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Tone Metathesis in the Dangme Imperative¹

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0. Introduction

Metathesis is a well-attested process, although perhaps more so in diachronic than in synchronic analysis.² In the synchronic realm, it is more commonly found as a purely morphophonemic phenomenon than as a device that signals some grammatical category or function. In terms of form, the most familiar type of metathesis is, of course, transposition of segments, although transposition of syllables and other phonological units is also found.³ This paper presents a case of metathesis which is in a sense triply rare: it is synchronic, it participates in the marking of a grammatical category, and it operates on tones rather than on segments.⁴

Our data come from Dangme, a Kwa language spoken in Ghana, and involve the formation of the imperative. In Dangme, the imperative verb may take one of several different forms, depending upon the tone of the stem, as well as upon the environment in which the stem occurs. The various possibilities are illustrated in (1-3):

			TONE MELODY	STEM
(1)	(a)	lá 'Sing!'	H	lá
	(b)	ko lá 'Don't sing!'	MH	
	(c)	kpalé lá 'Sing again!'	MHH	
(2)	(a)	yé 'Eat!'	H	ye
	(b)	kó ye 'Don't eat!'	HM	
	(c)	kpalé ye 'Eat again!'	MHM	
(3)	(a)	doó 'Dance!'	MH	dò
	(b)	kó dò 'Don't dance!'	HL	
	(c)	kpalé dò 'Dance again!'	MHL	

This paper gives a unified account of the surface tone patterns observed in these data. Following Kropp Dakubu (1987:25-27), we assume that the Potential marker, a floating H tone which immediately precedes the verb stem, is present in such examples. For M and L tone stems, this H tone associates leftwards when there is segmental material preceding the verb, as in the (b) and (c) forms of examples (2) and (3) above. However, when the verb stem is utterance-initial (as in the (a) forms of (2) and (3)), we argue that this floating H undergoes a rule of tone metathesis (in conjunction with other rules).⁵ The picture is somewhat more complicated for H tone stems, but we argue that the same rule of tone metathesis can be appealed to in the

utterance-initial cases. This formulation allows for an elegant account of the forms of the Dangme imperative, and provides evidence that transposition of tones must be included in any inventory of metathesis types.

1. The Potential Marker

Dangme makes use of a Potential aspect marker which has only tonal features specified. This floating H tone is positioned before the main verb of the clause, and appears in a wide range of constructions, such as futures, certain modalities, and hortatives. These are illustrated in (4-6), below:⁶

- (4) na má nã lè
 nà ma / nã lè
 Na FUT POT see 3SG
 'Na will see it'
- (5) e-sa né é-dò
 e- sa né e- / dò
 3SG-be+good that 3SG-POT dance
 'He ought to dance'
- (6) wá-dò
 wa- / dò
 1PL-POT dance
 'Let's dance'

In each case, the floating H tone of the potential marker appears before the verb stem. It is linked to the syllable preceding the verb by a rule of H Tone Linking, as shown in (7):

(7) H Tone Linking



Examples (4-6) illustrate the behavior of M tone syllables preceding a floating H. The behavior of a H tone syllable preceding a floating H has already been illustrated in the (c) examples of (1-3) (where *kpalé* 'return' is underlyingly MH). When the syllable before the Potential marker is L, however, the outcome is somewhat different. Rule (7), H Tone Linking, does not apply, but instead the vowel lengthens, and the H tone is linked to the new V slot. (8) provides an example of this in the optative construction, and the rule of Vowel Lengthening is given in (9).

Up to this point, we have restricted our discussion to monosyllabic verb stems. We turn now to disyllabic verb stems, still restricting ourselves to those with M and L tones:

- (18) číkó stem: čikɔ
'Smoke (e.g. meat)!'
- (19) bələ́ stem: bələ́
'Surround!'

These forms are in fact consistent with the data presented above. Since the rule of Floating H Metathesis (16) is written with reference only to the tones and the single tonal node involved, it will apply whether one or more than one tone bearing unit is linked to that tonal node. (20), then, illustrates the derivation of the forms in (18) and (19):

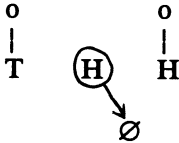
	stem: čikɔ 'smoke'	stem: bələ́ 'surround'
UR	čikɔ \ / H M	bələ́ \ / H L
H Meta-thesis	čikɔ \ / M H	bələ́ \ / L H
Vowel Length (and assoc)	n/a	bələ́ \ / L H
Assim.	n/a	bələ́ \ M H
H Tone Link.	čikɔ - - M H	n/a
	číkó 'Smoke!'	bələ́́ 'Surround!'

Finally, consider (21) and (22), which might be taken to be counterexamples to our analysis, on the grounds that they show no evidence of Floating H Metathesis:

- (21) sáke stem: sáke
'Pluck!'

Here, apparently, the floating H tone does not link to the left, but is instead deleted. A first approximation of a rule of Floating H Deletion appears in (26):

(26) Floating H Deletion



However, this rule is too general, in that it predicts that the Potential marker will always delete before a H tone verb stem. That this is not true is illustrated by examples (27) and (28):

- (27) e-sa né é-lá
 e- sa né e- lá
 3SG-be+good that 3SG- POT sing
 'He ought to sing'

- (28) e-sa né ó-bá lá
 e- sa né o- ba lá
 3SG-be+good that 2SG-come POT sing
 'You (sg) ought to come sing'

In fact, we have found that there are only three morphemes which cause the floating H of the Potential to be deleted: the Negative marker ko, and the first person plural and second person plural pronouns wa- and ñe-.¹⁴ The behavior of the latter two is illustrated in (29) and (30):

- (29) e-sa né wa-lá
 e- sa né wa- lá
 3SG-be+good that 1PL- POT sing
 'We ought to sing'

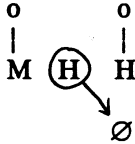
- (30) e-sa né ñe-lá
 e- sa né ñe- lá
 3SG-be+good that 2PL- POT sing
 'You (pl) ought to sing'

Furthermore, this deletion of the floating H occurs only when the main verb bears H tone. (31) and (32) illustrate the operation of regular leftward linking of the floating H to these pronouns when the verb stem is M or L, rather than H:

- (31) e-sa né wá-kpɛ
 e- sa né wa- kɛ
 3SG-be+good that 1PL- POT sew
 'We ought to sew'
- (32) e-sa né ñé-dò
 e- sa né ñɛ - dò
 3SG-be+good that 2PL- POT dance
 'You (pl) ought to dance'

At this point, we see no way to predict the loss of the Potential marker in these forms, and will tentatively write it off to lexical idiosyncrasy.¹⁵ Rule (26) can be generalized a bit, as shown in (33), but will only be triggered by this small set of morphemes.

(33) Floating H Deletion (revised)



Finally, note that (as expected) disyllabic stems behave in the same way that monosyllabic stems do; (34) illustrates the vacuous application of Floating H Metathesis, and (35) illustrates Floating H Deletion:

- (34) ǎǎlé stem: ǎǎlé
 'Rinse!'
- (35) ko ǎǎlé
 ko ǎǎlé
 NEG POT rinse
 'Don't rinse!'

This section has shown, then, that there are certain problems with the formation of the imperative of H tone stems; specifically, that instead of linking leftwards, the Potential marker is deleted when it appears after certain morphemes and before such a stem. Satisfactory resolution of these problems is beyond the scope of the present paper. The data do not contradict our claim, however, that the rule of Floating H Metathesis is operative in the formation of the imperative when the verb stem is in utterance-initial position, even when that stem has underlying H tone.

4. Conclusion

Formation of the imperative in Dangme involves placement of a floating H tone marking Potential aspect in a position immediately before the verb stem. When the stem bears M or L tone, this H tone is linked leftward to the preceding syllable if one is available. When the stem bears H tone, there is some irregularity in leftward linking of the floating H. When there is no preceding syllable for the H tone to link to, however, we have shown that a rule of Floating H Metathesis moves the floating tone to the right of the stem (no matter what tone that stem bears), thus allowing normal leftward linking. In the case of L tone verb stems, this rule must operate in conjunction with a small number of other rules, which are independently motivated by cases not involving Floating H Metathesis.

Floating H Metathesis also operates in disyllabic verb stems in which the two syllables have identical tones, but it fails to operate in disyllabic stems in which the syllables have two different tones. This falls out naturally from an autosegmental account, which requires that in the former case there be only one tonal autosegment associated with the two tone bearing units, but that in the latter case there be two. That is, autosegmental representation makes it possible to include disyllabic stems whose syllables have identical tones under our statement of the rule of Floating H Metathesis, and to exclude disyllabic stems whose syllables have two different tones, which is precisely what is needed to account for the data. A linear approach would require recourse to ad hoc stipulations in order to account for these facts, whereas their behavior is not only accounted for, but is predicted by a non-linear approach.

Finally, we would like to point out that the formation of the Dangme imperative provides an example of the relatively rare use of metathesis as a regular process that participates in expression of a grammatical category, as opposed to its rather more common function as an often irregular diachronic process by which historical change is effected.¹⁶ This case is all the more interesting in that the elements which are transposed are tones -- tone metathesis being another relatively rare phenomenon. This fact argues for the position that metathesis is a process which is not restricted solely to segments, but that it is instead a more general process with the ability to transpose various types of elements, including something as seemingly unlikely as tonal nodes.

Notes

1. Our thanks go to John Teye, a native speaker of Dangme currently residing in the United States, for his help in supplying the data used in this paper. In addition, we would also like to thank Claudia Brugman, Kathleen Hubbard, Mary Niepokuj, Joe Salmons, Ronnie Wilbur, and members of the Purdue

Linguistics Group for commenting on previous versions. All errors are of course our own.

2. Cf. Hock (1985) for discussion of the diachronic aspect, and Thompson and Thompson (1969), Okrand (1979), and Sohn (1980) for discussion of various cases of regular synchronic metathesis.

3. Cf. Ultan (1978:370).

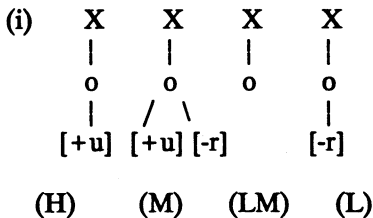
4. Goldsmith (1990:25) presents a tone metathesis rule for San Miguel El Grande Mixtec, and Maddieson (1978:352) mentions a few such cases as well (his term is "tonal displacement"). In addition, we have found mention of similar phenomena in at least a few other sources (e.g. for Nɔmaándé by Wilkendorf (1988), and for Igbo by Clark (1978)).

5. Maddieson (1978:352) notes that "tone displacement rules generally refer to location of isolated high tones," and ascribes this to the tendency for H to be the marked tone in most tone systems.

6. Abbreviations which are used in the paper are: 1,2,3 = First, second, third person, FUT = Future tense, NEG = Negative, PL = Plural, POT = Potential, SG = Singular.

Also note that example (4), as well as (8) and (12), illustrate a tone assimilation rule in which a L between a H and another L becomes M. Since this is tangential to our topic, we will just assume its operation where necessary.

7. (i) illustrates this model:



Note that in such a system either the tonal node or one of the features can undergo spreading. Rule (7) is a rule of the former type, in which the tonal node links to the left. Rule (10), the tone assimilation rule, is of the latter type; that is, it is one in which a feature spreads to the left.

8. While Dangme has a surface three tone system, data from the formation of the negative indicate that there are actually four underlying tones. The M

and LM of (i), above, are each phonetically realized as mid tone, but show different behavior with respect to negative formation (for details see Macaulay (in preparation)).

As stated in the text, Tone Assimilation operates to raise L to M before a M as well as before a H; note that our rule predicts that it would only do so before a M with the features [+u], [-r]. Whether it also operates before the other M ([-u], [+r]) is something we have yet to investigate; if it does, the formalization of this rule will have to be changed. We leave this a topic for future research.

9. It has been suggested to us that a simpler way to look at this would be to assume that a M tone stem such as ye is completely unspecified for tonal features, and that the process observed here is not linking to the right, but rather simple association of a floating tone to a toneless syllable. However, as Macaulay (in preparation) shows, only some M tone stems are of the unspecified type, while others must be fully specified (that is, the "LM" of example (i) above). Thus for approximately half of the M tone cases, this solution would not work.

10. Ultan (1978:372) distinguishes between simple metathesis, which is the transposition of one element around another (or others), and reciprocal metathesis, which is the exchange in position of two elements. Our rule of Floating H Metathesis is of the former type.

11. Note that Vowel Lengthening must be ordered before High Tone Linking in order to prevent the latter from applying to the L tone form.

12. Following Clements (1981:74-75), we will assume that a surface representation containing a floating tone is well-formed, and that such unassociated tones are not phonetically realized.

13. We have considered various ways to handle this problem, including allowing a floating H be moved into such a position, but then having it delete by a rule of Floating H Deletion (to be introduced in the next section). The solution in (23), however, seems best able to capture our sense that Floating H Metathesis respects the word boundary, and therefore cannot infix a floating H between two distinct tones.

14. Kropp Dakubu (1987:61) remarks that "the potential marker is ... not usually expressed if the verb begins with High tone." She points out cases with the first person plural pronoun wa-, but does not mention ñe-. Furthermore, her data concerning the tone of ko before H tone verb stems (1987:57) differs from ours, presumably because she is describing a different dialect (Ada).

15. Note that the fact that the three morphemes in question all have CV shape, while the 3SG prefix is simply V, is not the relevant factor: as shown in (28), the ingressive marker ba ('come') is CV, but it does not block linking of the Potential marker.

16. Cf. Hock 1986:110.16.

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