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Depression as Register: Evidence from Mijikenda

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Introduction

The current paper deals with two related subjects: the representation of depressor consonants and, more generally, the representation of tone. I discuss some of the tonal phenomena found in Mijikenda—a family of nine closely-related Bantu dialects of coastal Kenya—and show that they support a register-based view of depressors and a domain-based view of tone and register. Specifically, I show that the phenomenon known as Tonal Fission (Cassimjee and Kisseberth 1992) is best analyzed as the interaction of low and high register domains with high tone domains.

The Mijikenda dialects, in alphabetical order, are: Chonyi, Digo, Duruma, Giryama, Jibana (Dzihana), Kambe, Kauma, Rabai, and Ribe (Rihe). This work is based on recordings collected by Charles Kisseberth.

1 High Tone Shift

The first and most striking feature of Mijikenda tonology is exemplified in the Giryama data in (1), contrasting first-person and third-person subjects in the present tense.¹ Vowel length is not contrastive; the penult is predictably lengthened.

(1)	Present 1sg.	Present 3sg.	
	ni-na-ma:la	<u>a</u> -na-mă:la	‘want’
	ni-na-mala ku-gu:la	<u>a</u> -na-mala ku-gũ:la	‘want to buy’
	ni-na-mala ku-gula ŋgu:wo	<u>a</u> -na-mala ku-gula ŋgũ:wo	‘want to buy clothes’

This is High Tone Shift in Mijikenda: an underlying high tone (here originating on the third-person singular subject prefix a-) *shifts* to the right within the phonological phrase, and is heard on the penult. Contrast this with a “spreading” language

¹ Notation: \acute{v} high, \grave{v}/v low, \check{v} rising, \hat{v} falling, ^+v downstep, \underline{v} underlying location of high tone. The tone-bearing unit is the mora, which may be a vowel or a syllabic nasal.

like the Southern Bantu language Xitsonga (Kisseberth 1994), where a high tone is pronounced on all intermediate TBUs as well and we get *y-á-tsútsúmélá:na* ‘they are running to each other.’

When a phrase has more than one underlying high tone, each high tone surfaces on the TBU preceding the next underlying high tone (2, 3) or at the underlying location of the next high tone (4); the conditions governing this “overlap” vary between dialects and are not relevant for the present discussion.

- (2) High verb stems in the present tense (Kambe):

Infinitive	Present 1sg.	Present 3sg.	
ku-lá:la	ni-na-lá:la	y _u -ná-lá:la	‘sleep’
ku-rě:ha	ni-na-rě:ha	y _u -ná-rě:ha	‘give back’
ku-rĩ:sa	ni-na-rĩ:sa	y _u -ná-rĩ:sa	‘feed’
ku-kalá:ŋga	ni-na-kalá:ŋga	y _u -ná-kalá:ŋga	‘fry’
ku-kalaŋgĩ:ra	ni-na-kalaŋgĩ:ra	y _u -ná-kalaŋgĩ:ra	‘fry for’
ku-tsuŋguri:ra	ni-na-tsuŋguri:ra	y _u -ná-tsuŋguri:ra	‘peep’

- (3) High verb stems in the present tense, with an object prefix (Kambe):

Present 3sg.	
y _u -na-ní-rě:ha	‘(s)he’s giving back to me’
y _u -na-ní-hiri:ka	‘(s)he’s taking me along’
y _u -na-ní-siki:ra	‘(s)he remembers me’

- (4) High verb stems in the present tense (Chonyi):

Infinitive	Present 3sg.	Present 3sg. + OP	
ku-há:dza	y _u -ná-há:dza	y _u -na-rí-há:dza	‘name’
ku-lá:vya	y _u -ná-lá:vya	y _u -na-chí-lá:vya	‘give’
ku-tá:la	y _u -ná-tá:la	y _u -na-βá-tá:la	‘count’
ku-teŋgé:za	y _u -na-teŋgé:za	y _u -na-chi-teŋgé:za	‘repair’
ku-kalá:ŋga	y _u -na-kalá:ŋga	y _u -na-chi-kalá:ŋga	‘fry’

I shall employ the concept of *feature domains* (Kisseberth 1994; Cole and Kisseberth 1994; Cassimjee and Kisseberth 1998). A feature domain—in this case, a High Tone Domain (HTD)—is a “plan for the realization of a feature”: a sequence of TBUs which “belong” to a single high tone. A high tone can only be realized (“expressed”) on TBUs which are in a high tone domain, but may, due to various factors, remain unexpressed on some—or even all—TBUs. In (5) we see the domain representation of a spreading language like Xitsonga, and in (6) is the shifting behavior of Mijikenda, where high tones are only expressed on the head (here, rightmost) element of the domain, which nevertheless includes additional TBUs.

- (5) Xitsonga, domain-based view (high tone domain marked by parentheses):
(y-á-tsútsúméláa)na
- (6) Kambe, domain-based view: *(y_u-na-ní)-(siki)ra*

Domains are mostly used (and most directly useful) within Optimality Theory; the domains representation, together with the set of constraints governing domain structure and feature expression, is Optimal Domains Theory (ODT). In cases such as those discussed above, we would have some constraint promoting the expansion of High Tone Domains—call it MAXIMAL HTD—and a higher-ranked constraint prohibiting the expansion of a HTD onto the ultima—the well-known NONFINALITY—as well as a set of constraints leading to the expression of the feature only on the head TBU. I shall not be overly concerned here with the “Optimal” part of Optimal Domains Theory; instead, I intend to demonstrate its applicability to depressor effects in Mijikenda.

2 Depressors I: Restricting High Tone Shift

It is well known that voicing tends to affect pitch. In many languages, a vowel following a voiced consonant will be pronounced at a lower pitch than otherwise. In a number of tone languages this has been phonologized to the point that we see a set of so-called “depressor” consonants which interact with tonal processes. In Mijikenda, depressors are basically the voiced (non-prenasalized) obstruents (stops, fricatives, and affricates, not including β). Their effect on High Tone Shift is readily seen in the data below:

(7) Depressors restricting HTS to stem (Giryama):

Non-depressed stem:

ku-β̣ũ:ðya	ḁ-na-β̣ũ:ðya	‘despise’
ku-f̣ĩ:tsa	ḁ-na-f̣ĩ:tsa	‘hide’
ku-β̣áβ̣ũ:ka	ḁ-na-β̣áβ̣ũ:ka	‘search around in the grass’
ku-f̣uṭã:ma	ḁ-na-f̣uṭã:ma	‘squat’
ku-β̣áβ̣ukĩ:ra	ḁ-na-β̣áβ̣ukĩ:ra	‘be searchable’
ku-cḥĩmbirĩ:ra	ḁ-na-cḥĩmbirĩ:ra	‘flee to’

Depressed stem:

ku-ḅã:nda	ḁ-ná-ḅã:nda	‘break’
ku-ḍõ:na	ḁ-ná-ḍõ:na	‘engrave’
ku-ḅambã:nda	ḁ-ná-ḅambã:nda	‘break up’
ku-ḍaŋgũ:la	ḁ-ná-ḍaŋgũ:la	‘persevere’
ku-ḅambahũ:la	ḁ-ná-ḅambahũ:la	‘wrench apart’
ku-g̣ḅeg̣beḷẽ:ka	ḁ-ná-g̣ḅeg̣beḷẽ:ka	‘fall with resounding noise’

(8) Depressors restricting HTS to OP (Duruma):

yḁ-na-cḥí-ḅã:nda	yḁ-ná-vi-ḅã:nda	‘(s)he’s breaking [cl.7/8]’
yḁ-na-rí-ḥã:dza	yḁ-ná-ga-ḥã:dza	‘(s)he’s naming [cl.5/6]’
yḁ-na-cḥí-ḅĩnikĩ:za	yḁ-ná-vi-ḅĩnikĩ:za	‘(s)he’s covering [cl.7/8]’

- (9) Depressors restricting HTS to OP (Giryama):
a-na-rí-rě:ha a-ná-ga-rě:ha ‘(s)he’s giving back [cl.5/6]’
a-na-kí-fĩ:tsa a-ná-vi-fĩ:tsa ‘(s)he’s hiding [cl.7/8]’
a-na-í-kalã:ŋga a-ná-zi-kalã:ŋga ‘(s)he’s frying [cl.9/10]’
- (10) Depressors restricting HTS to OP (Kambe):
yu-na-ní-hĩrĩ:ka yu-ná-ga-hĩrĩ:ka ‘(s)he’s sending me/[cl.6]’
- (11) Depressors restricting HTS to OP (Kauma):
a-na-chí-sǒ:ma a-ná-vi-sǒ:ma ‘(s)he’s reading [cl.7/8]’

Where the expected surface location of a high tone is depressed, High Tone Shift is restricted. Note that this only applies to the surface location and not to any intermediate TBUs, e.g., in Giryama a-na-zazigĩrĩ:ka ‘(s)he is willing to play’, where HTS passes over three depressors.

The apparently universal link between voicing and lowered pitch has led authors such as Bradshaw (1999) to claim that [+voice] and [Low Tone] are a single feature—see Downing (2009) for an overview of these “single-source” theories. Others, such as Rycroft (1980) or Downing and Gick (2001), have pointed out that voicing and depression are not entirely parallel: in some cases, depression is governed by other (e.g., morphological) factors, and in others there are voiceless depressors as well as voiced non-depressors.

This is the case in Mijikenda. In Giryama, the phonemes [h], [f] and [ð] all have depressor and non-depressor counterparts; in other words, they restrict High Tone Shift in some morphemes but not in others:

- (12) Depressor and non-depressor [h] in Giryama:
- | Non-depressor | | Depressor | |
|----------------------|------------------|------------------------|----------------|
| <u>a</u> -na-hâ:la | ‘take’ | <u>a</u> -ná-hũ:la | ‘dish up food’ |
| <u>a</u> -na-hóhǒ:la | ‘bend’ | <u>a</u> -ná-hohǒ:sa | ‘pervert’ |
| <u>a</u> -na-háhĩ:sa | ‘cause to vomit’ | <u>a</u> -ná-hendzě:za | ‘consent’ |
- (13) Depressor and non-depressor [f] in Giryama:
- | Non-depressor | | Depressor | |
|-------------------------|--------------|------------------------|----------|
| <u>a</u> -na-fwâ:ha | ‘be fitting’ | <u>a</u> -ná-fĩ:tsa | ‘hide’ |
| <u>a</u> -na-fútá:ma | ‘squat’ | <u>a</u> -ná-fufũ:la | ‘revive’ |
| <u>a</u> -na-fwéðeðě:ka | ‘be ashamed’ | <u>a</u> -ná-fĩnikĩ:ra | ‘cover’ |
- (14) Depressor and non-depressor [ð] in Giryama:
- | Non-depressor | | Depressor | |
|-----------------------|-------------------|---------------------|---------------------------------|
| N/A | | <u>a</u> -ná-ðã:a | ‘fasten string around calabash’ |
| <u>a</u> -na-ðéðě:dʒa | ‘coax’ | <u>a</u> -ná-ðãĩ:wa | pass. of ku-ðã:a |
| <u>a</u> -na-ðũnyũ:ka | ‘become contused’ | <u>a</u> -ná-ðyǒ:ma | ‘speak with foreign accent’ |

2.1 Low Register Domains

In her ODT-based analysis of Xhosa tonology, Cassimjee (1998) argues that depression is best analyzed as a register feature: depressor consonants, as well as depressor-like morphological factors, form Low Register Domains, just like underlying high tones form High Tone Domains. The depressor effect we've seen so far in Mijikenda can clearly also be analyzed in such a way, although the benefit is not immediately evident. All we need to do is group all sequences of depressed TBUs in a phonological phrase into Low Register Domains, marked in the following data in boldface:

- (15) High Tone Domains and Low Register Domains:
- | | |
|------------------------------|--|
| (a-na-zazigirií)ka | '(s)he is willing to play' (Giryama) |
| (a-na-zazií)ga | '(s)he is playing' (Giryama) |
| ni-na-vi-(b̄inikií)za | 'I'm covering [cl.8]' (Ribe) |
| (a-na-gula ŋguú)wo | '(s)he is buying clothes' (Chonyi) |
| cho(m̄e a-ka-m-piga baraá)ka | 'and Chome hit Baraka' (Giryama) |
| ni-na-(b̄abadií)ka | 'I'm walking slowly with a stick' (Gir.) |
| n-(o)laga guú)de | 'I'm killing a night dove' (Ribe) |

The restriction of High Tone Shift could then be derived simply as a restriction on the expression of a high tone in a Low Register Domain. In a word like the Duruma *yū-ná-vi-b̄inikií:za* '(s)he's covering [cl.8]', for example, the domain structure is *(yū-ná)-vi-(b̄inikií)za*, and the expected form **(yū-na-ví)-(b̄inikií)za* violates the ban on depressed high tones.

So far, however, Low Register Domains offer no clear advantage over directly saying "no high tone on a depressed TBU". The strongest point for Low Register Domains, as well as the "depression as a feature" view, comes from a rather unusual tonal phenomenon limited to two of the Mijikenda dialects.

3 Depressors II: Fission

In Ribe and Kauma we see a tonal phenomenon first described by Cassimjee and Kisseberth (1992) as "Fission,"² exemplified below with data from two speakers of Ribe, marked here Ribe₁ and Ribe₂ (the speakers differ somewhat in their morphology, but not tonally).

² The name "Fission" is based on an autosegmental, derivational analysis of the phenomenon, which shall not concern us here.

(16) Examples of Fission

In Ribe₁:

- ku-súbũ:tu ‘to dare’ *cf.* ku-súbũ:tu (Chonyi)
 ku-galá-gǎ:la ‘to writhe’ *cf.* ku-gala-gǎ:la (Chonyi)
 w-á-zi-pĩ:ga ‘(s)he’s hitting [cl.10]’
cf. w-a-ni-pĩ:ga ‘(s)he’s hitting me’
 w-á-zi-fúgũ:la ‘(s)he’s untying [cl.10]’
cf. n-a-zi-fugu:la ‘I’m untying [cl.10]’

In Ribe₂:

- a-ndá-ga-fúgũ:la ‘(s)he’ll untie [cl.6]’
cf. ni-nda-ga-fugu:la ‘I’ll untie [cl.6]’
 a-na-mala ku-gula ŋgũ:wo ‘(s)he wants to buy clothes’
cf. ni-na-mala ku-gula ŋgu:wo ‘I want to buy clothes’
 a-na-píga má-bumbũ:mbu ‘(s)he’s beating drums’
cf. ni-na-píga ma-bumbumbu ‘I’m beating drums’
 a-na-sága má-gondolõ:we ‘(s)he’s pounding grain’
cf. ni-na-saga ma-gondolo:we ‘I’m pouding grain’

Fission is especially striking in the phrasal data from Ribe₂. Compare a-na-píga má-bumbũ:mbu ‘(s)he is beating drums’ with ni-na-píga ma-bumbumbu ‘I’m beating drums.’ Clearly, in the third-person form there is only one underlying high tone, and yet it is heard in three different places: one is the penult, the target of High Tone Shift, but two more places are on TBUs which precede depressors. Descriptively, fission can be phrased in the following way: a high tone surfaces before every depressor it passes in the “wake” of High Tone Shift. In domain terms, we have here a single High Tone Domain in which the feature is pronounced on three non-consecutive TBUs: (a-na-píga má-bumbuú)mbu. (Note that, within the autosegmental framework, such a surface structure is impossible since it violates the “adjacency constraint” (Goldsmith 1976); autosegmentally, Fission requires multiple surface high tones.) But how do we derive Fission?

3.1 High Register Domains

The following analysis of Fission was inspired in part by McCarthy’s (2004) concept of “Headed Spans.” Since we have already seen that depressors can be represented as Low Register Domains, I suggest that a phonological phrase in Mijikenda is exhaustively parsed into alternating Low and High Register Domains. Just as a span of consecutive depressed TBUs form a Low Register Domains, a span of consecutive non-depressed TBUs should form a High Register Domain. And just like all feature domains in general, Register Domains are headed; in the case of Mijikenda, they are right-headed, meaning that the rightmost element in a High Register

Domain is in some sense considered to be the most prominent. Once we have these domains, Fission immediately falls out: an “extra” high tone will surface before every depressed TBU, since it is *the head of a High Register Domain*.

Consider for example the phrase *a-na-píga má-bumbũ:mbu*. Marking all (Upper and Lower) Register Domains with curly brackets, the domain structure here is (*{a-na-pí}{ga}{má}{bu}{mbuú}mbu*). The syllables *pí* and *má* are the heads of High Register Domains *and* are inside a High Tone Domain, and so (in the dialects that have Fission) the high tone is also expressed on them. On the other hand, the final syllable (*mbu*) does not get an extra high tone; although it is the head of a High Register Domain, it does not belong to a High Tone Domain, and so the feature “High” may not be expressed on it.

3.2 Some Properties of Fission

The domain-based analysis sheds light on two additional properties of Fission.

3.2.1 Fission and Depressor Sequences

One property of Fission discussed in Kisseberth and Volk (2007) can be described as follows: an extra H appears before every depressor, but never on a depressed TBU. This is exemplified below.

(17) No extra high tone on a depressed TBU:

ni-nda-vi-gũ:la ‘I will buy [cl.8]’
β_a-nda-vi-gũ:la ‘(s)he will buy [cl.8]’ (*β_a-nda-v⁺í-gũ:la)

ni-na-ga-zumbu:la ‘I’m seeking [cl.6]’
β_a-ná-ga-zumbũ:la ‘(s)he’s seeking [cl.6]’ (*β_a-ná-g⁺á-zumbũ:la)

Take *β_a-nda-vi-gũ:la* as an example. We see Fission on *-nda-*, since it precedes the depressed *-vi-*. However, there is no Fission on *-vi-* itself, despite the fact that the following syllable (*gũ:*) is depressed. This is what the register analysis predicts. Consider the domain structure: (*{β_a-nda}{vi-gu}{ú}la*), and recall the condition for Fission: on the head of every High Register Domain. Now, the *-vi-* is part of a *Low* Register Domain, and obviously cannot be the head of any High Register Domain. In other words, on this analysis we do not need to add a condition to Fission along the lines of “pronounce every pre-depressor TBU as high, *unless it is depressed itself*”; the register domain approach makes it impossible even to predict Fission resulting in an “extra” high tone on a depressed TBU.

3.2.2 Fission and High Tone Domains

There is a more subtle property of Fission which appears trivial at first, but is nevertheless quite useful in the tonal analysis of Mijikenda. Note that Fission can only result in a high tone appearing on a TBU which is part of a High Tone Domain. The trivial implication of this is that we do not get spurious high tones in phrases where there is no underlying high tone, e.g., *ni-nda-vi-gu:la* and not **ni-ndá-vi-gu:la*. But the point here is that the presence of an underlying high tone in the phrase is not enough; Fission can only operate along the “path” of High Tone Shift. This is the reason why we get an extra high tone on the *lá* in *ku-galá-gǎ:la* but never on the *ku*-prefix: the High Tone Domain here starts on the stem and, although the syllable following the *ku*- is depressed (*ga*), Fission may not operate there.

An example of the cases where this fact really helps us can be seen in the imperative. Consider first the imperative in Giriyama:

(18) The imperative (data from Giriyama):

Low stems:

<i>gu:la</i>	‘buy!’	<i>gulǎ:-ni</i>	‘(pl.) buy!’
<i>tso:la</i>	‘pick up!’	<i>tsolǎ:-ni</i>	‘(pl.)’
<i>tsuku:la</i>	‘carry!’	<i>tsukulǎ:-ni</i>	‘(pl.)’
<i>suku:ma</i>	‘push!’	<i>sukumǎ:-ni</i>	‘(pl.)’
<i>marigi:za</i>	‘close!’	<i>marigizǎ:-ni</i>	‘(pl.)’

High stems:

<i>fu:la</i>	‘wash clothes!’	<i>fulǎ:-ni</i>	‘(pl.)’
<i>pa:ta</i>	‘get!’	<i>patǎ:-ni</i>	‘(pl.)’
<i>siki:ra</i>	‘hear!’	<i>sikirǎ:-ni</i>	‘(pl.)’
<i>kala:ŋga</i>	‘fry!’	<i>kalaŋgǎ:-ni</i>	‘(pl.)’
<i>kalaŋgi:ra</i>	‘fry for!’	<i>kalaŋgirǎ:-ni</i>	‘(pl.)’
<i>teŋgeneze:ra</i>	‘make with/for!’	<i>teŋgenezerǎ:-ni</i>	‘(pl.)’

The singular imperative forms like *marigi:za* or *teŋgeneze:ra* appear to carry no high tone whatever. It is only when the plural suffix *-ni* is added that we hear the latent high tone. (This type of behavior is actually quite common in Mijikenda, but lies beyond the scope of the present discussion.) The question we’re interested in here is this: what is the underlying location of this high tone? At first glance, it might appear to be a floating tone which is barred from surfacing (for whatever reason) in the singular imperative. Evidence from the dialects with Fission, however, proves what the correct analysis must be:

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(19) Fission in the Ribe₁ imperative:

No depressors:

la:la	‘sleep!’	lalǎ:-ni
ri:sa	‘feed!’	risǎ:-ni
kala:ŋga	‘fry!’	kalaŋǎ:-ni
hiri:ka	‘send!’	hirikǎ:-ni

Depressors:

galá-ga:la	(*gala-ga:la)	‘writhe!’	galá-galǎ:-ni
galú:za	(*galu:za)	‘change!’	galúzǎ:-ni
hégu:la	(*hegu:la)	‘remove from the fire!’	hégulǎ:-ni
súbu:tu	(*subu:tu)	‘dare!’	súbutǔ:-ni

The fact that Fission results in a surface high tone as early as the first syllable in hégu:la and súbu:tu shows that the high tone here cannot be floating; there must be a High Tone Domain that covers *the entire stem*, i.e., the domain structure of hégu:la is ({hé}{**gu**}{ula}), and a depressor-less imperative like kala:ŋga ‘fry’ has the domain structure (kalaŋga)—no Low Register Domains, no Fission.

There is one point that still remains, which is this: if we have a High Tone Domain that covers the stem in these verbs, why don’t we get a high tone on the head of that domain, namely on the ultima? Why get kala:ŋga and not *kala:ŋgá? This brings us back to the same Nonfinality effect we used above to explain why High Tone Shift stops on the penult: the final syllable in a phonological phrase in Mijikenda is never pronounced with high pitch. When morphological or other factors create a High Tone Domain that includes the ultima, that High tone is simply unable to surface. But facts such as Fission (as well as the surface location of preceding high tones) clearly show that the High Tone Domain has real surface presence.

4 Conclusion

As I have shown, the domains abstraction allows us to represent directly the phenomenon of Tonal Fission in Mijikenda. This supports the view of depression as a register effect, as opposed to the “single-source” view of depressors. Furthermore, by adding the notion of High Register Domains we get a natural motivation for Fission, as well as an almost trivial explanation of its scope and behavior.

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