Tone Fusion in Mọ̀bà Yorùbá

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1 Introduction: Vowel Elision in Yorùbá[1]

This paper examines the effect of vowel elision on tones in the Mọ̀bà dialect of Yorùbá, a Niger-Congo language spoken primarily in Nigeria and Benin. In Yorùbá, vowel hiatus across certain morpheme boundaries causes one of the vowels to be deleted. This has been well documented for the Standard dialect (SY), most recently in Akinlabi and Liberman (2001), and in Pulleyblank (1986), but a full analysis of the process in Mọ̀bà Yorùbá (MY) has yet to be provided. Environments where deletion occurs include, but are not limited to, VPs, where a vowel final verb is followed by a vowel initial noun, and PPs, where a vowel final preposition is followed by a vowel initial noun. This paper looks at the behaviour of the tones associated with the hiatus vowels, so it begins with examples of each possible tonal environment and its output, in both dialects. Phonemically, there are 3 level tones in Yorùbá, high (H), mid (M), and low (L). Falling and rising tones only occur phonetically, as a result of tonal spread. Thus, when looking at sequences of two underlying vowels, there are nine possibilities: LL, LM, LH, ML, MM, MH, HL, HM, and HH. Three of these possibilities, LH, MH, and HH, do not occur, because there are no underlying H tone initial, vowel-initial nouns in Yorùbá.

			L		**L**		**L**	
LL	SY	(1)	kà	+	ĩwé	→	kàwĕ 'read'	(Pulleyblank, 1986, p.117)[3]
	MY	(2)	tà sell	+	ẹ̀fọ́ vegetables	→	tẹ̀fọ̌ 'sell vegetables'	244J
			L		**M**		**M**	
LM	SY	(3)	jà	+	olè	→	jalè 'steal'	(Pulleyblank, 1986, p. 117)
	MY	(4)	tà sell	+	ata pepper	→	tata 'sell pepper'	357J

[1]All sentences, unless otherwise stated, were provided by Standard and Mọ̀bà speaker Ọládiípọ̀ Ajíbóyè, to whom I am very grateful for help and who provided the puzzle. I would also like to thank Rose-Marie Déchaine, Madeleine Wade, Gunnar Hansson, Michelle Huang, Xianghua Wu, class members of 2004 UBC course LING 432/532, participants of the 35th ACAL, and anonymous reviewers for their comments and suggestions. This paper is the result of a fieldwork class taken by the author at the University of British Columbia.

[2] Examples are given in the Yorùbá orthography. A dot under a vowel indicates a retracted vowel and a syllable final 'n' indicates that the preceding vowel is nasalised. Thus, (10) below is still an example of vowel hiatus, since yún is an open syllable.

[3] Morpheme glosses for SY have not been provided when they are not provided in the original source, or when the gloss is the same as that of the corresponding MY phrase.

 Selected Proceedings of the 35th Annual Conference on African Linguistics, ed. John Mugane et al., 158-168. Somerville, MA: Cascadilla Proceedings Project.

			M		**L**		**L**			
ML	SY	(5)	jọ	+	àjẹ́	→	jàjẹ̌			(Akinlabi & Liberman, 2001, p. 10)
	MY	(6)	jọ	+	àjẹ́	→	jàjẹ̌			249J
			resemble		witch		‘resemble a witch’			
			M		**M**		**M**			
MM	SY	(7)	mu	+	ẹmu	→	mẹmu			(Pulleyblank, 1986, p. 116)
	MY	(8)	mu	+	ẹmu	→	mẹmu			240J
			drink		palm wine		‘drink palm wine’			
			H		**M**		**H**			
HM	SY	(9)	rí	+	igbá	→	rígba			(Pulleyblank, 1986, p. 109)
			see		calabash		‘see a calabash’			
	MY	(10)	yún	+	oko	→	yóko			66J
			go		farm		‘go to a farm’			

The sequence HL is missing from the above list. It will be dealt with at length in the following sections. As shown above, MY and SY behave identically with respect to tone in the environments exemplified thus far. When the sequence is HL, they do not.

2 Standard Yorùbá HL Vowel Elision

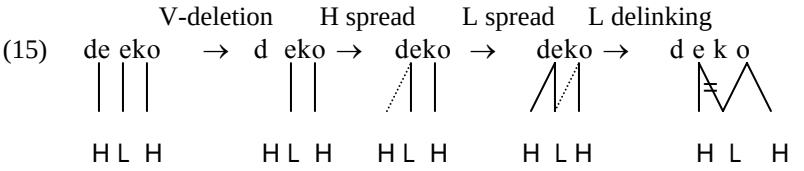
When the two hiatus vowels bear the tones H and L respectively underlyingly, the resulting tone is always H in SY:

	H		**H**		**L**		H	**H**		
(11)	ó	+	dé	+	èkó	→	ó	dékǒ		175Ja
	3sg		arrive		Lagos		‘He/she is arriving in Lagos.’			
	M		**H**		**L**		M	**H**		
(12)	mo	+	dé	+	èkó	→	mo	dékǒ		173Ja
	1sg		arrive		Lagos		‘I’m arriving in Lagos.’			
			L	**H**	**L**			L	**H**	
(13)	mo	+	kò	+	dé	+èkó	→	n kò	dékǒ	179Ja
	1sg		NEG		arrive	Lagos		‘I’m not arriving in Lagos.’		
	#		**H**			**L**		**H**		
(14)			ní	+		àná	→	lánǎ…		355J
			Prep			yesterday		‘By yesterday...’		

Notice that the output is always H, no matter what the preceding tone, or even if there is no preceding tone. This will be seen as relevant to the discussion of MY below.

Pulleyblank’s (1986) autosegmental analysis for this result is that the H tone of the verb, left floating when its vowel is deleted[4], spreads onto the following syllable, and the L tone is delinked. I have adapted his analysis for the example in (15).

[4] Relevant here is that it is usually, but not always, the first vowel of hiatus that is deleted. See Bamgboṣe (1966) for discussion of Yorùbá vowel elision, and Casali (1997) for a cross-linguistic analysis.



Although the L tone is delinked, its presence is still felt, as it spreads onto a following H tone, creating a rising contour tone on the last syllable: *dékǒ*. This is a standard effect in both dialects, occurring whenever a L tone precedes a H tone within a morpheme.

3 Mọ̀bà Yorùbá HL Vowel Elision

3.1 Effects of Elision on HL Sequences in Different Tone Environments

In Mọ̀bà Yorùbá, when a H tone verb is followed by a L tone initial noun, there are some situations where a H tone results (like in SY), and some where instead a M tone surfaces. The factor that decides which of these routes is taken is the quality of the preceding tone. Below are each of the environments, paralleling examples (11)-(14) of SY, but this time with two examples of each, where available, in MY.

Preceded by a H tone:

			H		**H**		**L**		H **H**	
(16)	mǐ	+	yọ́	+	dé	+	èkó	→	mǐ yọ́ dékǒ	216J
	1sg		can		arrive		Lagos		‘I can arrive in Lagos.’	
			H		**H**		**L**		H **H**	
(17)	Adé	+	HTS[5]	+	ní	+	ẹ̀bà	→	Adé lẹ́bà	326J
	Ade				have		eba		‘Ade has eba.’	

Preceded by a M tone:

			M		**H**		**L**		M **M**	
(18)	mǐ	+	ti	+	dé	+	èkó	→	mǐ ti dekǒ	214J
	1sg		PERF		arrive		Lagos		‘I have arrived in Lagos.’	
			M		**H**		**L**		M **M**	
(19)	Adé	+	ti	+	ní	+	ọ̀bẹ́	→	Adé ti lọbẹ	348J
	Ade		PERF		have		knife		‘Ade has gotten a knife.’	

Preceded by a L tone:

			L		**H**		**L**		L **M**	
(20)	mǐ	+	kè	+	dé	+	èkó	→	mi kè dekǒ	179Jb
	1sg		NEG		arrive		Lagos		‘I’m not arriving in Lagos.’	
			L		**H**		**L**		L **M**	
(21)	Adé	+	kè	+	ní	+	èrè	→	Adé kè lere	344J
	Ade		NEG		have		image/ statue		‘Ade doen’t have an image/statue.’	

[5] HTS stands for High Tone Syllable, and has been argued a subject agreement marker by Déchaine (1992). Although its function and form are not discussed here, it is important to notice that it affects the following HL sequence as does a normal H tone.

Sentence-initial:

	#	**H**		**L**		**M**	
(22)		ní	+	àná …	→	lanǎ…	353J
		PREP		yesterday		'By yesterday...'	

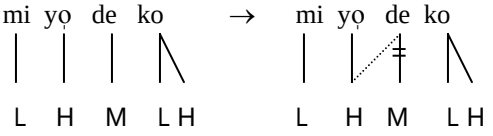
The only environment where MY seemingly behaves like SY is when the HL hiatus vowels are preceded by a H tone. When preceded by other tones, and, crucially, when in sentence initial position, the HL sequence surfaces as a M tone.

3.2 H Tone Spread in Mọ̀bà Yorùbá

Pulleyblank's (1986) analysis of SY will not fully account for the MY data. However, first I will consider whether it can account for the cases where the two dialects behave identically. When considered in isolation, examples (16) and (17), which look like SY, appear to result from the H tone spread and delinking that occurs in SY. But none of the other forms undergo such a process. Why? These two examples are marked in MY, and there is no reason they should undergo spreading and delinking while the other examples do not.

What makes (16), for example, special is the H tone on *yọ́*, so it must be that this H tone is causing the H tone on the next syllable. This can most easily be accounted for by positing H tone spread, from *yọ́* onto *de*. However it is that the M tone on *de* arises, it is usurped by the H tone, and delinks from its mora[6]. (23) shows this process, starting partway through the derivation, when the M tone has already been created.

(23)



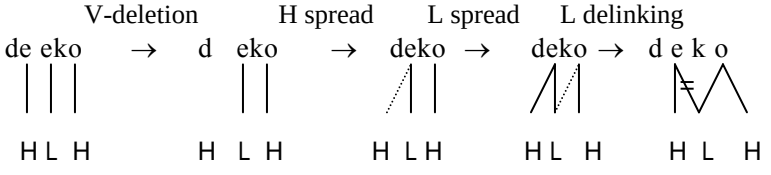
3.3 Predicted Outcomes of a HL Sequence

The situation of HL vowel elision is one where a ratio of two tones to two moras changes to a ratio of two tones to one mora. At some point in the derivation, there is a H tone and a L tone, and only one mora with which to associate. In such a situation, there are three logical outcomes:

1. H + L → H (delinking of L) dékǒ

This is what occurs in SY, shown in Pulleyblank's (1986) analysis, repeated here:

(15)

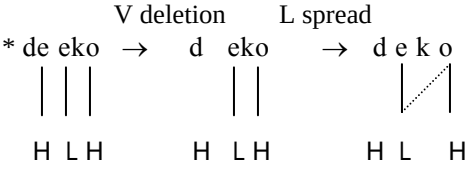


2. H + L → L (H left floating) *dèkǒ

This is not attested in Yorùbá, but would look like (24):

[6] I am assuming, following Pulleyblank (1994), that the tone -bearing unit in Yoruba is the mora, and that each short vowel is monomoraic. As an abbreviation, the moras are left out in these diagrams, and tones are linked directly to vowels.

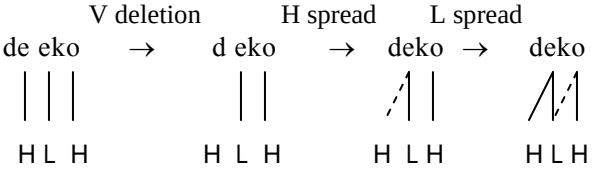
(24)



3. H + L → HL (creation of a contour tone) ?dêkǒ

This process occurs before a M tone in some dialects of Yorùbá (Akinlabi & Liberman, 2001, p. 10). It also occurs in some other languages; Ephali Etsako (Akinlabi, 1995) and Lulubo (Andersen, 1987) are two examples. This is how an analysis would look for Yorùbá:

(25)



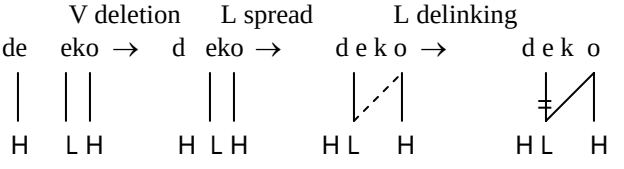
None of these three logical outcomes is the attested outcome for MY. What I wish to determine is where the M tone comes from.

I first consider one hypothesis: the delinking of both H and L. Moras bearing mid tones on the surface have been argued by Pulleyblank (1986) to be underlyingly toneless. Therefore, a M tone could also result from loss of tone. After showing an analysis of tone loss to be flawed, I will offer my analysis of the M tone as resulting from fusion of the H tone and the L tone, and show this derived M tone to be phonologically distinct from a regular M tone.

4 Loss of Tone Hypothesis

M tones have been argued to result from underlying tonelessness. H and L tones in Yorùbá are lexically specified, and if a mora is not specified for tone, it will surface, unless otherwise affected, as a M tone. It seems appropriate, therefore, that a loss of tone would also result in a phonetic M tone. Thus, it can be argued that, in the cases of elision discussed in this paper, both the H tone and the L tone are delinked from the hiatus vowels so that the remaining vowel surfaces with a M tone in MY. In the example below, it is V_1, the first vowel in the hiatus, which is deleted, so the L tone is delinked, and the H tone is simply left floating.

(26)



There are a couple of problems with this hypothesis. First, it is not clear what the motivation would be for delinking the L tone. Sometimes, a L tone is delinked because a tone has spread onto its mora, as in the H tone spread and subsequent L tone delinking of SY in (15). Here, there is no tone to usurp the L tone. Another possible reason for the delinking of the L tone here is that it has spread onto the following mora, and no longer needs its original mora as a host. That cannot be true, because L tone spread onto a following H tone applies across the board, and does not normally require the L tone to be delinked. An example is below.

(27)

		L H		L LH	
jọ	+	àjẹ́	→	jàjẹ̌	
resemble		witch		resemble a witch	(Akinlabi and Liberman, 2001, p. 10)

In this example, the L tone spreads onto the following mora, creating a contour tone, but it also remains linked to its original mora. Therefore, there is no apparent motivation for the delinking of the L tone in (26).

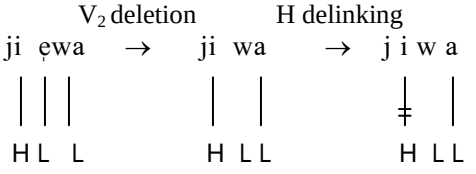
The opposite problem arises when we look at examples of V_2 deletion:

(28)	jí	+	ẹ̀wà	→	jiwà
	steal		beans		to steal beans

128J

Sometimes, the second hiatus vowel, which is underlyingly associated with the L tone, is deleted. Then, according to this hypothesis, there would be delinking of the H tone, and the L tone would be left floating. In such a situation, there is no apparent motivation for delinking of the H tone.

(29)



Even if there were motivation for these delinkings, it is not very likely that two separate processes are at work, one for V_1 deletion and the other for V_2 deletion. Since a M tone is created in either case, it is better to find one process that accounts for the M tone formation.

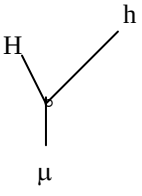
5 Tone Fusion Analysis

A mid tone is phonetically in between a H tone and a L tone, so an alternate analysis, and the one argued for in this paper, is that the surface M tone results from fusion of the H and L tones.

5.1 Snider's Tonal Feature Geometry

In order to properly explain tone fusion, we must look closer at tones, zooming in to the level of tone features. There have been several proposals for tonal feature geometries (see Bao (1999) for a list), but the one used here is from Snider (1999). First I will give a brief outline of his model. Snider's geometry of tone consists of four autosegmental tiers, shown in (30) below.

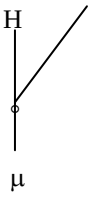
(30)

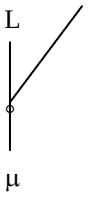


Register Tier
Tonal Tier
Tonal Root Node Tier
Tonal-bearing Unit Tier

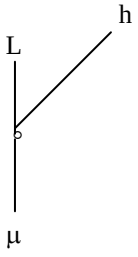
Each tier forms a separate plane, allowing features on the register tier and tonal tier to spread independently of one another. The tone-bearing unit here is the mora, and the register tier and tonal tier contain the features which specify the quality of a tone. The register of a tone is the pitch range in which the tone is uttered, with respect to the previous mora's register. A lower case "h" denotes a higher register than the previous one, and a lower case "l" a lower one. The tonal tier specifies the pitch of the tone relative to its register. A capital "H" denotes a relatively high pitched tone, and a capital "L" a relatively low pitched tone (Snider, 1999, pp. 22-23).

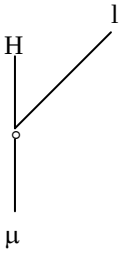
Snider (1999) gives the following geometries for H tones and L tones:

(31) H tone: 

L tone: 

There are two possibilities for the geometry of a M tone:

(32) 



(Snider, 1999, p. 24)

In the next section, I will discuss which of these is to be used for the regular M tone in Yorùbá.

5.2 Pulleyblank's (1986) Tone Features for Yorùbá

Pulleyblank (1986) uses Yip's (1980) tonal geometry to account for SY. The geometry is quite different from Snider's, but uses register features which parallel Snider's features: [+/- upper] are parallel to [h] and [l]. [+/- raised] are subregister features which are similar to Snider's [H] and [L] tonal features. Pulleyblank proposes that the tones appear as follows underlyingly in SY:

(33)
H	L
[+upper]	[-raised]

(Pulleyblank, 1986, p. 126)

M tones are, as mentioned previously, not present underlyingly. There are then two default rules, which apply to create the three surface level tones.

(34) V → V
|
[-upper]

(35) V → V
|
[+raised]

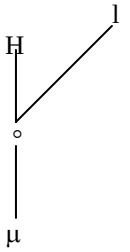
(Pulleyblank, 1986, p. 126)

Since H tone is already specified for [upper], only (35) applies to it, resulting in the correct [+upper][+raised]. L tone, on the other hand, is already specified for [raised], so only rule (34) applies, resulting in [-upper][-raised]. Any mora without a tone will be subject to both (34) and (35), and the M tone [-upper][+raised] will be present on the surface (p. 126):

(36) V → M
|
[-upper]
[+raised]

If Pulleyblank's (1986) analysis of M tone formation (36) is translated into Snider's tone feature geometry, the idea of a default lower register [l] and a default high tonal feature [H] will result in the following representation of a surface M tone resulting from underlying tonelessness:

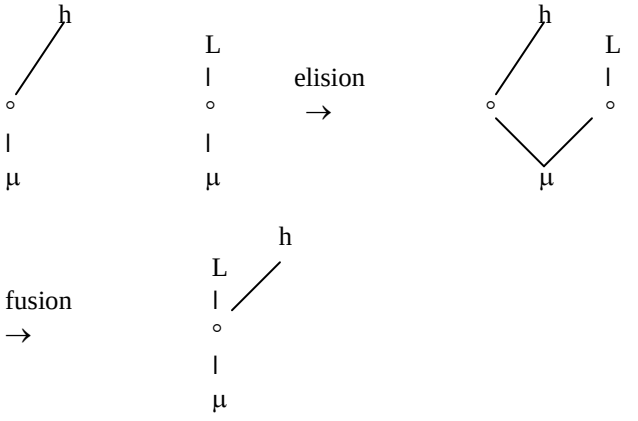
(3)



5.3 A Model of Tone Fusion

It is possible to use Snider's geometry of tone to give a representation of the fusion of a H tone and a L tone. In the case of fusion, two tones that are underlyingly associated with two separate vowels, in two separate morphemes, compete for one vowel (one mora) on the surface. If the tone specifications from 5.2 are followed, an underlying H tone followed by an underlying L tone will appear as in (38). The H tone is specified as h on the register tier and the L tone is specified as L on the tonal tier. When vowel elision occurs, the tonal root nodes of these two tones are fused, resulting in a M tone that has L on the tonal tier and h on the register tier.

(38)



This is the second possibility for a M tone's feature geometry; it is opposite to that proposed in 5.2 for the surface default M tone resulting from tonelessness. The derived M tone of this paper is indeed the opposite of the toneless M tone. While the latter is a default, unmarked tone, only occurring when no tonal features are expressed underlyingly, the former is highly marked, occurring only in situations of vowel elision. This idea of two distinct M tones will be explored in 6.1.

As with the previous hypothesis, the L tone spread onto the final H tone must occur before fusion, to derive the grammatical LH contour on the last syllable, rather than a MH contour.

There are two important ways in which this analysis is better than the previous analysis of tone loss. First, fusion does not require any unmotivated delinking of tones. Second, it nicely accounts for the identical behaviour of V_1 deletion and V_2 deletion. With the tone loss analysis, the two situations called for different solutions: if V_1 is deleted, the L tone delinks and the H tone is left floating, while if V_2 is deleted, the H tone delinks and the L tone is left floating. In the fusion analysis outlined in this section, the process is the same no matter which vowel is deleted.

There are also cases where, instead of vowel elision, vowel coalescence occurs, as documented for SY by Awobuluyi (1984). An example from Awobuluyi is below.

(39) ogún + èjĭ → ogójĭ
twenty two forty

This is a SY example, but if MY behaves similarly (but with M tone on the second *o*), the tonal fusion analysis works perfectly. The tone loss analysis would require yet another process to derive this result.

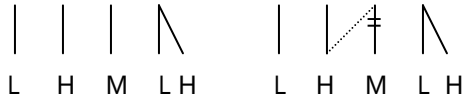
6 Two Mid Tones

6.1 Two Mid Tones in Mọ̀bà Yorùbá

According to the fusion analysis, there are two different M tones: the derived M tone (created by fusion), and what will henceforth be called the natural M tone (resulting from underlying tonelessness). Bao (1999), whose geometry is similar to Snider's, argues that, for certain languages at least (the Chinese dialects Gao'an and Xiamen), there are two M tones, one underlying and the other derived, which are phonetically identical but differ phonologically[7]. This idea is in line with the two separate phonological M tones that have come out of sections 5.2 and 5.3 in my analysis of MY.

There is some evidence to support the idea of a different phonological representation for the natural and derived M tones; the two do not behave the same way phonologically. Recall (section 3.2) that a preceding H tone spreads onto a following derived M tone, resulting in the anomalous MY forms of sentences (16) and (17). I have repeated the H tone spread analysis for MY below.

(23) mi yọ de ko → mi yọ de ko



As shown in (23), a H tone spreads onto a following derived M tone. However, a H tone does not spread onto a following *natural* M tone. In section 3, it was shown that when the two hiatus vowels bear L and M tones respectively, the surface tone is M. When this sequence is preceded by H tone *yọ́*, the H tone does not spread.

	L	**M**		**M**		
(40)	tà	ata	→	tata		(358J)
	sell	pepper		to sell pepper		
		H	L	**M**	**H M**	
(41)	mĭ	yọ́	tà	ata	→ mĭ yọ́ tata	(358J)
	1sg	can	sell	pepper	I can sell pepper.	

The different phonological behaviour of the derived M tone and the natural M tone can be explained if they really are two different phonological tones, [h, L] and [l, H], respectively.[8]

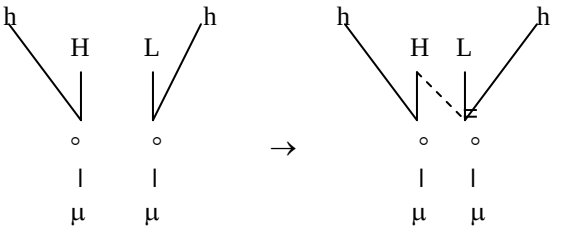
6.2 Reanalysis of H Spread in Mọ̀bà Yorùbá

Assuming the above features for M tones, the puzzle of the selective H tone spread shown in 3.2 can be solved. The apparent H tone spread can be analysed as spread of the feature [H] onto the following M tone.

[7] See Bao (1999) pp. 184-188 for arguments

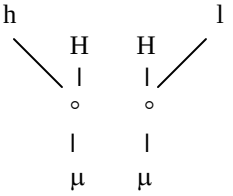
[8] It is not possible at this stage to see whether the two M tones also differ phonetically, as recording and acoustic analysis have not been done by the author.

(41)



The reason that the natural M tone is not affected is that it already bears the feature [H], so any spread would be redundant.

(42)



7 Conclusion

When vowel hiatus is resolved by vowel elision in Mọ̀bà Yorùbá, a sequence of H and L tones surfaces as a M tone, except when the hiatus vowels are preceded by a H tone. Then, the resulting tone is H. I have argued that the M tone results from fusion of the H and L tones. This derived M tone differs from a natural M tone in that it is affected by a preceding H tone, while a natural M tone is not. I propose that the two M tones, while identical phonetically (at least to the ear), differ phonologically in which features they consist of, one being [l, H] and the other [h, L]. Translating Pulleyblank's (1986) default rules for SY tones into Snider's (1999) feature geometry, I have assumed that the natural M tone results from default [l] and [H] features, while the derived M tone results from the lexically specified [h] and [L] features of the H and L tones participating in fusion. When the derived M tone is preceded by a H tone, the tonal tier [H] feature of the H tone spreads onto the M tone, and the [L] feature of the M tone is delinked. The spread of [H] onto a natural M tone is redundant, so the M tone remains unaffected.

This paper has followed some earlier works on tone, such as Pulleyblank (1986), Yip (1980, 1989), and Snider (1999) in presenting tone in an autosegmental framework. The analysis presented is derivational, but the idea of tone fusion could also be presented within a non-derivational, constraint-based approach such as Optimality Theory. This paper is intended as a presentation both of an interesting phenomenon in Mọ̀bà Yorùbá and of the idea of tonal fusion, which will hopefully serve as a base for further analysis of the tonal phonology of this dialect. Another area for future research is an acoustic study of the two mid tones in MY. If the two tones differ phonetically, it will add credence to the claim that they differ phonologically.

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