Vowel Harmony in Borneo?: An examination of vowel changes in Tindal Dusun

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This paper will examine a vowel-changing phenomenon in Tindal Dusun, a Western-Austronesian language spoken in Sabah, Borneo (Malaysia). Tindal exhibits a phenomenon that has been called vowel harmony by various authors working on Sabahan languages {Kroeger, 1992 #4; Hurlbut, 1981 #3; Harris, 1993 #2; Boutin, 1993 #1}. However, this phenomenon differs from those that have typically been called vowel harmony in linguistic literature. It does not involve underspecified vowels or changing phonological features of vowels, but rather entails a change of /o/ to /a/. In Tindal, the vowel /a/ spreads from right to left changing /o/ to /a/. The spreading of /a/ is blocked by the high vowels /i/ and /u/ (i.e., any vowel but /o/), but intervening consonants do not affect the rule. This can be formalized as a rule whereby /o/ changes to /a/ if the following syllable contains /a/, o → a/ __ (C)(C). This rule must be allowed to apply iteratively. I call this phenomenon "vowel lowering" here, while recognizing that there are various ways to frame this issue.

Next, this paper will examine how this vowel-lowering rule interacts with other aspects of the phonology. The rule applies when the diphthong [ay] has been neutralized as [E:], a sociolinguistically conditioned change. Moreover, vowel lowering seems to take precedence over the effects of prepenultimate neutralization, which changes prepenultimate /a/ to /o/. Finally, this paper will compare the process of vowel lowering in Tindal with similar but not identical process in other Sabahan languages.

1. Introduction

Tindal is a Dusunic (Austronesian) language spoken in Sabah, in northern Borneo, politically part of Malaysia. The data for this grammatical sketch were collected at the University of Hawai'i from a single speaker of Tindal who had been living in the United States for over a year. The consultant, Wendell Gingging, was born in 1974 and raised in Kota Belud, Kelawat district, Minonun sub-district. The data were elicited through the medium of English, which he speaks fluently. Moreover, Gingging, like most speakers of Tindal, is fluent in Malay because it is used in the schools. In addition to speaking Tindal, Malay, and English, he is familiar with Bajau, Mandarin, Hakka, Cantonese, and German.

Tindal is a coastal dialect of Central Dusunic, which is part of a group of interconnected languages and dialects spoken throughout central Sabah, all called "Dusun." Tindal means 'people who have come out from the earth', and speakers of this language would call themselves Dusun Tindal, with the more general term first.

2. Tindal Vowels

Tindal has four phonemic vowels: /i/ /u/ /a/ and /o/, the latter of which ranges in pronunciation from [o] to [ ]. All these vowels also contrast phonemic length, as shown in (1) below.

(1)   baᴺ 'river' vs. t-abaN 'older brother'
       o-siⁿn 'salty' vs. t-usin 'money'

ko̚n sikow 'thank you' vs. kontiho? 'sneeze'
hu̚n (standard measure) vs. tuhun 'go down'

Tindal also has a number of diphthongs, where the term DIPHTHONG is not meant to be indicative of these sounds' status as unit phonemes, but rather of their phonetic quality. The question of whether or not they are unit phonemes remains to be resolved, although the majority of the evidence points to them as sequences of two vowels, one of which happens to be non-syllabic. The diphthongs [oy] and [ay] optionally become [E:], balancing out the vowel phoneme inventory. This change has been reported as a completed in Kimaragang Dusun {Kroeger, 1993 #15: 37}, but it is a sociolinguistically conditioned allophone in Tindal that seems to be an in-group marker.

(2)   wala⇔y ~ walE≅˩ 'house'
        oNo≅y ~ oNE≅˩ 'to go'
        wai≈g ~ wE˩g 'water'

These phonetic diphthongs may even reduce to [E˩] across morpheme boundaries, as shown in (3) below.

(3)   no + ihad 'cry' + an → nE˩hadan

[E˩] seems to be a long vowel by default because it is replacing two segments (a diphthong). While [E˩] may be shortened in rapid speech, length is not contrastive for this vowel.
        The change of [ay] and [oy] to [E˩] may be diffusing slowly across the language, as not all forms with [ay] or [oy] may be monophthongized.

(4)   alai≈d 'a long time' *alE˩d

On the other hand, certain forms with [E˩] were never found to occur with a diphthong (e.g., *bE˩ho?* 'today', and *parE˩* 'rice'), and in fact, the underlying synchronic form of these words may simply contain [E˩], although historically they contained diphthongs.

3. Stress

Tindal stress is almost always penultimate, but occurs word-finally in some words with final heavy syllables. Emphasis seems to cause stress to become word-final. This is problematic for my data, because many of the forms have been elicited in isolation, and words in isolation are often emphasized. Word-final stress appears to be permitted only on heavy syllables, but not all such syllables take final stress. Example (5) illustrates instances of penultimate stress, whereas (6) shows final stress.

(5)   hino⇔mbo 'where, which one'
        morobu⇔at 'to work'
        ta⇔nay 'termite'
(6)   tanayo⇔n 'termite infested'
        tompi9o⇔s 'hairy caterpillar'
        gipa⇔n 'centipede, scorpion'
        wala⇔y 'house'
        dula⇔ 'saliva'
        lapa⇔p 'sole of foot'

4. Vowel lowering

Tindal exhibits a phenomenon that has been called vowel harmony by various authors working on Sabahan languages {Kroeger, 1992 #4; Hurlbut, 1981 #3; Harris, 1993 #2; Boutin, 1993 #1}. However, this phenomenon is different from what has typically been called vowel harmony in the linguistic literature, where an underspecified vowel becomes fully specified by

harmonizing with other vowels in the phonological word. Traditional vowel harmony languages have also been described as "containing at least two sets of vowels which cannot co-occur within the same (phonological) word" {Ringen, 1988 #14: 1}. Tindal 'vowel harmony', on the other hand, entails a change of /o/ to /a/. All vowels are fully specified underlyingly, and all can co-occur within a single phonological word under specified conditions. In Tindal, the vowel /a/ spreads from right to left[1] changing /o/ to /a/, without regard to intervening consonants. In example (7) below, the initial /a/ of the roots changes the prefix vowels from /o/ to /a/, as compared with example (8) below, where the prefix retains the original /o/.

(7)   no 'completive' + gapus 'hug, embrace' → nagapus
       no 'completive' + takaw 'steal' → natakaw
       no 'completive' + rata? 'flat' → narata?

(8)   no 'completive' + boli 'buy' → noboli
       no 'completive' + intob 'count' → nointob

The spreading of /a/ is blocked by the high vowels /i/ and /u/ (i.e., any vowel but /o/).

(9)   oruol 'painful' + an → orual-an

       tigog 'shock, startle' + an → tigagan

       po CAUSATIVE + dosi 'fear' + an BENEFACTIVE/LOCATIVE → podosian

       kodut 'pinch' + -ay IMPERATIVE → kodutay

Therefore, words which contain /a/ in a syllable after, but not immediately following, a syllable with /o/, such as *koniham* 'tomorrow', and *soNira?* 'when', are permitted in Tindal.

This vowel change can be formalized as a rule whereby /o/ changes to /a/ if the following syllable contains /a/.

(10)   o → a / __ (C)(C)a

This rule must be allowed to apply iteratively.

Vowel lowering also spreads to clitics, such as /so / 'one' (where → n in the following example). In this case, CLITIC refers to a semantically independent form that attaches phonologically to another word.

(11)   somok   no   **san**=jam[2]   yolo   m<in>o-monow
        near   already one=hour   3PL   <CPL>AF-walk
        'They walked for almost an hour.'

As mentioned above, the diphthong [ay] neutralizes to [Eː] in Tindal, and in such cases, this vowel change still applies. This is one reason for my claim that [Eˈ] does not (yet) deserve full phonemic status in Tindal, as it is diffusing slowly across the language. In (12) below, the root *boros* 'speak' combines with the imperative suffix -*ay*, which subsequently monophthongizes.

(12)   baras-E˥   ka˥gu da˥?
        speak-IMP again   wish
        'Please say (that) again.'

In my lexical database, there were two forms which inexplicably violated the vowel changing rule, show in (13) below. These forms may be misanalyzed, and may actually represent two separate phonological words, or the initial *ko-* is a prefix, and these are cases of the speaker not applying rule (10), as discussed below.

(13)   kobasan 'usually'

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[1] While I generally consider the terms RIGHT and LEFT to be biased towards languages with European writing systems, I find them to be the simplest way of expaining the situation in Tindal.

[2] <j> is a loan phoneme [dZ].

kola? 'fit, as clothes'

Moreover, in Tindal, the use of vowel lowering seems to be optional or idiolectal. Although the consultant for this study generally employed this vowel lowering rule, he occasionally gave non-harmonious forms, as in (14) below.

(14)   noko-sabak 'got angry'
       noko-gagas 'got skinny'
       momo-waig 'dissolve'

The consultant claimed that one of his parents had this vowel lowering rule, while the other did not, despite the fact that the two parents grew up in the same village (although on opposite sides). A sociolinguistic study of the use of this rule in the community is needed to determine the actual conditions of the change.

   A few verbs consistently cause problems for this vowel lowering rule, and /a/ roots may alternate with /o/ roots in these cases.

(15)   n-ansak 'undercooked rice; over-ripened'[3] < onsok 'ripe'
       n-onsok 'ripened' < onsok 'ripe'
       mo-monow < panaw 'leave, walk' (also exhibiting nasal substitution)
       ma-manaw < panaw 'leave, walk' (also exhibiting nasal substitution)

5. Prepenultimate neutralization

   In Tindal, /a/ becomes /o/ in pre-penultimate syllables. It is likely that the conditioning factor is stress, as stress is nearly always penultimate. Therefore, we can say that /a/ becomes /o/ in the syllable before the stressed syllable. I call this phenomenon prepenultimate neutralization, as /o/ seems to be the most neutral vowel in Tindal[4], and as the phenomenon has been known by this name in languages such as Malay, where the change is to /↔/, the most neutral vowel in that language.

(16)   tanud 'follow' → tonud-on
       gayo 'big' → goyo-on
       waguh 'new' → po-wogu-an

Vowel lowering seems to take place after neutralization. In (17), we see that prepenultimate neutralization does not seem to affect /o/ if the penultimate syllable is /a/. This can be explained by saying that the neutralization takes place, but the vowel-lowering rule changes the /o/ back to /a/, so the effects of neutralization are erased.

(17)   babak 'break' → babak-on
       akan 'eat' → akan-o?

The same logic can be applied to forms such as (18) below. The neutralization may take place, but vowel lowering erases its effects.

(18)   no + katol 'itchy' + -an → na-katal-an

In (19) below, the neutralization rule takes away a potential input for vowel lowering.

(19)   waguh 'new' → po-wogu-an

Since the root no longer contains /a/, the prefix has no reason to change from the underlying /o/ form.

   In (20) below, *kandadu* 'lock' becomes *kondodu-on*. The second /a/ of the root is underlyingly /a/, but when that vowel changes by prepenultimate neutralization, the preceding /a/

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[3] These glosses for this form were provided on different days.
[4] Historically, it derives from Proto-Austronesian [↔] in non-final position (Robert Blust, personal communication).

is changed as well. Apparently, then, the neutralization rule changes all instances of /a/ preceding the penultimate vowel.

(20)   kondodu-on   no   kamah
       lock-PATIENT.FOCUS   already   or.else
       'Make sure you padlock it!'

Unfortunately, because Tindal only has a few roots of the form CaCaC(not a), this is the only example of this phenomenon in my data.

    The neutralization rule is not without exception, however. The following forms did not change as expected.

(21)   talib 'to pass' → talib-on 'something you pass'
       malu   'shy' → amalu-on isio 'she tends to be shy'

In two instances, there were alternations between /o/ and /a/ not covered above, which seem to be associated with a change of /w/ to /h/. In (22) /o/ has changed to /a/, whereas in (23), /a/ has become /o/.

(22)   kilah-on i takanon nu 'your food has ants' < kilo⇔w 'ant'
(23)   takoh-on 'something that is habitually stolen' < takaw

Without further examples of such shifts, I cannot speculate as to their conditioning.

6. Other Austronesian languages

    Even among Austronesian languages, this phenomenon seems to be limited to a relatively small number of closely related languages. Vowel harmonies exhibited by many Austronesian languages closely resemble the classic definition of vowel harmony. Chamorro (Guam), Yapese (Yap), and Madurese (Java), for example, all have vowel harmonies based on tense/lax distinctions. Chamorro also has front/back vowel harmony.

    Vowel harmony in Selayarese (Sulawesi), seems to be intermediate between these other vowel harmonies and Tindal vowel harmony. In Selayarese, mid vowels /e/ and /o/ are lowered before /a/. Mithun and Basri admit {Mithun, 1986 #5: 229} that "most models of phonology would automatically classify the lowered mid vowels as lax." In this way, the lowering is akin to the tense/lax harmony found in Chamorro, Yapese, and Madurese. It is the environment of the lowering, however, that is of immediate concern to this study. The mid vowels lower slightly before an immediately following /a/.   Remember, in Tindal, there is only one phonemic mid vowel, and this is the vowel that becomes /a/, an extreme form of lowering. In Selayarese, however, the environment for lowering is not exactly the same as in Tindal. The mid vowels lower when they are immediately followed by /a/, without an intervening consonant (in Tindal, consonants do not effect vowel harmony). Much as in Tindal, the lowering spreads from right to left, across all mid vowels. The mid vowels also lower when the preceding syllable is stressed and the following syllable contains /a/.   So, vowel harmony in both Tindal and Selayarese involves a complex interaction between segmental phonology and stress.

    Within Sabah (the northern part of Borneo Island, politically Malaysia), Tindal-type vowel changes relatively frequent, although the particular rules vary from language to language. In the Dusunic language family to which Tindal belongs, Kimaragang {Kroeger, 1992 #4: 279-82} and Labuk Kadazan {Hurlbut, 1981 #3: 46-7} both have vowel lowering and stress rules that are the same as in Tindal. Kroeger mentions also that vowel harmony in Kimaragang does not apply to geminate /oo/. Data was unavailable to test whether vowel harmony affects geminate /oo/ in Tindal, as geminate /oo/ is quite rare in this language. In Eastern Kadazan, the rules again seem to be quite similar to Tindal, but Hurlbut {, 1988 #6: 121} frames them a bit differently. Regarding /a/ to /o/ changes, she says that when a suffix with /o/ is added, the /a/s in the root

become /o/ by vowel harmony. She lists a second rule whereby /a/ suffixes trigger /a/s to become /o/ if the intervening vowel is /i/ or /u/.   All her examples, however, mirror the prepenultimate neutralization rule stated above for Tindal. Interestingly, Hurlbut notes that the prefixes *pod-* and *pog-* do not undergo vowel harmony in Eastern Kadazan. In Tindal, while vowel harmony may be dialectical, no particular prefixes are immune to harmony.

In the Paitanic (a sister family to Dusunic) language Kalabuan, there are constraints on the distribution of /o/, but in a rather different form than in Dusunic languages. In Kalabuan, /o/ may occur in non-final syllables only if /o/ occurs in all the following syllables {Spitzack, 1993 #7: 88}. Moreover, a sequence of /oa/ becomes [aa].   In Tindal, many words have /o/ in non-final syllables with other vowels in subsequent syllables, as *gonit* 'lightning' and *tobuk* 'hair'.

Murutic languages are also present in Sabah, but are more distantly related to Dusunic and Paitanic. They superficially have vowel changes similar to Dusunic languages, but the underlying rules are quite different. In Timugon Murut {Kroeger, 1992 #4: 282-6} and Tagal {Harris, 1993 #2: 79-80}, /a/ spreads right-to-left, changing /o/, much like in Dusunic languages, but unlike in Kimaragang, geminate /oo/ may also change. In Tagal, there is an additional rule whereby /o/ spreads right to left, from a root onto a prefix. In Timugon, suffixes that contain vowels other than /a/ also seem to be able to trigger this 'harmony'. Kroeger attributes the vowel distributions in Timugon to two constraints. The first one prohibits a vowel other than /o/ from following /o/. So, /o/ can only occur in non-final syllables if all the following vowels are /o/. Second, if /o/ occurs in the last two syllables of a word, it may not be directly preceded by /a/. The facts of Timugon vowel distribution all follow from these two constraints. When Kroeger frames the rules in this manner, we can see that underlyingly, Timugon is quite similar to Kalabuan.

On the island of Banggi, just north of the mainland of Sabah, there are several languages with Tindal-type vowel rules. Although these languages are considered Philippine languages {Grimes, 2000 #8}, Banggi Island is politically part of Sabah, and the vowel changes are somewhat similar to those on the mainland of Sabah. In Molbog, there are two rules involving changes of /o/ and /a/. The first is that /a/ is only permitted in the last two syllables of a word. The second is that /o/ becomes /a/ where the two vowels are adjacent or when they are only separated by /h/ or / /, including across morpheme and word boundaries {Thiessen, 1977 #9: 11-14}.

Bonggi, also spoken on Banggi Island, is "closest to Molbog of the Philippines, although not very close" {Grimes, 2000 #8}. Bonggi vowel changes are bi-direction and affect vowels other than /o/ and /a/ {Kroeger, 1992 #4: 286-93}. The first Bonggi vowel rule is that high vowels /i/ and /u/ replace /↔/. They made spread in either direction. The second Bonggi vowel rule spreads / / left-to-right, changing non-high vowels (/a/ and /↔/).

Tindal-type vowel rules seems to be mainly confined to Sabah (including Banggi Island), although Selayarese vowel harmony also resembles Sabahan situation. One problem in assessing the similarities of the various types of vowel-changing rules is that each author frames them in a different way. So, for example, Hurlbut {, 1988 #6: 121} lists four different rules for Eastern Kadazan morphology, but the limited amount of data she provides seems to be completely consistent with the two rules I have formed for Tindal. Without access to a more extensive set of data for Eastern Kadazan vowel harmony, I am forced to rely upon the author's analysis. When multiple processes, such as neutralization and vowel harmony, interact, there are many possible ways to interpret the situation, and often no way to check who is right. This seems to be the

situation in Sabahan vowel lowering. The various descriptions that authors' have chosen to depict each language may obscure similarities between these varieties.

7. Conclusion

All these Sabahan vowel changes have been called vowel harmony, and while all of them involve vowel changes that eliminate differences in vowels in a phonological word, they are sufficiently different from traditional vowel harmony to give us pause when using this phrase. They do not involve any underspecification, and the vowels /o/ and /a/ are not mutually exclusive. Both /o/ and /a/ can occur in a single word under the right conditions. With regard to Tindal, the vowel changes under discussion can most simply be explained by a rule (or constraint, depending on your phonological persuasion). This rule needs to be ordered with regard to prepenultimate neutralization. If we as a linguistic community accept the term VOWEL HARMONY as I have defined it here, it does not apply to the Sabahan languages.