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# Tone Specification in Leggbo\*

Mary Paster  
University of California, Berkeley

## 1 Introduction

Like many West African languages, Leggbo, an Upper Cross language spoken in Nigeria, exhibits a three-way surface tonal contrast among H(igh), M(id), and L(ow). Pulleyblank (1986) claimed that in languages with a H-M-L surface contrast, /H/ and /L/ are phonologically specified with M unspecified and assigned by default (as in, for example, Pulleyblank (1986) and Akinlabi (1984) for Yoruba). Assuming the correctness of these analyses, is this really a universal? Do universal tone features and default tones dictate that M is always the default tone in three-tone languages? Or, as Hyman (2001) asks, can there be three-tone languages where M is specified and where some other tone is the default value?

In this paper, I argue that Leggbo is one such language. As I will show, Pulleyblank's (1986) arguments for default M in Yoruba do not apply to Leggbo. The M tone in Leggbo is phonologically active and should not be analyzed as unspecified. Furthermore, as I will demonstrate, there is evidence suggesting that if any tone is unspecified in Leggbo, the L tone is the most likely candidate. Because Leggbo differs from the Yoruba-type three-tone languages in terms of its underlying tones and default surface tone, the choice of the unmarked tone in three-tone languages cannot be a universal: it is a language-specific choice.

### 1.1 The tone system of Leggbo

As shown in (1), there is a two-way surface tonal contrast on verb roots<sup>1</sup>.

(1)	M-toned roots	L-toned roots
CV	bá dzi 'they will eat'	bá s̀ 'they will make/do'
	ba dzi 'they ate'	ba s̀ 'they made/did'
	bà dzi 'and they ate'	bà s̀ 'and they made/did'
CVN	bá tɔɔm 'they will send'	bá nùm 'they will take'
	ba tɔɔm 'they sent'	ba nùm 'they took'
	bà tɔɔm 'and they sent'	bà nùm 'and they took'

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<sup>1</sup> H tone is indicated with an acute accent, L with grave accent, and M with no diacritic.

CVC-V	bá man-a	'they will hold'	bá fin-a	'they will touch'
	ba man-a	'they held'	ba fin-a	'they touched'
	bà man-a	'and they held'	bà fin-a	'and they touched'

As will be discussed, the data in (1) point us towards leaving one of the three surface tone values unspecified, since only two of them contrast on verb roots. However, as shown in (2), all three tone values contrast on noun roots<sup>2</sup>.

(2)	<b>H prefixes</b>	<b>H-toned roots</b> ákpá íkon 'shoe'	<b>M-toned roots</b> lí-dzil 'food' á-kpan 'plate'	<b>L-toned roots</b>
	<b>M prefixes</b>	lɛ-jál 'sacrifice'	lɛ-val 'race'	lɛ-gbàl 'time'
		e-kpón 'mountain'	e-wa 'lightning'	e-pà 'hawk'
	<b>L prefixes</b>	lè-tál 'stone'	lè-ttol 'head'	lè-sàl 'tooth'
		è-dzé 'yam'	è-kɔ 'bone'	è-kkà 'mother'

In section 2.1, we will see that some of these tone contrasts are neutralized in nouns in the genitive construction, and I will show how this phenomenon constitutes further evidence for specified M tone.

## 2 Criteria for tonal markedness

Several criteria for determining underlyingly specified vs. unspecified tones point to specified M tone, and some suggest L as the default tone in Leggbo. Maddieson (1978) cites prominence in assimilatory processes as an indicator of specified tones. As will be shown, there is a tone rule in the genitive construction that is analyzable as an assimilatory process, and it is the M tone that spreads by this rule. Unlike Yoruba, Leggbo has neither High Tone Spreading (HTS) nor Low Tone Spreading (LTS), but only (what I analyze as) Mid Tone Spreading (MTS). Thus, the application of this criterion gives us an argument in favor of specified M, but tells us nothing about whether there is an unspecified value, since both L and H cannot be unspecified.

Hyman (2001) adds floating tones and tonal distribution as criteria for tonal markedness. Application of these criteria has somewhat conflicting results: as analyzed by Hyman et al. (2002), some inflectional and derivational markers on verbs consist of floating L and H tone 'particles,' suggesting that both L and H are available underlyingly in addition to M. However, evidence from tonal distribution is suggestive of underlying H and M with L as the unspecified, default tone: as I will show, L alternates with M on noun prefixes and with H on verb roots. The fact that L is the target in both cases can be explained if we assume that L is underlyingly unspecified, though as we will see, this assumption is not unproblematic. In this paper, I weigh the advantages of the two potential analyses suggested above: on the one hand, an underlying H-M-L contrast mapping to a surface H-M-L contrast; on the other hand, an underlying H-M-Ø contrast

<sup>2</sup> Nouns with H-toned prefixes are not common. There are no H-L nouns, and the only H-H noun is the one given in (2), the first word of the compound word meaning 'shoe'.

corresponding to surface H-M-L, with L being filled in by default after all morphological tone assignments and phonological rules affecting tone are carried out.

### 2.1 M-tone spreading

The genitive (or ‘associative’) construction is composed of N1(possessed) + *awa* (associative marker)<sup>3</sup> + N2(possessor), as in (3). Note that in (3), no tonal alternations take place: each word surfaces with the same tones that it has in isolation when the prefix of N2 is M or H, regardless of the final tone of N1.

(3)	<b>N2 has /M-H/</b>		<b>N2 has /M-M/</b>
	sìn (awa) e-kpón	‘hair of mountain’	sìn (awa) e-wa ‘hair of lightning’
	è-kɔ (awa) e-kpón	‘bone of mountain’	è-kɔ (awa) e-wa ‘bone of lightning’
	li-kól (awa) e-kpón	‘mat of mountain’	li-kól (awa) e-wa ‘mat of lightning’
	sìn (awa) le-jál	‘hair of sacrifice’	sìn (awa) le-val ‘hair of race’
	è-kɔ (awa) le-jál	‘bone of sacrifice’	è-kɔ (awa) le-val ‘bone of race’
	li-kól (awa) le-jál	‘mat of sacrifice’	li-kól (awa) le-val ‘mat of race’
	<b>N2 has /M-L/</b>		<b>N2 has /H-M/</b>
	sìn (awa) ghi-tù	‘hair of lizard’	sìn (awa) lí-dzil ‘hair of food’
	è-kɔ (awa) ghi-tù	‘bone of lizard’	è-kɔ (awa) lí-dzil ‘bone of food’
	li-kól (awa) ghi-tù	‘mat of lizard’	li-kól (awa) lí-dzil ‘mat of food’
	sìn (awa) e-pà	‘hair of hawk’	sìn (awa) á-kpaŋ ‘hair of plate’
	è-kɔ (awa) e-pà	‘bone of hawk’	è-kɔ (awa) á-kpaŋ ‘bone of plate’
	li-kól (awa) e-pà	‘mat of hawk’	li-kól (awa) á-kpaŋ ‘mat of plate’

As shown in (4), however, if the prefix of N2 has L tone in isolation, it surfaces with M tone (again, regardless of the final tone of N1) in the genitive.

(4)	<b>Nouns with L-H in isolation</b>	<b>L-H → M-H as N2 in genitive</b>
	h-tsól ‘ear’	vvóm (awa) li-tsól ‘something of ear’
		lè-ttol (awa) li-tsól ‘head of ear’
	è-dzé ‘yam’	sìn (awa) li-tsól ‘hair of ear’
		vvóm (awa) e-dzé ‘something of yam’
		lè-ttol (awa) e-dzé ‘head of yam’
	ŋ-kó á-kawà ‘coconut’	sìn (awa) e-dzé ‘hair of yam’
		vvóm (awa) ŋ-kó á-kawà ‘s.t. of coconut’
		lè-ttol (awa) ŋ-kó á-kawà ‘head of coconut’
		sìn (awa) ŋ-kó á-kawà ‘hair of coconut’

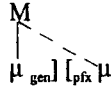
<sup>3</sup> In each of these examples, the genitive marker *awa* is optional – it is obligatory only when N2 has no prefix. In all cases, including where the marker is obligatory, *awa* is in free variation with the reduced *a*.

Nouns with L-L in isolation		L-L → M-L as N2 in genitive	
lè-sàl	'tooth'	v̀vóm (awa) lè-sàl	'something of tooth'
		lè-ttol (awa) lè-sàl	'head of tooth'
		sìn (awa) lè-sàl	'hair of tooth'
è-kkà	'mother'	v̀vóm (awa) è-kkà	'something of mother'
		lè-ttol (awa) è-kkà	'head of mother'
		sìn (awa) è-kkà	'hair of mother'
ɲ-gwù	'bribe'	v̀vóm (awa) ɲ-gwù	'something of bribe'
		lè-ttol (awa) ɲ-gwù	'head of bribe'
		sìn (awa) ɲ-gwù	'hair of bribe'

The fact that M tone spreads from *awa* to a following noun prefix suggests that M is a phonologically active element that should not be analyzed as unspecified. As mentioned above, *awa~a* is optional in all of these examples. Regardless of the presence of *awa~a*, the same tonal effect applies to the prefix of N2. I assume that the M tone of *awa* is left behind when *awa* is omitted; therefore, the process is still one of assimilation to the M of the genitive. One could maintain that M is unspecified and that the rule responsible for the alternation in the genitive is one of L-tone delinking, but there is no phonological reason why a L tone should be deleted following a toneless element. The tone change could be seen as a morphological rule that removes the tone of the N2 prefix in the genitive, but one would then have to explain why H-toned prefixes do not also lose their tone in this position.

To account for why 'L-toned' prefixes undergo this change in the genitive while H-toned prefixes do not, one could assume that prefixes that surface as L-toned in isolation are underlyingly toneless and get M in the genitive by a rule that spreads M onto a following toneless mora, depicted in (5).

(5) **Genitive M Tone Spreading (MTS)**



The rule in (5) applies as illustrated in (6). As shown in (6a), MTS applies to 'L-toned' prefixes because they are underlyingly toneless. H-toned prefixes, shown in (6b), have underlying H and do not undergo the rule<sup>4</sup>.

<sup>4</sup> An alternative would be to say that M spreads onto N2 prefixes in the genitive, and that H prefixes, which are uncommon, are not actually prefixes. This would eliminate the need to claim that surface-L prefixes are toneless. However, although H prefixes are not common, they are perfectly well-behaved prefixes in the genitive, since an N2 with a H prefix does not obligatorily take *awa*, as shown in the forms (3).

- (6) a. **M spreads to toneless prefix**                      b. **M does not spread to H prefix**
- |                 |                   |
|-----------------|-------------------|
|                 |                   |
| [sìn awa e-dzé] | [sìn awa lí-dzil] |

Note that this rule is specific to the genitive. A preceding M tone from words other than *awa* does not spread to a following noun prefix, as shown in the forms below:

- (7) **L-H nouns**                      **L-L nouns**
- |                  |                   |             |                  |
|------------------|-------------------|-------------|------------------|
| e-de ñ-tóól      | ‘it is an ear’    | e-de lè-sàl | ‘it is a tooth’  |
| e-de è-dzé       | ‘it is a yam’     | e-de è-kkà  | ‘it is a mother’ |
| e-de ñ-kó á-kawà | ‘it is a coconut’ | e-de ñ-gwù  | ‘it is a bribe’  |

Furthermore, it is not the case that the tone change always applies to the second of two nouns. For example, the prefix tone of a direct object does not raise following an indirect object (8).

- (8)
- |                    |                             |
|--------------------|-----------------------------|
| e nii wàhé lé-sàl  | ‘he gave the child a tooth’ |
| e nii wàhé lè-ttol | ‘he gave the child a head’  |
| e nii wàhé è-dzé   | ‘he gave the child a yam’   |

Note also that the M tone spreads only onto a prefix. No tone change applies to an N2 that has no prefix, as shown in (9).

- (9) **Prefixless nouns in isolation**                      **No tone change in genitive**
- |                    |             |               |                     |
|--------------------|-------------|---------------|---------------------|
| vvóm               | ‘something’ | sìn awa vvóm  | ‘hair of something’ |
| dze                | ‘crocodile’ | sìn awa dze   | ‘hair of crocodile’ |
| ddèn               | ‘eye’       | sìn awa ddèn  | ‘hair of eye’       |
| sìn                | ‘hair’      | sìn awa sìn   | ‘hair of hair’      |
| wàdúm <sup>5</sup> | ‘man’       | sìn awa wàdúm | ‘hair of man’       |

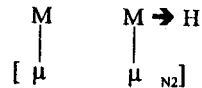
A second tone change in the genitive applies to L-M nouns. As shown in (10), nouns that are L-M in isolation surface in the genitive not as M-M, as would have been predicted given only the rule described above, but as M-H.

<sup>5</sup> This is part of a class of nouns whose first syllables resemble prefixes but apparently have been ‘frozen’ as part of the root. Like prefixless nouns, these obligatorily take *awa* and do not undergo a tone change in the genitive.

(10) <b>L-M nouns in isolation</b>	<b>L-M nouns surface as M-H in genitive</b>
lè-ból 'handle'	vvóm (awa) lè-ból 'something of handle'
	le-ttól (awa) lè-ból 'head of handle'
lè-ttol 'head'	sìn (awa) lè-ból 'hair of handle'
	vvóm (awa) le-ttól 'something of head'
	le-ttól (awa) le-ttól 'head of head'
	sìn (awa) le-ttól 'hair of head'
è-kó 'bone'	vvóm (awa) è-kó 'something of bone'
	le-ttól (awa) è-kó 'head of bone'
	sìn (awa) è-kó 'hair of bone'
ḡ-kwó 'weekday'	vvóm (awa) ḡ-kwó 'something of weekday'
	le-ttól (awa) ḡ-kwó 'head of weekday'
	sìn (awa) ḡ-kwó 'hair of weekday'

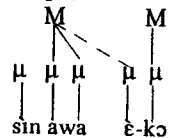
I analyze this as a construction-specific dissimilation of adjacent M tones in the genitive. The fact that adjacent M tones dissimilate can be taken as further evidence that M tone is not an unspecified, default tone in Leggbo, but is rather a specified, phonologically active tone in the system. As shown below, when the rule in (5) produces adjacent M tones on N2, a later rule of dissimilation changes the second M to H.

(11) **Genitive M-M dissimilation**<sup>6</sup>

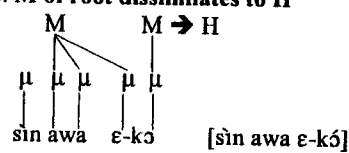


The application of the rules in (5) and (11) is demonstrated in (12). First, MTS applies to the prefix of the underlyingly L-M N2, producing a M tone on the prefix (12a). Then the adjacent M tones trigger dissimilation, causing the N2 root tone to change to H (12b). The end result is [M-H] on N2.

(12) a. **M spreads to toneless prefix**



b. **M of root dissimilates to H**

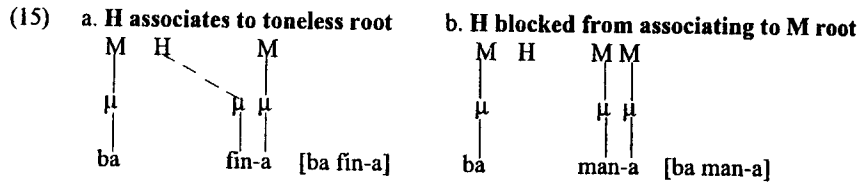


Another interesting aspect of the M~H alternation is that in trisyllabic L-M-M nouns, only the first of the two M tones dissimilates to H when the L-toned prefix changes to H.

<sup>6</sup> Note that the dissimilation rule applies only when there are two distinct instances of M; it does not apply to nouns that are underlyingly M-M. I assume that prior to the application of M-M dissimilation, the two M tones of an underlyingly M-M noun fuse into a single M, so that the condition triggering M-M dissimilation is not met.



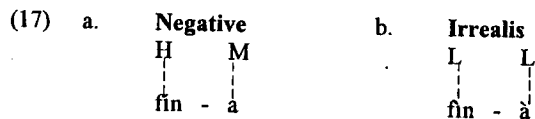
The pattern in (14) can be understood if we assume that the L~H roots in (14a) are underlyingly toneless, while the roots in (14b) have underlying M. As illustrated in (15a), under this analysis, grammatical tone associates to and is realized on the toneless roots, but in (15b), the underlying M of the M-toned root blocks the association of the grammatical tone, so the grammatical tone is not realized.



To account for the L~H pattern in (14a), Hyman et al. (2002) propose inflectional 'particles', consisting of H and L grammatical tones, and a system of 'overrides' that determine which grammatical tone surfaces when multiple inflectional morphemes are combined and compete for realization on the verb. The overrides cannot be explained completely phonologically, since H and L override each other differently depending on the sources of the grammatical tones. For example, focusing on root tones, as in (16), what I call 'toneless' roots have L-L on the stem (root + suffix) in the irrealis and H-M in the negative, and when a verb is inflected for both irrealis and negative, it has L-L.

(16) Negative (H-M)	bè àà fin-a	'they did not touch'
	bè àà bbál-a	'they did not remember'
	bè àà vìl-i	'they did not cut'
Irrealis (L-L)	bá fin-à	'they will touch'
	bá bbàl-à	'they will remember'
	bá vìl-ì	'they will cut'
Negative+Irrealis (L-L)	bè ààá fin-à	'they will not touch'
	bè ààá bbàl-à	'they will not remember'
	bè ààá vìl-ì	'they will not cut'

The illustrations in (17) schematize how the grammatical tones are realized. In the negative (17a), the H-M grammatical tones associate to the toneless root and suffix, producing H-M. In the irrealis (17b), the L-L grammatical tones associate to the root and suffix, producing L-L. When the negative and irrealis are combined (17c), the L-L of the irrealis 'wins out' over the negative H-M, resulting in a L-L surface form.

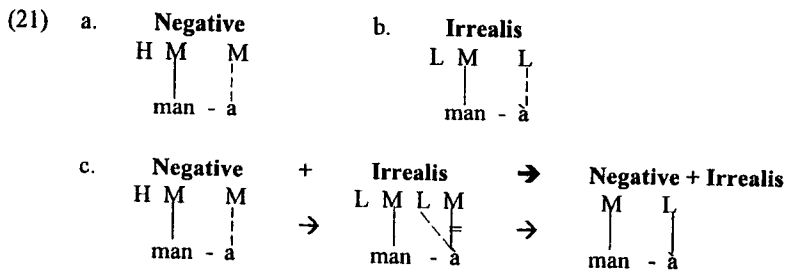




Now contrast the behavior of the 'toneless' roots above with that of M-toned roots. As shown in (20) (cf. (16)), the M-toned root does not take on the grammatical tones of the irrealis or negative, but remains M-toned. Note, however, that the tone of the suffix does change depending on the inflectional category.

(20)	Negative (H-M)	bè àà man-a	'they did not hold'
		bè àà mmin-a	'they did not squeeze'
		bè àà ttal-i	'they did not untie'
	Irrealis (L-L)	bá man-à	'they will hold'
		bá mmin-à	'they will squeeze'
		bá ttal-ì	'they will untie'
	Negative+Irrealis (L-L)	be ààá man-à	'they will not hold'
		be ààá mmin-à	'they will not squeeze'
		be ààá ttal-ì	'they will not untie'

I assume that, as mentioned in connection with the toneless roots analyzed above, the suffixes here are underlyingly toneless. As before, the suffix L tone of the irrealis 'wins out' over the suffix M of the negative. The illustrations in (21) show how grammatical tones are realized when the root has M tone. In the negative (21a), which has a H-M pattern, the H tone cannot associate to the root because the lexical M tone blocks the association of grammatical tones to the root. Since the suffix is toneless, the M tone of the negative associates to it. The result is M-M in the negative. In the irrealis (21b), which contributes L-L, the first L tone does not associate to the root due to the lexical M tone. The second L associates to the toneless suffix, resulting in M-L in the irrealis. When the negative and irrealis are combined (21c), the root retains its M tone since neither the negative nor the irrealis tones can override the lexical tone. The suffix L of the irrealis overrides the M suffix tone of the negative, resulting in M-L in the negative irrealis.



Similarly, contrast the habitual and negative forms of the toneless roots (in (18)) with those of M-toned roots (22). Once again, the M-toned roots do not take on the grammatical tones of the habitual or negative, but the toneless suffixes do take on grammatical tones.

for toneless roots, and do not propose a synchronic explanation for why M-toned roots retain their underlying tone while roots of the other type take on grammatical tones.

(22)	<b>Habitual (L-L)</b>	ba nà man-à	'they habitually hold'
		ba nà mmin-à	'they habitually squeeze'
		ba nà ttal-ì	'they habitually untie'
	<b>Negative (H-M)</b>	bè àà man-a	'they did not hold'
		bè àà mmin-a	'they did not squeeze'
		bè àà ttal-i	'they did not untie'
	<b>Negative+Habitual (H-M)</b>	bè dzè àà man-a	'they do not habitually hold'
		bè dzè àà mmin-a	'they do not hab. squeeze'
		bè dzè àà ttal-i	'they do not habitually untie'

The realization of the habitual and negative tones with M-toned roots is illustrated in (23). In the habitual (23a), which has L-L, the first L cannot associate to the root due to the underlying M. The second L associates to the toneless suffix, resulting in M-L in the habitual. In the negative (23b; also described above), the H cannot associate to the root, but the M associates to the suffix, resulting in M-M. When the habitual and negative are combined (23c), neither grammatical tone associates to the root, but the negative suffix M wins out over the habitual L suffix, resulting in M-M in the habitual negative.

(23)	a.	<b>Habitual</b>		b.	<b>Negative</b>	
		L M L			H M M	
		man - à			man - a	
	c.	<b>Habitual</b>	+	<b>Negative</b>	→	<b>Habitual + Negative</b>
		L M L		H M M L		M M
			→		→	
		man - à		man - a		man - a

Assuming that lexical tones have special status preventing their deletion in favor of grammatical tones, we now have a phonological basis for the difference in behavior between the non-alternating M-toned roots<sup>9</sup> vs. the alternating L~H roots: the M-toned roots have a prespecified root tone which blocks the association of grammatical tones, while the L~H roots have no underlying tone and express whatever grammatical tone is assigned to them (and, in cases where more than one grammatical tone is assigned, they express the tones of the highest ranked inflectional category) or get L by default.

<sup>9</sup> There are two exceptions to the generalization that M-toned verbs always have M. The first is the perfect, where M-toned verbs do express the grammatical L-H tone. The second marks verbs in 'purpose' clauses, where M-toned verbs surface with H-M. Nonetheless, the asymmetry between M-toned vs. L~H roots in all of the other inflectional categories is striking and warrants an explanation; the fact that there exist two categories where the underlying M root tone does not surface can be accommodated in the present analysis if we assume that the perfect and purpose grammatical tones exceptionally outrank the lexical tone of the root.

The main problem raised by analyzing the verb system in this way is that at the same time as I have argued for a M vs. toneless distinction on verb roots, I have also made use of floating L and H tone grammatical markers. On the one hand, assuming that L is unspecified on verb roots provides a principled explanation for the asymmetry between the two root types with respect to whether they express grammatical tones. As we saw in 2.1, assuming that L is unspecified also accounts for why the genitive M tone spreads to L-toned N2 prefixes but not to H-toned prefixes. On the other hand, the analysis of the verb system given here requires L to be available underlyingly as a floating tone, as in the habitual and irrealis described above. A possible reconciliation of these facts would be to claim that there are four possible tone values underlyingly (H, M, L, and Ø) and that L is filled in as the default tone, producing the three-way surface contrast in the language. However, there is no area of the language where all four values are needed; as we have seen, the tests for phonologically specified tones point us in different directions depending on which part of the system we focus on.

### 3 Conclusion

I have argued against the claim that in all languages with a three-way surface tonal contrast and only two underlying tones, the M tone will be the unspecified, default tone. Regardless of whether the Leggbo L tone is specified, I hope to have made it clear that the M tone is an important element in the phonological system and that there is no reason to assume that it is the unspecified or default tone. There do remain well-established examples of 3-tone languages where the M tone is unspecified (e.g. Yoruba (Pulleyblank 1986)), returning us to the question (Hyman 2001) of how many other types of 3-tone systems might exist. For example, is there a language where a surface H-M-L contrast is generated by underlying Ø-M-L with H as the default tone? This is an empirical issue, and perhaps future research will reveal a language with just such a system. In any event, I hope to have demonstrated that the choice of a default tone is not a universal principle but a language-specific choice.

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