+ATR] harmony from the [+high, +ATR] Itive morpheme /-i/. Notice that [+ATR] harmony does not spread to the preceding 3SG pronoun *hàr* even though it contains a potential target vowel for [+ATR] harmony. In (16) the Itive morpheme in the verb assimilates to [-ATR] as a result of progressive [-ATR] harmony from the [+high, -ATR] root vowel. [-ATR] harmony does not extend to the following word *ʃùm* ‘meat’, which contains a potential [+high, -ATR] target vowel.

(15)	[hàr	ʃerir	gùbí]	(16)	[hàp’	yìlp’	ʃùm]
	hàr	ʃer-i-r	gùbí		hàp’	yìl-i-p’	ʃùm
	3SG.M	sweep-ITV-3SG.M	house		3SG.F	see-ITV-3SG.F	meat
	‘He sweeps the house’				‘She sees the meat’		

Examples (17, 18) further illustrate the lack of both [+ATR] and [-ATR] harmony processes across word boundaries. In (17, 18), the root vowel of the negative auxiliary verb *baʃ* assimilates to [+ATR]. This process does not spread to the [-high, -ATR] vowel contained in the sentence initial pronoun. Furthermore in (17), the [+high, +ATR] vowels in *gùbí* ‘house’ do not cause anticipatory [+ATR] harmony to the [-high, -ATR] vowel in the verb root *ʃer* ‘sweep’. Likewise in (18), the [+high, -ATR] vowel in the verb root *yìl* ‘see’ does not cause progressive [-ATR] harmony to the [+high, +ATR] vowel in the following word *ʃùm* ‘meat’.

(17)	[hàr	bəʃír	ʃer	gùbí]	(18)	[hàp’	bəʃíp’	yìl	ʃùm]
	hàr	baʃ-í-r	ʃer	gùbí		hàp’	baʃ-í-p’	yìl	ʃùm
	3SG.M	NEG-ITV-3SG.M	sweep	house		3SG.F	NEG-ITV-3SG.F	see	meat
	‘He does not sweep the house’					‘She does not see the meat’			

Within the phonological word there are limitations as to how far ATR harmony can spread. The following data contain disyllabic CVCV verb roots inflected with the 1SG morpheme /-na/ and the 2SG morpheme /-i/. The examples in (19) show that anticipatory [+ATR] harmony only extends one syllable to the left of the 2SG [+high, +ATR] trigger vowel /-i/ as only the second root vowel assimilates to [+ATR]. The identical behavior is seen in (20).

(19)	màzá-ná	[màzáná]	‘I am tired’	màzá-í	[màzáí]	‘You are tired’
	há pá-ná	[há páná]	‘I stay’	há pá-í	[há páí]	‘You stay’
	t’ádà-ná	[t’ádàná]	‘I bake’	t’ádà-í	[t’ádàí]	‘You bake’
	wadá-ná	[wadáná]	‘I exchange’	wadá-í	[wadáí]	‘You exchange’



[+ATR] harmony. These suffixes behave like the [+ATR] *dominant* affixes mentioned above. The criteria amply suggest a [+ATR] dominant system in Komo were it not for another distinct harmony process.

Progressive [-ATR] harmony in Komo is also fully productive. In this process, [+high, -ATR] stem vowels cause [+high, +ATR] suffix vowels to assimilate to [-ATR]. These are the *same* suffix vowels that behave as prototypical [+ATR] dominant affixes. So, Komo exhibits [+ATR] dominant harmony—except when it doesn't.

Irregularities in ATR harmony systems are not uncommon. Certain corners of a given system may fail to conform to the general pattern and exhibit what Baković (2000) calls 'dominance reversal'. He attributes this erratic behavior to morphologically idiosyncratic cases (cf. Turkana) and states, "I am not at this time aware of any phonologically predictable dominance reversals" (Baković 2000: 120). Furthermore, Casali (2008: 521) states, "[...] dominance of [-ATR] vowels in /2IU/ nearly always appears in some way exceptional; something found in limited and specific circumstances alongside a more general pattern of [+ATR] dominance."<sup>9</sup>

It has been shown that Komo displays two distinct ATR harmony processes. [+ATR] harmony is expected in the existing typology given the vowel system and with what appear to be prototypical [+ATR] dominant affixes. But, [-ATR] harmony processes account for a substantial amount of the data. Is [-ATR] harmony in Komo an instance of 'dominance reversal'? The data suggests that both processes are not morphologically idiosyncratic, but rather phonologically conditioned. Furthermore, if the precise phonological conditions for harmony are not met, words can have disharmonic surface realizations. If this is indeed a case of phonologically conditioned dominance reversal, then Komo ATR harmony challenges the notion that within any one language, only one ATR value can be dominant.

## Abbreviations

1	first person	M	masculine
2	second person	N	neuter
3	third person	NEG	negative
APPL	applicative	REL	relativizer
EX	exclusive	PFV	perfective
F	feminine	PL	plural
IN	inclusive	SG	singular
ITV	itive	VEN	ventive

Tone:  $\acute{v}$  = high,  $v$  = mid (unmarked),  $\grave{v}$  = low

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<sup>9</sup> /2IU/ refers to languages with phonemic ATR contrast in the [+high] vowels.



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