TONAL ‘UPSTEP’ IN ENGENNI

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Engenni, a Kwa language spoken in Nigeria, has three levels of surface pitch with restrictions on the top and middle levels. There are only two contrasting tones: low and high. In addition there is what Thomas (1978) calls “automatic upstep.” The upstep is predictable and results in the upstep of a high tone whenever a low tone follows the high. Although the environment that conditions upstep is predictable, there is no real motivation for considering this phenomenon to be upstep. An alternative analysis is to consider the ‘normal’ high tones of the Engenni system to be downstepped, and to consider the ‘upstepped’ highs to be simply non-downstepped. By analyzing Engenni as an incomplete tonal downstep system, and by couching this analysis within the framework of Register Tier Theory (Snider 1990), the Engenni tone system can be described in a manner that is only minimally different from other downstep systems. The present analysis also explains why the upstep of what has often appeared to be an upstep system in many African languages affects only one tone-bearing unit and is never cumulative (i.e., it never results in upwards terracing). The emerging answer is that the superhigh tone of these systems is not an upstepped high, as such, but rather a non-downstepped high.

L’engenni, une langue kwa parlée au Nigéria, connaît trois niveaux de réalisation des tons à la surface avec quelques restrictions aux deux niveaux supérieurs. Il n’y a que deux hauteurs tonales opposables sous-jacentes: le ton haut et le ton bas. En plus de cela, on trouve ce que Thomas (1978) appelle “le rehaussement tonal automatique”. Ce rehaussement est prédictible et résulte en un rehaussement du ton haut chaque fois qu’un ton bas suit le ton haut. Bien que l’environnement conditionnant le rehaussement est prédictible, il n’y a pas vraiment de raisons de considérer ce phénomène comme un rehaussement tonal à proprement parler. Une autre manière de l’analyser consiste à considérer les tons hauts ‘normaux’ du système tonal engenni comme étant des tons hauts abaissés et de considérer les tons hauts rehaussés simplement comme des tons hauts non abaissés. En analysant le système tonal engenni comme étant un système à abaissement tonal incomplet et en faisant entrer cette analyse dans le modèle “Register Tier Theory” (Snider 1990), le système tonal engenni peut alors être décrit d’une manière qui ne diffère que très peu des autres systèmes à abaissement tonal. La présente analyse explique aussi pourquoi le rehaussement tonal, qui est apparu comme étant un système à rehaussement tonal dans de nombreuses langues africaines, affecte seulement les unités porteuses de ton et n’est jamais cumulatif (c’est-à-dire qu’il ne résulte pas en un mouvement ascendant du niveau du registre haut). La réponse émergeant de cette analyse est que le ton super haut de ces systèmes n’est pas un ton haut rehaussé en tant que tel, mais plutôt un ton haut non abaissé.

1. ENGENNI[1]

Although Thomas (1974, 1978) describes Engenni, a Kwa language spoken in Nigeria, as having three levels of surface pitch with restrictions on the top and middle levels, she analyzes the system as having only two contrasting tonemes, low and high. In addition there is what she calls “automatic upstep.”

Upstep can be described as the phonological shifting upwards of the tonal register within a phonological phrase similar in nature to changing to a higher key in a score of music. Upstep in Engenni is predictable and results in the shifting upwards of a high tone whenever a low tone follows the high. Examples of this appear in (1) and (2).[2] In the surface representations throughout this article, the dotted lines represent the tonal registers, and the solid lines represent the tones of the utterance relative to the registers, that is, the idealized pitch tracks.

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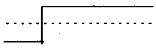
[1] An earlier version of this article was presented at the *27th Annual Conference on African Linguistics*, held in Gainesville, Florida, March 29–31, 1996. I am grateful to Rod Casali, Jim Roberts, and an anonymous *JWAL* referee for discussions and comments that contributed to improving the analysis and presentation. I am also grateful to Mark Karan and Ruth Stalder for translating the abstract into French. The usual disclaimers apply.

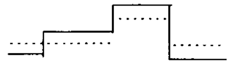
[2] All data in this article are taken from Thomas (1974, 1978). Although I have included all glosses as they are provided in the source documents, I have taken the liberty to replace certain of Thomas’ phonetic symbols with their IPA equivalents. In some cases more detail would have been desirable, but this information was not available to me. I have similarly accepted Thomas’ underlying forms as provided. Although I have no reason to question their validity, at the same time I would have preferred to have been able to include more evidence to support them.

(1) a.



mì mɔ́ní wɔ́
I saw you.

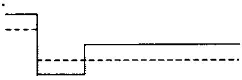
b.



mì mɔ́nì wɔ́ bhɛ̀ɛ̀
I did see you.

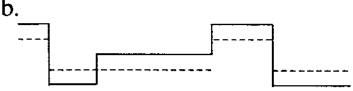
In (1a) **wɔ́** is realized at the same level as the high-toned tone-bearing units (TBUs) that precede it. This may be contrasted with (1b) in which a low tone follows **wɔ́**. In this case, the high tone of **wɔ́** is upstepped relative to the high-toned TBUs that precede it.

(2) a.



ɔ́mʊ̀ dhɛ́mʊ́ yá
The house is big.

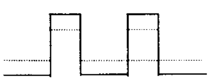
b.



ɔ́mʊ̀ dhɛ́mʊ́ yá sə̀mʊ̀
Is the house big?

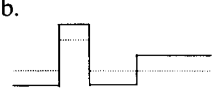
(2) is similar to (1) except that the utterance begins with high tone. Again, each time a high-toned TBU tone precedes a low-toned TBU the high-toned TBU is upstepped relative to preceding high-toned TBUs. So far the data that support the claims made to this point would also be consistent with another possible analysis in which there are three underlying tones, high, mid, and low, and a rule that lowers high tones to mid in utterance-final position. Looking again at (1) and (2), the data support this in that **wɔ́** and **yá** are high utterance medially and mid utterance finally. This possible analysis can be ruled out by looking at the data in (3).

(3) a.



ìkpí là má nà
the snail

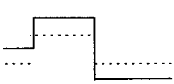
b.



ìkpí là má nʊ́
as for snail

In (1a), although **má** is phonetically realized as high utterance medially before a low tone, it is realized as mid also utterance medially in (1b) when it is followed by a high tone. This shows that high is not lowered to mid in utterance-final position, and further supports the claim that high is upstepped relative to preceding highs only when it is followed by low. Another example appears in (4) in which the utterance begins with a high-toned TBU, but in this case it is not immediately followed by a low tone.

(4)



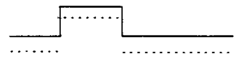
á kpʊ́ kʊ̀rɔ̀

cassava

As can be seen in (4), it is only when a high-toned TBU occurs immediately before a low tone that it is upstepped.

Upstep also occurs when the tone-bearing support for the low tone is deleted. "When two vowels come together at a word boundary, the first vowel together with its tone is elided" (Thomas 1974:14, 15). This may be seen in (5) and (6).

(5)



únwónì ólíló → **un wo nolilo** mouth of a bottle

(6)

ó vúmù ópílópó → **o vu mopilopo** she will dry the pig meat

In these examples, even though the tone-bearing support of the low tone in each case has been elided, upstep on the immediately preceding high still occurs.

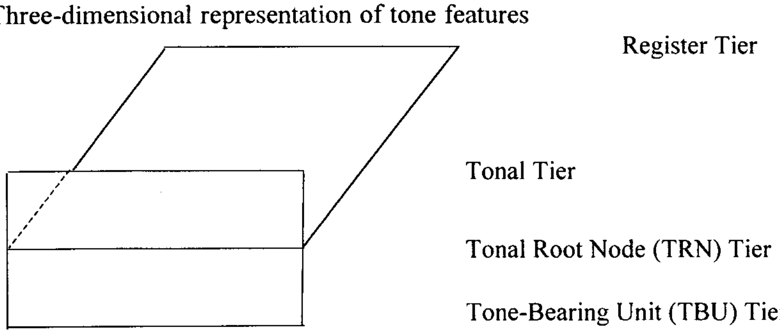
One way to analyze this is to simply say, as Thomas does, that a high tone before a low tone is "upstepped," or raised. But there is no real motivation for this raising. The examples in (2) shed additional light on the subject. An alternative way to analyze this phenomenon is to consider that in (2a) the low-toned **mʋ̀** and everything to its right is downstepped relative to the preceding high-toned **ɔ́**. In this respect it behaves just ike normal downstepping languages. When low-toned **sə̀mʋ̀** is added to this sentence in (2b), the downstep effect stops short one TBU before the low tone. This leaves the high-toned **yá** non-downstepped relative to the preceding downstepped high tone.[3]

By analyzing Engenni tone as an incomplete downstep system, and by couching this analysis within the REGISTER TIER THEORY framework of Snider (1990), the Engenni tone system can be described in a manner that is only minimally different from other downstep systems.

2. REGISTER TIER THEORY

An overview of register tier theory is presented in this section. A three-dimensional structure for tone features like that in (7) is reasonably well-established in the literature.

(7) Three-dimensional representation of tone features



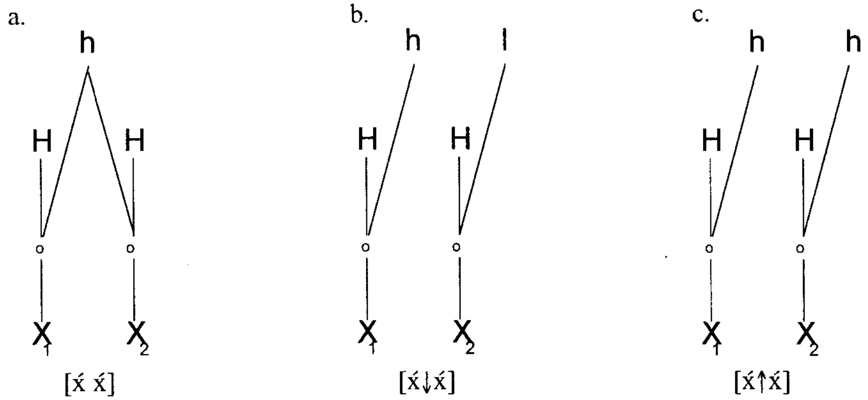
Less well-established is the notion of the relative nature of register feature values. Snider (1988, 1990) and Snider and Van der Hulst (1993) define register features as having a value relative to the register of the preceding tone-bearing unit, i.e., higher than or lower than the preceding register, as opposed to a static value such as high or low. The tone of a TBU associated with the 'higher register' feature **h** is therefore realized on the next higher register to that of a preceding TBU, provided the preceding TBU is not also linked

[3] Thomas (1974) considers, but rejects, an analysis similar to this on grounds that her analysis is simpler. In the conclusion, I will argue that the present proposal is more explanatory.

to that same register **h**. The tonal feature H or L, which is associated to any given TBU, specifies whether the tone is high or low relative to the current register.

In order to demonstrate the relative nature of the register feature values, (8) provides three different configurations that involve minimal differences on the register tier. Each TBU is associated with a feature H on the tonal tier. Since features on the tonal tier have a static, or nonrelative value, in each case the pitch of X_2 relative to that of X_1 is not affected by the fact that there are two Hs on the tonal tier. For reasons of clarity, we assume for the moment the suspension of all obligatory contour principle (OCP) effects.[4]

(8)

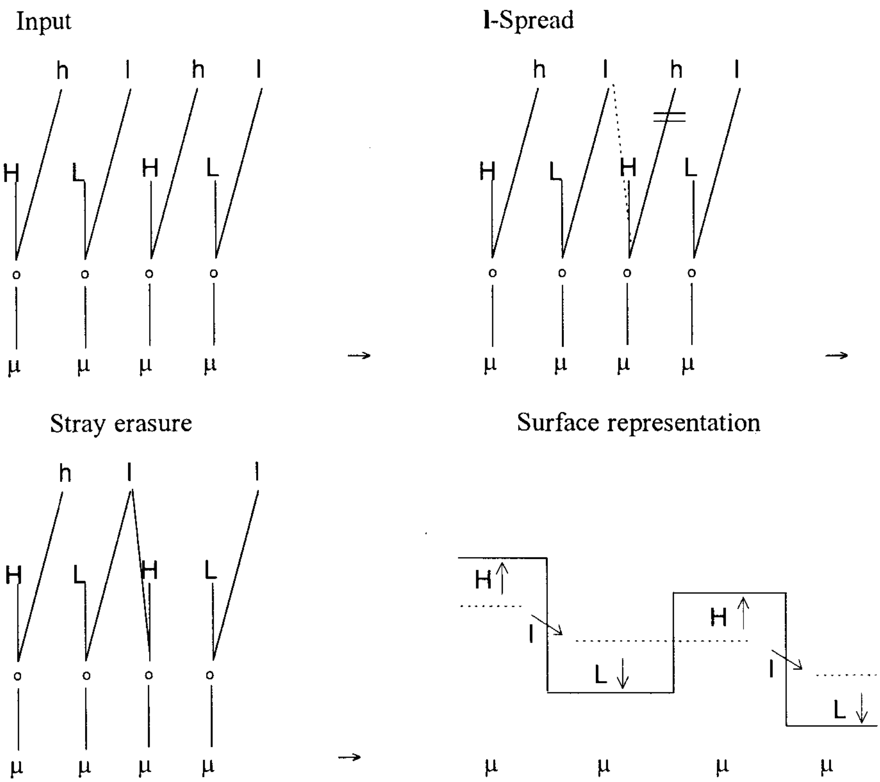


In (8a), both TBUs are associated to the same register **h** and are consequently realized at the same pitch level. In (8b), X_2 is associated with the register **l** and its pitch is consequently realized on the next lower register to that of X_1. In (8c), even though both TBUs are associated to identical features, X_2 is realized on the next higher register to that of X_1 since it is associated to a different **h** than the **h** of X_1. Whenever adjacent TBUs are associated to different **h**s, the pitch of the second TBU is always realized on a higher register, and whenever adjacent TBUs are associated to different **l**s, the pitch of the second TBU is always realized on a lower register. The register feature is therefore interpreted as a command to descend to the next register lower, or ascend to the next register higher than that of the preceding TBU, regardless of what was involved in determining the register of the preceding TBU.

Now consider downstepping languages in which sequences of high-low-high result in progressively lowered high tones. Languages like this have a rule of rightwards **l**-spread. The hypothetical derivation in (9) is typical for this scenario.

[4] The OCP is a constraint that blocks identical features from being adjacent on the same tier.

(9)

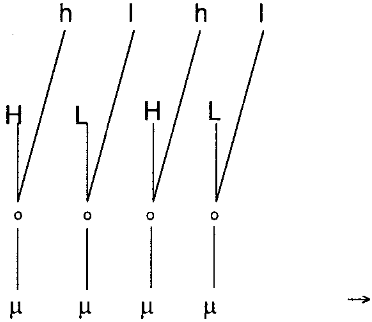


In (9), the first register **l** spreads rightwards onto the third tonal root node (TRN), and the original register **h** associated with that node is dissociated. Stray erasure then applies and deletes the floating register **h**.[5] The phonetic algorithm interprets the output as follows. Because the first TBU is asssociated to a register **h**, and the second and third TBUs are associated to a single register **l**, the register of the second and third TBUs is downstepped relative to that of the first TBU. The point of downstep is, therefore, at the juncture of the first high/lo sequence. Because the second high has "assimilated" to the register of the preceding low, it is downstepped relative to the first high. The fourth TBU is also associated to a register **l**. Since this **l** is distinct from the preceding **l**, the pitch of the fourth TBU is also downstepped relative to that of the preceding TBU.

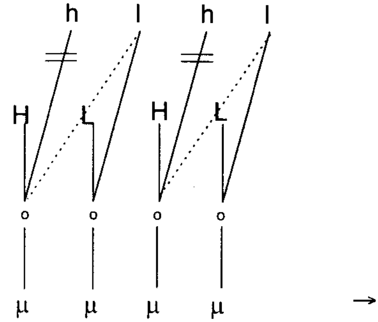
Although terracing downstep in most languages is effected by a rule of rightwards **l**-spread, if the direction of the **l**-spread were leftward, as in (10), the result would be what is sometimes called "total" downstep. In total downstep systems, a high tone is phonetically realized at the same height as a preceding high tone. Notice that this type of downstep is also terracing.

[5] I assume that stray erasure is the final rule to apply before the phonetic algorithm is implemented. Crucially, the OCP does not apply after stray erasure.

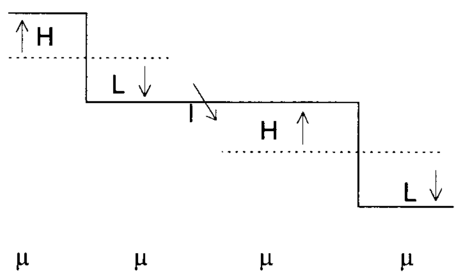
(10) Input



l-Spread (leftward)



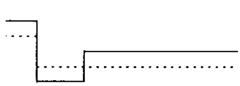
Surface representation



3. APPLICATION

In Engenni, as in many West African languages, a high tone that follows a low tone is always lower than a high tone that precedes the low tone, but higher than the low tone itself. This is typically called downdrift or automatic downstep, and a clear example of it appears in (11), repeated from (2).

(11)

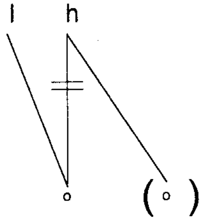


ɔ́mʋ̀ dhɛ́mʋ́ yá

The house is big.

When automatic downstep occurs, the high tone that follows the low tone assimilates to the lower register of the low tone and is consequently realized on a register that is lower than any high tone that precedes the low tone. We can account for this phenomenon with the l-spread rule of (12).

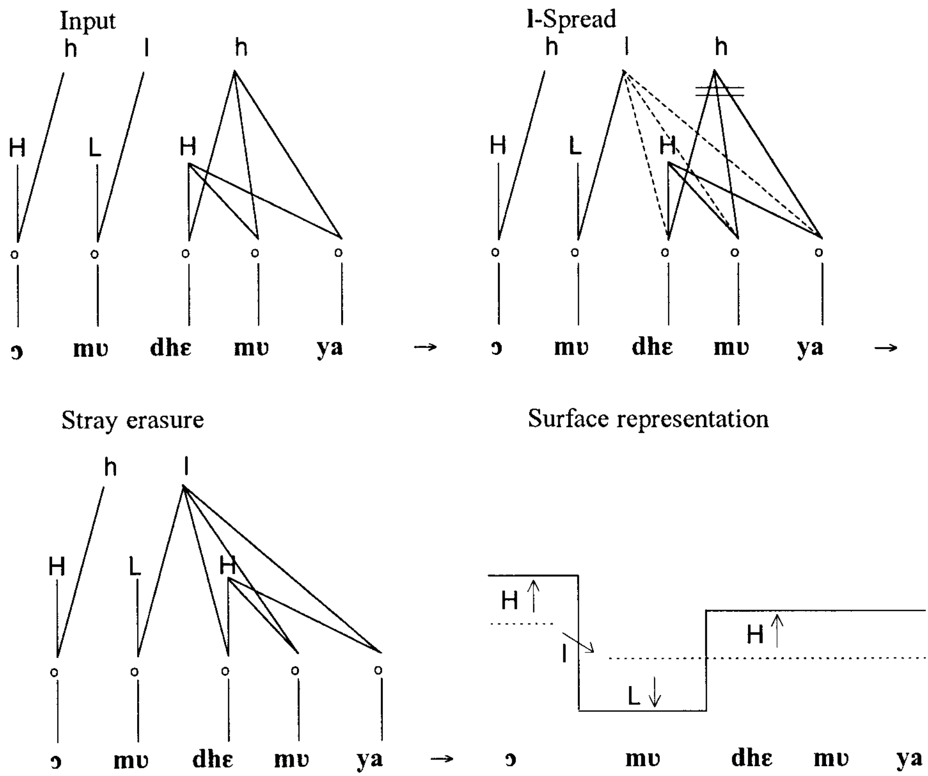
(12) **l**-spread (postlexical and iterative)



In (12), an **l**, whether floating or associated, spreads rightwards and delinks a following **h** from its TRN, subject to the following condition. If there is another TRN following the first TRN, the second TRN must also be associated to the **h** register feature. This is because there is a constraint in Engenni against a floating **h** register feature occurring between associated **l** register features. Stated another way, the constraint prevents two **l** register features from being associated to adjacent TRNs.

A tentative derivation of (11) appears in (13). For each of the derivations in the remainder of this article, the input is fully specified and assumes the prior filling in of any and all default features.

(13)



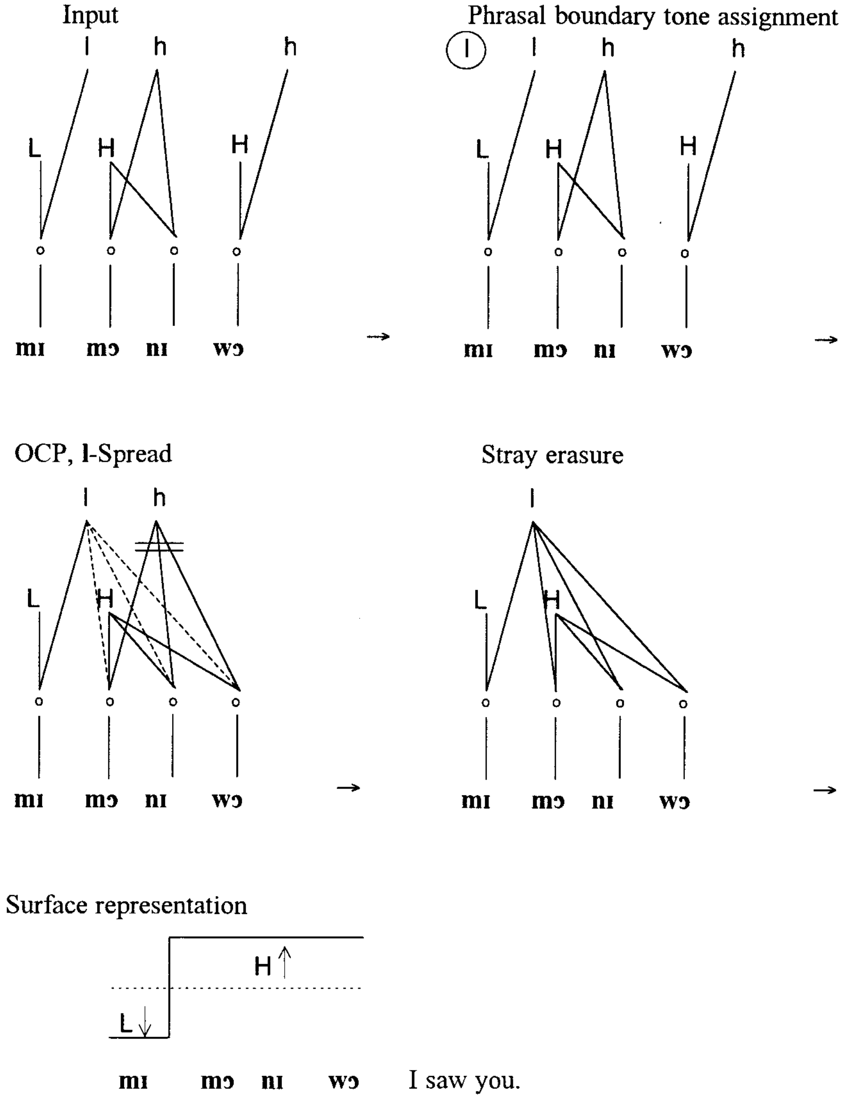
In (13), application of **l**-spread spreads the register **l** to all of the TRNs to its right, delinking the register **h**s. Subsequently, a rule of stray erasure deletes all prosodically unlicensed (i.e., unassociated or floating) elements.

Although the rule of **l**-spread in (12) accounts for the examples in (1) and (2) in a straightforward manner, in order to account for examples like (4), it is further necessary to assume that Engenni, and many other languages in West Africa, assign by default a floating **l** register boundary tone to the left edge of phonological phrases.[6] This is stated in (14).

(14) Phrasal boundary tone assignment
Assign a floating **l** to the left edge of the phonological phrase.

We now show derivations for some of the examples in §1. Notice that in (15) and (16), the application of phrasal boundary tone assignment does not have any effect on the surface realization. This is because in both cases, the boundary **l** is followed immediately by a lexical **l** with which it merges, due to OCP constraints. In (17), however, phrasal boundary tone assignment does make a difference.

(15)

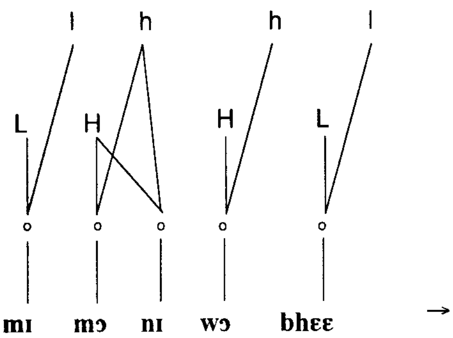


[6] In order to account for the superhigh tone in languages like Krachi (cf. Snider 1990), it is necessary to assume that a floating **l** register boundary tone is assigned to the right edge of phonological phrases. This raises the possiblity that many (at least Niger-Congo) African languages assign floating **l** register boundary tones to both edges of the phonological phrase.

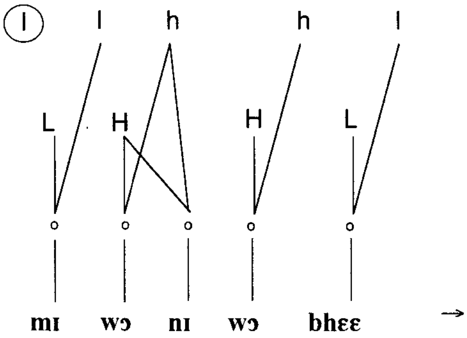
In (15), phrasal boundary tone assignment inserts a floating register **l** at the left edge of the utterance. Next, the OCP merges identical adjacent features, and the rule of **l**-spread spreads the register **l** to all of the TRNs to its right, delinking the register **h**s. Finally, stray erasure deletes all prosodically unlicensed elements. For this example, the application or nonapplication of phrasal boundary tone assignment is irrelevant because the register **l** that is assigned by this rule is merged with the initial **l** of the phrase through application of the OCP. Since all TBUs are now associated to the same register feature, the high and low tones of the utterance are both realized on the same register, as indicated in the surface representation for (15).

We next look at an example in which **l**-spread does not delink all of the **h** register features.

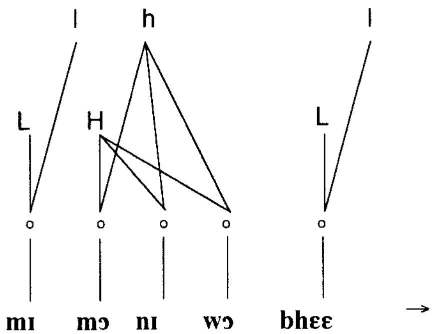
(16) Input



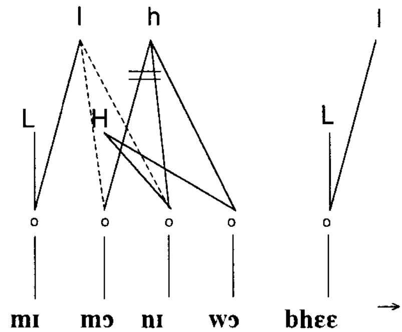
Phrasal boundary tone assignment



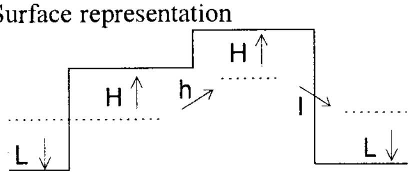
OCP



l-spread



Surface representation



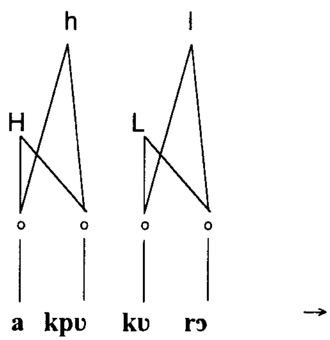
mɪ mɔ nɪ wɔ bhɛɛ I did see you.

In (16), phrasal boundary tone assignment assigns a floating register **l** to the left edge of the utterance, and, similar to (15), application of the OCP negates any effect the application of this rule might otherwise have. Application of **l**-spread results in the leftmost register **l** spreading rightwards and delinking the register **h** as far as the TBU **ní**. At this point, the constraint against a floating **h** register feature occurring between associated **l** register features prevents the **l** from spreading and delinking the **h** from the TRN of **wɔ́**. Interpreting the surface representation for (16), we see that the low and high tones of **mì mɔ́ ní** are realized on the same register. The high tone of **wɔ́** is realized on the next register higher, and the low tone of **bhɛ̀ɛ̀** is realized on the next register lower than that of **wɔ́**, that is, the same register that **mì mɔ́ ní** are realized on.

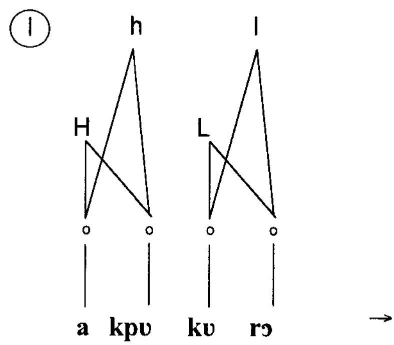
One good question, raised by an anonymous *JWAL* referee, concerns whether or not the TBU **wɔ́** should be considered to be upstepped? Certainly **wɔ́** is upstepped relative to the preceding TBU. This question is not just an attempt to play with semantics, because there is a real question at stake. In the overall scheme of things, if one considers the high-toned TBU that precedes **wɔ́** not to be downstepped, then one probably should consider **wɔ́** as being upstepped (Option A). On the other hand, if one considers the high-toned TBU that precedes **wɔ́** to be downstepped (present analysis), then one probably should consider **wɔ́** as being non-downstepped (Option B). Choosing between these two options is not as arbitrary as it might first appear. In the case of Option B (downstep/non-downstep), the downstep is motivated in that the high tones that undergo the downstep are preceded by low tones, an environment which is known to cause downstep in other tonal languages. But in the case of Option B (non-downstep/upstep), there is no obvious motivation for the upstep. So I conclude that the superhigh tone in Engenni is simply a non-downstepped high.

Turning now to (17), we have a case where phrasal boundary tone assignment does make a difference.

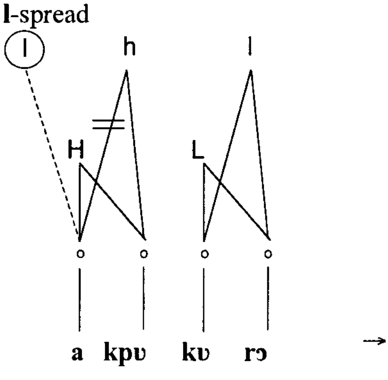
(17) Input



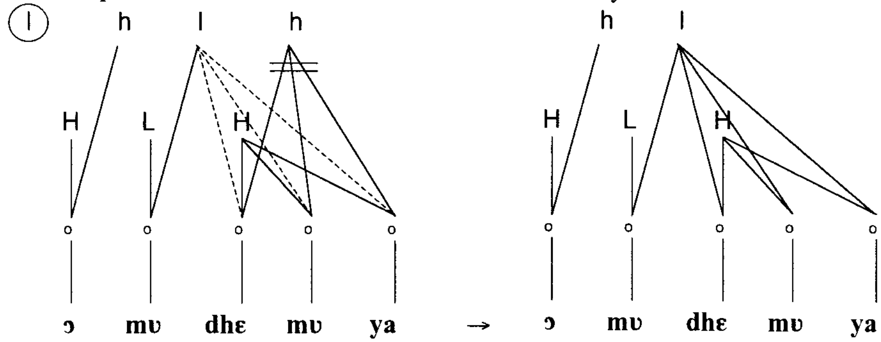
Phrasal boundary tone assignment



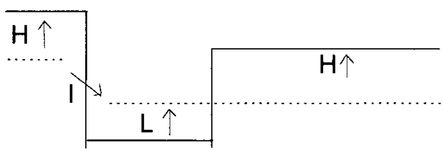
l-spread



l-Spread   Stray erasure



Surface representation



ɔ mʊ dhɛ mʊ ya   The house is big.

In (18), application of phrasal boundary tone assignment assigns a register **l** to the left edge of the utterance. Since spreading of that **l** would violate the constraint against two **l** register features being associated to adjacent TRNs, the application of **l**-spread is blocked, and the (still) unassociated **l** is later deleted by stray erasure. The net result of (18) is therefore identical to that of (13).

4. CONCLUSION

Thomas (1974:25) considers, but rejects, an analysis very similar to the present proposal. The analysis she considers can be summarized as follows:

a) a sequence of highs is lowered after low or floating low,

b) a downstepped high reverts to the pitch of the previous high in the utterance before low, and

c) all utterance-initial highs are lowered.

She rejects this analysis on the grounds that an analysis that simply upsteps a high-toned TBU before a low tone (one component) is simpler than one that requires the three components just stated. I deal with each of these components in the order b), c), and a).

Component b) represents a real difference between the present proposal and the analysis Thomas rejects. In her rejected analysis, the highest pitch level first undergoes lowering, and later raising. In the present proposal, it undergoes neither. This makes the present proposal one component simpler than the one she rejects.

Component c) does pose an added complication to the present analysis. In order to account for the lowering of initial high tones, I suggest that languages assign by default floating low boundary tones to the left and right edges of utterances. In the case of Engenni, it is the left low boundary tone that is responsible for the lowering of initial high tones. Although the boundary tone proposal does add to the complexity of the analysis, its explanatory power goes beyond accounting for Engenni. Snider (in preparation) develops a four-way typology of downstep systems in which the boundary tone proposal plays a key role in treating a number of seemingly disparate register phenomena in a unified manner.

Finally, component a) of Thomas' rejected analysis, i.e., a sequence of highs is lowered after low or floating low, is much more natural and explanatory than the analysis that high-toned TBUs are upstepped before low tones. Cross-linguistically, this component is needed anyway in order to account for downstep in a great multitude of African languages.

In conclusion, the success of register tier theory in accounting for the superhigh tone of Engenni suggests that it would also prove successful in accounting for the superhigh tones of many other African languages. With only minor modifications to the Engenni analysis, for example, the so-called upstepped high in Krachi of Snider (1990) can be readily accounted for.[7] Although clear cases do exist of terracing upstepped high tones (e.g., Acatlán Mixtec, described in Pike and Wistrand (1974) and Kimatuumbi, described in Odden (1996)), it has been a mystery why the upstep of what has often appeared to be an upstep system in many African languages affects only one TBU and is never cumulative (i.e., it never results in upwards terracing). The emerging answer is that the superhigh tone of these systems is not an upstepped high, as such, but rather a non-downstepped high.

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[7] This also involves only a minor modification to the analysis of Snider (1990).