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Vowel Harmony in Kimaragang as a lexical rule

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1 Introduction

This paper discuss the vowel harmony system of Kimaragang Dusun, an endangered language spoken in northeastern Borneo, from the perspective of Lexical Phonology (Kiparsky 1982; Mohanan 1986; Mohanan and Mohanan 1984; Kaisse and Shaw 1985). The paper is primarily a typological sketch, rather than a formal analysis. I offer it here because the data are interesting, and Mohanan has always loved interesting data; and because Mohanan himself helped me to look at the corresponding Timugon Murut data in a new way, a very long time ago.

Vowel Harmony (VH) in Kimaragang has the classic properties of a lexical rule: it is obligatory, categorical, and structure preserving (Kiparsky, 1985). It does not apply across clitic boundaries, and appears to be sensitive to different levels, or strata, of affixation, applying to some prefixes but not to others. Moreover, there appear to be a small number of lexical exceptions, roots which idiosyncratically fail to undergo VH. I begin in section 2 by outlining the basic pattern of Vowel Harmony, contrasting it with a second (and competing) process which I call Vowel Neutralization. Section 3 lays out the evidence referred to above which supports the identification of VH as a lexical rule. Section 4 provides a brief comparison of the Kimaragang facts with a similar pattern of vowel alternations found in a related language, Timugon Murut.

2 Vowel Harmony and Vowel Neutralization

Kimaragang is a member of the Dusunic family, a cluster of closely-related languages belonging to the Northeast Borneo subgroup of Western Malayo-Polynesian (Wurm, 1993). Dusunic languages generally exhibit a basic 4-vowel system: /i,a,o,u/. The back mid vowel, which is traditionally represented as /o/, is normally unrounded or only slightly rounded in most Dusunic languages. It has a fairly wide range of phonetic variants, but its most basic realization is generally as a central or back unrounded vowel, [ʌ] or [ɤ] (Miller, 1993). Kimaragang uses slightly more rounding for this vowel, with the pronunciation ranging from [ɔ] in stressed or long syllables to [ə] in short, pre-stress syllables. Kimaragang has also developed a 5th contrastive vowel, /e/, but this development is not of major significance to the present study and will be largely ignored in what follows.[1]

Vowel Harmony, which affects only the non-high vowels, changes /o/ to /a/ when the next vowel to the right is /a/. In other words, the low vowel /a/ spreads from right-to-left, replacing adjacent non-high vowels (/o/), one syllable at a time. The following examples illustrate this pattern:

(1) **Kimaragang Vowel Harmony** (roots are italicized)[2]

Underlying		**Surface**	**gloss**
ondom-an	→	andaman	'remember'
noko-*dagaŋ*	→	nakadagaŋ	'sold'
po-*ogom*-an	→	paagaman	'place where you set something'
po-*rolop*-an	→	paralapan	'cause to be gobbled up'
m-*ponoN*-sawo	→	manansawo	'to marry'
poN-*omot*-an	→	paŋamatan	'harvest time'
poN-*loboŋ*-an	→	paŋalabaŋan	'time/place of burial'
poN-*tanom*-an	→	pananaman	'time/place of planting'
<in>poN-*olos*-an	→	pinaŋalasan	'the person you borrowed from'
<in>poN-*asok*-an	→	pinaŋasakan	'the place where dry rice is planted'

High vowels /i,u/ are opaque; they neither trigger nor undergo vowel harmony, and the process cannot apply when a high vowel intervenes between

[1] The /e/ developed through the coalescence of the sequences *o(h/ʔ)i and *a(h/ʔ)i. Thus even though /e/ is a non-high vowel, it is not affected by VH because the /i/ in the historical form was opaque to VH. Synchronically, this coalescence is still productive in the post-lexical rule of Vowel Merger discussed in sec. 3 below. See Kroeger (1993) for further discussion.

[2] The phonemic contrast between implosive /ɓ,ɗ/ and normal /b,d/ is not consistently written in the materials available to me, and so is suppressed in this paper. This contrast has no effect on the vowel alternations under discussion here. For a description of nasal assimilation patterns see Kroeger (2005).

the /a/ and a preceding /o/, as illustrated in (2a). Semivowels /y,w/, however, do not block vowel harmony, as shown by the examples in (2b):

(2) a.	*sogit*-an	→	sogitan	'feel cold'
	oliŋ-an	→	oliŋan	'forget'
	noko-*pilat*	→	nokopilat	'accidentally wounded'
	sobu-an	→	sobuwan	'be urinated on'
	m-poN-*duat*	→	moŋoduat	'to ask'
b.	o-*sodoy*-an	→	asadayan	'all day long'
	o-*lobow*-an	→	alabawan	'receive muddy water'
	o-DUP-*lowoŋ*-an	→	alalawaŋan	'consider someone stupid'
	o-*roloy*-an	→	aralayan	'to be overgrown (e.g. with vines)'

Examples like those in (3) demonstrate two additional facts about the harmony process. First, it is unidirectional: /a/ does not spread from left-to-right, but only from right-to-left. Second, although both non-high vowels are involved in the process, only one of them (/a/) can trigger it; /o/ does not spread to the left when preceded by /a/.

(3)	*dagaŋ*-on	→	dagaŋon	'to buy'
	surat-on	→	suraton	'to write'
	rapaʔ-on	→	rapaʔon	'to boil'
	lapak-on	→	lapakon	'to split'

However, there is another context in which the change from /a/ to /o/ can be triggered. This process, which I refer to as Vowel Neutralization, is illustrated in (4). The generalization here is that any pre-penultimate /a/ which is not immediately followed by another /a/ gets changed to /o/.

(4) **Vowel Neutralization**

a. *talib*-an	→	toliban	'to pass by'
b. *lasu*-an	→	losuan	'to feel hot'
c. *anu*-on	→	onuwon	'to take'
d. *sawo*-on	→	sowoʔon	'to marry'
e. *tanom*-on	→	tonomon	'to plant'
f. *rayow*-on	→	royoʔon	'to praise'

Each of the examples in (4) involves a disyllabic root whose first vowel is /a/ and whose second vowel is something else. When a suffix is added, the /a/ becomes pre-penultimate and so changes to /o/. If the suffix vowel is /a/ (as in 4a–b), which could trigger vowel harmony, this change is observed only when the second root vowel is high. If the suffix vowel is /o/, which

cannot trigger vowel harmony, the change is observed no matter what the second root vowel is.[3]

I believe that this neutralization is related to stress placement. A number of Sabah languages outside of the Dusunic family have similar processes which neutralize non-high vowels in pre-stress syllables, and most if not all of these languages have regular penultimate stress. Labuk Kadazan (Hurlbut, 1981) is a Dusunic language very closely related to Kimaragang, with a similar pattern of vowel harmony. It also has regular penultimate stress, and exhibits the same pattern of neutralization illustrated in (4): any /a/ in the penultimate syllable of a root is reduced to /o/ when a suffix is added, because of the shift in stress placement which is triggered by suffixation.

The pattern of stress placement in Kimaragang is slightly more complex. As in Penampang Kadazan (Miller, 1993), stress in Kimaragang seems to be neither contrastive nor fully predictable. Stress is may fall on either the penultimate or the final syllable, and in some words appears to be equally distributed over the final two syllables. Nevertheless, it is safe to say that stress always falls within the final disyllabic foot of the word, and that any /a/ occurring before the final foot is a target for neutralization.[4]

Notice that Vowel Harmony wins out over Neutralization in environments where both rules could apply, as illustrated by the occurrences of prepenultimate /a/ in (1) above. In terms of rule ordering, this means that VH must follow Neutralization;[5] in terms of constraints, VH must outrank Neutralization.

Another interesting aspect of the VH alternation in Kimaragang is that it is (somewhat unexpectedly) constrained by Geminate Inalterability (Hayes, 1986): "true" (i.e. morpheme-internal) geminate vowels systematically fail to undergo Vowel Harmony, as seen in (5a), while "fake geminates" (sequences of identical vowels across a morpheme boundary) do undergo vowel harmony, as seen in (5b). Due to limitations of space I will not discuss this issue further here; but see Wee (this volume) for a discussion of tautomorphemic vs. heteromorphemic geminates.

(5) a.	n-o-*loot*-an	→	nolootan	'was covered with sand/dirt'
	o-*toor*-an	→	otooran	'long-lasting'
	tobooŋ-an	→	tobooŋan	'to muzzle; tie the mouth (of a dog)'

[3] In Kimaragang, unlike Timugon, there are no suffixes whose nucleus is a high vowel.

[4] Recall that Kimaragang /o/ is pronounced as schwa in pre-stress positions, so VN can be seen as neutralization of an unstressed vowel to schwa.

[5] This is a "counter-feeding" ordering, since if the order were reversed the forms created by VH would be neutralized by VN.

	-in-*sood*-an	→	sinoodan	'helped to pound rice'
	po-*tood*-ay	→	potooday	'cause to go slowly' (imper.)
	n-o-*sook*-an	→	nosookan	'was dished up for' (ben.)
	tiŋgoob-ay	→	tiŋgoobay	'cover (imper.)'
	n-*oob*-an	→	nooban	'brooded' (hen on eggs)
	poN-*woog*-an	→	pomoogan	'washing place'
	poN-in-*loow*-an	→	poŋinloowan	'term of address'
b.	po-*ogom*-an	→	paagaman	'place where you set something'
	ko-*omot*-an	→	kaamatan	'harvest'
	n-o-*ondom*-an	→	naandaman	'was remembered'
	noko-*abur*	→	nakaabur	'spilled, wasted' (IV)

3 VH as a lexical rule

As mentioned in the introduction, Vowel Harmony in Kimaragang has the properties predicted for a lexical rule within the theory of of Lexical Phonology. In environments where it can apply, it is obligatory. It is categorical, meaning that it changes /o/ to /a/ without producing varying degrees of lowness or roundness. It is structure preserving in the sense that it does not create segments (or combinations of features) not found in underlying representations (Kiparsky, 1985). Moreover, there seem to be a small number of lexical exceptions, roots which idiosyncratically fail to undergo VH. Most of these are loan words, such as: *podar* 'soap powder', *kodak* 'film', *biola* 'violin', *kokola* 'coca-cola', *sojar* 'soldier'. A rare example of a native root that resists VH is the root *konan* 'negotiate bride price'. However, some speakers pronounce and write this word as *koonan*, with the geminate vowel resisting VH as mentioned above; and this seems likely to be the historical form of the word. Another example of a lexical exception is the third person plural pronoun which some speakers pronounce as *yoʔalo* (others pronounce it as *yaalo*).[6]

We may contrast these features of VH with a process I will call Vowel Merger, which changes the sequences /o+u/ and /o+i/ to [oo] and [ee] respectively, as illustrated in (6).

[6] This form is historically bimorphemic, derived from the root **alo*.

(6) **Vowel Merger**

ko-*uli*	→	kooli	'able to return'
i-po-*udung*	→	ipoodung	'cause to put in fire'
n-o-*ugut*	→	noogut	'has been gathered'
o-*uni*	→	ooni	'used to produce sound'
po-*inum*-on	→	peenumon	'cause to drink'
ko-*ilo*	→	keelo	'to know'
noko-*igit*	→	nokeegit	'has gotten engaged'

Impressionistically, the long vowel [oo] which is created by this process is more tense and more rounded than other /oo/ clusters, whether within a single morpheme or across morpheme boundaries (example: *ko-uli* [kooli] 'able to return' vs. *ko-ogom* [kɔɔgɔm] 'able to sit'). Lip rounding is not contrastive for non-high vowels; thus Vowel Merger is not structure preserving, since it creates a tense rounded vowel [o] which is not part of the underlying phoneme inventory of Kimaragang.

Another interesting difference between the two processes is that Vowel Merger frequently applies across clitic (or particle) boundaries, whereas Vowel Harmony does not. Some examples of /o+i/ merger across clitic boundaries are presented in (7). (When the long [ee] in these examples is unstressed, it often shortens to [e].)

(7)

no 'compl' +*ilo?* 'that (DIST)'	→	*ne(e)lo?*
po 'incompl' +*ilo?* 'that (DIST)'	→	*pe(e)lo?*
no 'compl' + *ino* 'that (MED)'	→	*ne(e)no*
no 'compl' + *iri* 'that (SALIENT)'	→	*ne(e)ri*
po 'incompl' + *iri* 'that (SALIENT)'	→	*pe(e)ri*
irad ko? 'like' +*ilo?* 'that (DIST)'	→	*irad keelo?*
aso 'not exist' + =*i?* 'emphatic'	→	*asee?*

Some examples showing the failure of VH to apply across similar boundaries are presented in (8). Examples (8f,g) involve clusters of second position particles, as shown by their pre-verbal position following the initial NEG.

(8) a. *po* 'incompl' + *ka* 'hearsay' → *poka*

b. *po* 'incompl' + *ma* 'prtcl' → *poma*

c. Waroo no kaka irih … (*na kaka)
exist FOC HEARSAY SALIENT
'Once upon a time …'

d. Ba-banar no ka. (*na ka)
DUP-true FOC HEARSAY
'It is true, so they say.'

e. …ong alaku ko amu … (*ka amu)
if salable or NEG
'… if it will sell or not.'

f. Amu no yalo gumoos … (*na yalo)
NEG COMPL 3sg.NOM tolerate
'He can no longer tolerate …'

g. Amu po yalo nopongo … (*pa yalo)
NEG INCOMPL 3sg.NOM finished
'He is not yet finished …'

When a disyllabic root is reduplicated, a process that is only productive for vowel-initial roots, Vowel Merger can apply across the reduplicative boundary as illustrated in (9a). Vowel Harmony cannot apply across these boundaries, as illustrated in (9b).[7]

(9) a.	*iso-iso*	→	ise(e)so	'just one; all alone'
	m-pi-*iyo-iyo*	→	miyeeyo	'look like each other'
	ko-*ilo-ilo*	→	keeleelo	'source of knowledge'
b.	*yalo-yalo*	→	yalo-yalo (*yala-yalo)	'he himself'
	o-*angod-angod*	→	aangod-angod (*aangad-angod)	'somewhat fragrant'
	ko-*abos-abos*	→	kaabos-abos (*kaabas-abos)	'occasion for loss'
	m-pi-*ambot-ambot*	→	miambot-ambot (*miambat-ambot)	'speak/sing at the same time'
	m-pi-*aŋgol-aŋgol*	→	miaŋgol-aŋgol (*miaŋgal-aŋgol)	'a good match for each other'

Vowel Harmony appears to be sensitive to different levels, or strata, of affixation. We have already seen many examples of prefixes which undergo VH in the expected way; but there are a number of other prefixes in which /o/ fails to alternate. Some examples are provided in (10). This kind of morphological selectivity is a characteristic feature of lexical rules, and one that is not normally found in post-lexical rules.

(10)	soro-DUP-*walu*	→	sorowawalu	'eight apiece'
	soro-DUP-*opod*-an	→	soroapapadan	'having 10 each'
	soŋ-DUP-*akan*	→	soŋakanakan	'each one eating'

[7] Note that Vowel Harmony does apply in CV reduplication; some examples are seen in (10).

soŋ-DUP-*ago*	→	soŋagaago[8]	'all hurrying around'
ponoko-DUP-*lamin*	→	ponokolalamin	'use as a room'
ponoko-DUP-*talib*	→	ponokotatalib	'keep passing by'
oŋo-*gayo*	→	oŋogayo	'big (pl.)'
oŋo-DUP-*maal*	→	oŋomamaal	'expensive (pl.)'
oŋo-DUP-*lambat*	→	oŋolalambat	'widely spaced (pl.)'
n-oŋo-*babak*	→	noŋobabak	'all got broken'
n-oŋo-*kalabus*	→	nongokalabus	'all escaped'
soŋ-ko-DUP-*gamit*	→	soŋkogagamit	'grab wildly'
soŋ-ko-DUP-*sako*	→	soŋkosasako	'accept rides carelessly' (e.g. with unknown driver)
soŋ-ko-po-*loboŋ*-ay	→	soŋkopalabangay	'buried carelessly' (i.e. in an bad place)
soŋ-ko-po-*boros*-ay	→	soŋkopabarasai	'passed message carelessly' (i.e. to wrong person)

My tentative hypothesis is that the prefixes which fail to alternate belong to a separate level from those to which VH can apply. The non-alternating prefixes are phonologically unusual in other respects as well, such as failure to undergo nasal assimilation in forms such as /soŋ-balanga/ [soŋbalaŋa] 'one clay pot full'; /soŋ-tulud/ [soŋtulud] 'all flying around'. However, more work is needed to develop and test the details of this hypothesis.

In the preceding section we showed that a "fake" (i.e., heteromorphemic) geminate /o+o/ can undergo vowel harmony (5b). However, this is not true for the geminate [oo] created by Vowel Merger, as seen in examples like *n-o-ubat-an* [noobatan] 'treated with medicine'; *i-po-ugas* [ipoogas] 'cause to erase'; *ko-ubas-an* [koobasan] 'custom; habit'; etc. This is immediately explained if VH is a lexical rule while VM is post-lexical, under the assumption that all lexical rules apply before any post-lexical rule. (VH will not apply to the underlying /o/ in the prefixes, because of the opacity of the high vowel /u/.) So these forms are not instances of geminate inalterability but simply a result of the relationship between lexical and post-lexical rules, which in this case produces a counter-feeding order.

4 Timugon Murut

The Dusunic and Murutic families, two of the main branches within the Northeast Borneo subgroup, are closely related to each other. The closeness

[8] I assume that the change of /o+a/ to [aa] in this form is due to Vowel Merger rather than Vowel Harmony.

of the relationship is seen not only in shared vocabulary items (roughly 50% shared cognates; Smith, 1984), but also in extensive phonological and grammatical similarities. The distribution of non-high vowels in Timugon Murut is at first glance very similar to the Kimaragang patterns discussed in section 1; but on closer inspection some interesting differences emerge. The change of /o/ to /a/ in (11a), triggered by a suffix containing /a/, looks superficially very similar to the Kimaragang VH pattern illustrated in (1) above. But in Timugon, as (11b) demonstrates, the same change can be triggered by a suffix whose vowel is /i/.

(11) Timugon Murut[9]

a.	*orop*-an	→	arapan ‘perch’ (LocF)	
	oŋoy-an	→	aŋayan ‘go’ (LocF)	
	sakoy-an	→	sakayan ‘mount, ride’ (LocF)	
	in-*abot*-an	→	inabatan ‘belt’ (RF, past tense)	
	paG-*sigo*-an	→	pansigaan ‘spying place’ (LocF)	
b.	*tanom*-in	→	tanamin	‘plant’ (RF)
	abot-in	→	abatin	‘belt’ (RF)
	atod-in	→	atarin	‘escort’ (RF)
	rakop-in	→	rakapin	‘catch (w/ noose)’ (RF)
	oŋoy-in	→	aŋayin	‘go’ (RF)
	sigo-in	→	sigain	‘spy on’ (RF)
	orop-in	→	arapin	‘perch’ (RF)
	pa-*korojo*-in	→	pakarajain	‘cause to work on’ (RF)
	sakoy-iʔ	→	sakayiʔ	‘mount, ride’ (RF imper.)

Similarly, the change of /a/ to /o/ in (12a) looks superficially very similar to the Kimaragang Neutralization pattern illustrated in (4). But in Timugon, as (12b) demonstrates, pre-penultimate /a/ cannot change to /o/ when followed by a high vowel. Moreover, pre-penultimate /a/ does not change to /o/ unless the suffix vowel is /o/, as shown in the first four examples of (11b).

(12) Timugon Murut

a.	*tanom*-on	→	tonomon ‘plant’ (OF)
	patoy-on	→	potoyon ‘kill’ (OF)
	abot-on	→	oboton ‘belt’ (OF)

[9] Much of the data for Timugon Murut is taken from Prentice (1971); the rest was provided by Richard Brewis and Silipa bte. Majius (p.c.), supplemented by examples from K. Brewis (1988) and Brewis & Brewis (1988). The labels for voice categories are those adopted by Prentice, following the terminological norm for Philippine languages in the 1960s and 70s: AF ‘actor focus’, OF ‘object focus’, RF ‘referent focus’, LocF ‘locative focus’.

	rakop-on	→	rokopon ‘catch (w/ noose)’ (OF)
	pa-*sakoy*-on	→	posokoyon ‘cause to mount’ (OF)
	paN-*takod*-on	→	ponokoron ‘live-with’ (OF)
	paG-*latok*-on	→	porotokon ‘cause to mix’ (OF)
b.	*tampio*-on	→	tampioon ‘drought-stricken’
	anduʔ-on	→	anduon ‘marry’ (OF)
	pali-on	→	palion ‘abstain from’ (OF)
	sapuk-on	→	sapukon ‘shoot with blow-gun’ (OF)
	taŋiʔ-in	→	taŋiin ‘weep for’ (RF)
	paG-*alig*-in	→	pagaligin ‘exchange’ (RF)
	paG-*anduʔ*-an	→	paganduan ‘marry each other’ (LocF)
	paG-*saruy*-an	→	pansaruyan ‘swim’ (LocF)

It turns out that in Timugon, the vowel that spreads to the left is /o/, not /a/; and Neutralization changes /o/ to /a/. So VH and Neutralization in Timugon are almost the mirror images of the corresponding processes in Kimaragang. Prentice (1971:22, sec. 2.3.4.1.1) summarizes the distribution of non-high vowels in Timugon with the following two descriptive generalizations:

(i) /o/ may occur in non-final syllables of morphemes and words only if /o/ also occurs in all following syllables.

(ii) if /o/ occurs in the last two syllables of a word, /a/ may not occur in preceding syllables of the word unless another vowel intervenes.

Generalization (i) is responsible for the change from /o/ to /a/ when a suffix is added whose vowel is not /o/. This pattern of alternation was seen in (11). Generalization (ii) is responsible for the pattern of alternation seen in (12a): when a suffix containing the vowel /o/ is added to a root whose last two syllables contain the vowels /a/ and /o/ in that order, the antepenultimate /a/ together with any /a/ further to the left change to /o/. This leftward spreading of /o/ is blocked by the intervention of a high vowel, as seen in (12b).

Let me note in passing that Generalization (i) has an interesting parallel in Selayarese, where [-ATR] mid vowels may occur only (a) in final open syllables, or (b) in a syllable immediately preceding a [-ATR] mid vowel (Basri and Chen, 1999).

K.P. Mohanan (p.c.) has pointed out to me[10] that Prentice’s two generalizations can be understood in autosegmental terms by making the following assumptions:

[10] This would have been sometime in the early 1990s, during Mo’s first few years in Singapore.

(13) a. The melodic features [o] may not appear in non-final position on the V-melody tier.
b. Any [o] which violates this constraint is delinked and subsequently deleted (through stray erasure).
c. /a/ is the neutral vowel in Timugon; unspecified vowels are realized as /a/ by default spell-out rules.
d. An [o] which is linked to more than one V slot spreads to a non-high (or unspecified) vowel on its left (that is, doubly linked /o/ replaces /a/ from right-to-left).

Since Timugon has regular penultimate stress, the effect of assumption (13d) could also be achieved by specifying that "An [o] which is linked to the stressed syllable spreads…", since (13a–b) ensure that a penultimate /o/ must be followed by /o/. The somewhat surprising fact that a single /o/ does not spread is illustrated in (14).

(14)

akan-on	→	akanon 'eat' (OF)
baal-on	→	baalon 'make' (OF)
lunsay-on	→	lunsayon 'demolish' (OF)
ukab-on	→	ukabon 'open' (OF)
ansak-on	→	ansakon 'cook' (OF)
rasaŋ-on	→	rasaŋon 'sweat' (OF)

Taken together, the assumptions in (13) result in two kinds of alternations. First, a non-final /o/ which is not immediately followed by /o/ is delinked and surfaces as /a/; I refer to this pattern as Timugon Neutralization. Second, a non-final /o/ which is immediately followed by /o/ spreads to the left if there is an /a/ in the preceding syllable; I refer to this pattern as Timugon Vowel Harmony. The vowel /o/ is independently licensed only in the final syllable.

Notice that, if we change /a/ to /o/ and vice versa in the preceding paragraph, we have a system very similar to that of Kimaragang. The other two changes that would need to be made to achieve a perfect fit are (a) refer to "pre-penultimate" position rather than "non-final" position; and (b) remove the requirement for VH triggers to be doubly linked (or stressed). The resulting description would read: "First, a pre-penultimate /a/ which is not immediately followed by /a/ is delinked and surfaces as /o/; I refer to this pattern as Kimaragang Neutralization. Second, any /a/ spreads to the left if there is an /o/ in the preceding syllable; I refer to this pattern as Kimaragang Vowel Harmony. The vowel /a/ is independently licensed only in the final disyllabic foot."

On this view, both languages have a rule of Vowel Harmony which spreads a "marked" vowel from right to left replacing the default vowel; and a second rule of Neutralization that replaces a "marked" vowel in a non-

licensed position with the default vowel. This approach requires us to assume that /a/ is the default vowel in Timugon while /o/ is the default vowel in Kimaragang.

An alternative approach would be to restate these generalizations in terms of features, rather than phonemes. It seems quite plausible that the active feature in Timugon, i.e. the feature that spreads via Vowel Harmony, could be different from the active feature in Kimaragang. One relevant fact is that the phonetic features of /o/ are different in the two languages. As noted above, /o/ is normally unrounded or only slightly rounded in most Dusunic languages, something like [ʌ] or [ɤ]. In Timugon, however, /o/ is actually pronounced as a round vowel. Let us tentatively adopt the following classification of Timugon vowels, and assume that the harmonic feature is [+ round]:

(15) **Timugon vowels:**

	i	**u**	**a**	**o**
High	+	+	–	–
Round	–	+	–	+

In principle we could use these same two features to distinguish the four basic Dusunic vowels, but there are at least two obvious problems with this analysis. First, it does not seem to reflect the actual pronunciation of /o/ in Dusunic languages. Tongue position, rather than rounding, seems to be the primary feature which distinguishes /o/ from /a/ in these languages. Second, a two-feature system leaves no room for the emergence of the fifth vowel /e/ in Kimaragang.

Most descriptions of Dusunic languages assume that the feature which minimally distinguishes /a/ from /o/ is [low] (see, for example, Hurlbut 1993; Pekkanen 1993). However, "lowness" harmony (spreading of [+low] in this traditional sense) seems to be quite rare. One could plausibly suggest that the harmonic feature is actually [ATR], at least for those dialects where /o/ is pronounced as a tense back unrounded vowel [ɤ].[11] I would like to propose a third option, namely that the active feature, i.e. the feature that distinguishes /a/ from /o/, is [RTR], as suggested by Basri and Chen (1999) for Selayarese. I propose the classification shown in (16) for the Kimaragang vowels.

[11] The [ATR] analysis seems counter to the phonetic facts of Kimaragang, in which /o/ is generally pronounced as a lax ([–ATR]) vowel, like /a/. However, it is not uncommon for lexical rules to preserve morpho-phonemic alternations long after the phonetic motivation for those alternations has been lost due to historical change.

(16) **Kimaragang vowels:**

	i	**u**	**a**	**o**	**(e)**
High	+	+	–	–	–
Back	–	+	+	+	–
RTR	(–)	(–)	+	–	–

Under these assumptions, we can say that both languages have a rule of Vowel Harmony which spreads the active feature from right to left, and a second rule of Neutralization that deletes the active feature when it occurs in a non-licensed position. For Timugon, we would need to stipulate that high vowels are opaque; for Kimaragang, this follows from the feature analysis in (16). The main differences between the two languages reduce to (a) the identity of the active feature, and (b) the position in which it is independently licensed (final syllable vs. final foot).

5 Conclusion

Kimaragang VH is typologically interesting in several respects. First, it appears to be an example of a unidirectional dominant-recessive harmony system, in that the dominant vowel (/a/) always spreads from right to left, whether from suffix to root or from root to prefix. Bakovic (2000) states that such systems are "unattested". Second, it seems to be unusual for vowel harmony to exhibit Geminate Inalterability effects. Maltese and Tigre have a process of rounding harmony that does not affect long vowels (McCarthy 1979; Schein & Steriade 1986), but this is the only comparable case that I am aware of.

This paper has argued that Kimaragang VH has properties typically associated with lexical phonological processes, notably the existence of lexical exceptions and sensitivity to specific classes of affixation. VH has been shown to "outrank" (i.e., stand in a counter-feeding relationship to) Neutralization, a competing pattern of vowel alternations. I have also argued that the vowel alternations of Timugon Murut are essentially the same as those of Kimaragang except for the identity of the active feature (alternatively, the default vowel) and the domain within which that feature (or segment) is licensed.

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