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**Pius W. Akumbu**

## **Tone on Njyem Nouns: A Register Tier Theory Perspective**

### **Abstract**

This paper describes and explains the make-up and realization of tone on the nouns of Njyem, a narrow Bantu language of the Makaa-Njyem sub group. It is classified as A.84 (Guthrie 1971: 33; Maho 2003: 642) and spoken from the forest region of South Eastern Cameroon over to the north of the Republic of the Congo. The article uses the nuts and bolts of Register Tier Theory (RTT) (Inkelas 1987; Inkelas et al. 1987; Snider 1988, 1990, 1999) to insightfully explain tonal phenomena found on Njyem nouns. The analysis reveals that the nouns have four underlying tonal melodies, namely, H, L, HL, and LH and that tonal and/or phonological processes trigger the other surface realizations. In order to account for these surface forms, the contrastive underlying tonal melodies of noun roots are given and the realization on the surface of each melody discussed within the framework of RTT.

### **1. Introduction**

This article discusses the tonology of Njyem nouns. Njyem is a narrow Bantu language of the Makaa-Njyem sub group. It is classified as A.84 (Guthrie 1971: 33; Maho 2003: 642) and spoken from the forest region of South Eastern Cameroon over to the north of the Republic of the Congo. The article begins by an overview of Register Tier Theory (RTT), followed by a presentation of the morpheme structure of noun roots. Considering that the surface tone is not always identical to the underlying tone in languages, this paper goes ahead to use the nuts and bolts of RTT to explain observed tonal phenomena in Njyem. The associative constructions are presented synoptically at the end of the paper in order to further explore and account for the behaviour of tones in larger nominal constructions.

## 2. Register Tier Theory

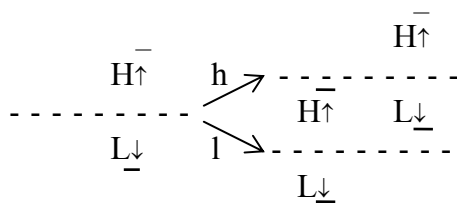
Register Tier Theory (RTT) (Inkelas 1987; Inkelas et al. 1987; Snider 1988, 1990, 1999) recognizes the following autosegmental features and tiers: the register features *h* and *l* on a REGISTER TIER, the tonal features *H* and *L* on a TONAL TIER, a TONAL ROOT NODE TIER (TRN), and a TONE-BEARING UNIT TIER (TBU). These tiers are geometrically arranged according to the configuration in figure 1 taken from Snider (1999: 23).



**Figure 1.** Geometry of tone

Features on the Register tier and the Tonal tier are linked to structural nodes on the TRN. Geometrically, these tiers form a separate plane with respect to the TRN. Nodes on the TRN are, in turn, linked to moras ( $\mu$ ) on the TBU tier. (Snider 1999: 23.)

The register features *h* and *l* are defined following Snider (1999: 25) as “effect a register shift *h* = higher, and *l* = lower relative to the preceding register setting”, and the tonal features *H* and *L* are defined as realize the “TBU at *H* = high pitch, and *L* = low pitch relative to the current register”. This is shown in figure 2 (the dotted lines represent registers and the solid lines represent tones).



**Figure 2.** Register features and tonal features

The geometry in figure 1 and the features in figure 2 make it possible to specify up to four logically possible tonal distinctions, namely, a high tone on a high register, a high tone on a low register, a low tone on a high register, and a low tone on a low register. Notice firstly that the register feature of any given TBU is specified in relation to that of the preceding register. The register of the initial TBU for its part is construed to be higher than or lower than the reference point that native speakers usually have in mind when beginning an utterance. Secondly, the tonal feature associated to any given TBU specifies whether the tone is low or high in relation to the current register. RTT is used in this paper to insightfully explain the tonal processes that occur in Njyem, given that within this theoretical model features on each tier can behave independently of one another.

### 3. Morpheme structure of noun roots

The most common morpheme structures that occur on Njyem noun roots are CV and CVC. The less common CVV morpheme type also occurs. This morpheme structure is shown in table 1.

**Table 1.** Morpheme structure of noun roots

CV	CVC	CVV
<i>lè-dzè</i> 'tooth'	<i>nùn</i> 'bird'	<i>bí:</i> 'quarter'
<i>bî</i> 'residence'	<i>lè-bíl</i> 'breast'	<i>dzó:</i> 'bed'
<i>lè-bò</i> 'foot'	<i>sèb</i> 'insect'	<i>dú:</i> 'noise'
<i>só</i> 'friend'	<i>dùr</i> 'robe'	<i>dú:</i> 'extra part'

### 4. Contrastive underlying tonal melodies for noun roots

Njyem has two underlying tones – High and Low (Akumbu 2006). The nouns have mostly monosyllabic and disyllabic roots. The noun roots have a four-way contrastive underlying tonal melody, namely, H, L, HL, and LH as shown in the examples below. The singular nouns presented in the following table are taken from Noun Class 7, which takes neither a segmental nor a floating tone noun class prefix.

**Table 2.** Contrastive underlying tonal melodies for noun roots

Underlying Form	CVCV	CVC	CV
H	<i>tʃihó</i> 'island'	<i>bím</i> 'quantity'	<i>lĩ</i> 'tree'
	<i>sámá</i> 'group'	<i>bán</i> 'pledge'	<i>lá</i> 'glass'
L	<i>sèhè</i> 'tale'	<i>nùn</i> 'bird'	<i>dzò</i> 'laugh'
	<i>dzàṅà</i> 'fiance'	<i>tòm</i> 'fight'	<i>mò</i> 'stomach'
HL	<i>límà</i> 'dream'	<i>lám</i> 'trap'	<i>ṅá</i> 'nail'
	<i>kúrà</i> 'blow'	<i>nôr</i> 'vagina'	<i>bî</i> 'residence'
LH	<i>tʃilà</i> 'taboo'	<i>kòb</i> 'fault'	<i>gù</i> 'madman'
	<i>ṅàṅà</i> 'elegance'	<i>bàm</i> 'material'	<i>ntù</i> 'quarrel'

In table 2, it can be observed that some of the surface tones are different from the underlying melodies. An example is the underlying LH melody that surfaces as L. Evidence for assuming these underlying melodies will be discussed later. In § 4.3, it will be shown that l-spread and h-delink, Merger, and HL Simplification account for the HL melody. Similarly, l-spread and h-delink, the Obligatory Contour Principle (OCP), and Low Tone Spread are exploited in § 4.4 to justify the underlying LH melody. Notes on each melody follow.

#### 4.1 H melody

As indicated in table 2, the underlying high melody surfaces as High on all syllables in words in isolation. In combination, this melody still surfaces as High, spread over the entire domain of the melody. This implies that the

phoneme of tone is the complete melody associated with a particular morpheme. In other words, “tones are simply a property of the morpheme and not of any particular segment or syllable in that morpheme” (Yip 2002: 72).

- |  |  |   |                             |  |  |  |    |  |   |                             |
|--|--|---|-----------------------------|--|--|--|----|--|---|-----------------------------|
| $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$  | $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$  |   |                             |  |  |  |    |  |   |                             |
| (1) a.   | <i>sama</i> <i>je</i><br>group    his<br>‘his group’   | → | [ <i>sama</i> <i>je</i> ]   |  |  |  |    |  |   |                             |
| <table style="border: none; width: 100%;"> <tr> <td style="text-align: center; padding-right: 20px;"> <math display="block">\begin{array}{cccc} \underline{\underline{L}} &amp; \underline{\underline{H}} &amp; \underline{\underline{H}} &amp; \underline{\underline{L}} \\ \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} \end{array}</math> </td> <td style="text-align: center; padding-right: 20px;"> <math display="block">\begin{array}{cccc} \underline{\underline{L}} &amp; \underline{\underline{H}} &amp; \underline{\underline{H}} &amp; \underline{\underline{L}} \\ \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} \end{array}</math> </td> <td></td> </tr> <tr> <td style="vertical-align: top;">b.</td> <td style="vertical-align: top;"> <i>mpala</i>            <i>ja:</i><br/> camp                that<br/> ‘that camp’ </td> <td style="vertical-align: middle; text-align: center;">→</td> <td style="vertical-align: top;"> [<i>mpala</i>    <i>ja:</i>] </td> </tr> </table> |  |   |                             | $\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$ | $\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$ |  | b. | <i>mpala</i> <i>ja:</i><br>camp                that<br>‘that camp’ | → | [ <i>mpala</i> <i>ja:</i> ] |
| $\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$   | $\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$ |   |                             |  |  |  |    |  |   |                             |
| b.   | <i>mpala</i> <i>ja:</i><br>camp                that<br>‘that camp’   | → | [ <i>mpala</i> <i>ja:</i> ] |  |  |  |    |  |   |                             |
| <table style="border: none; width: 100%;"> <tr> <td style="text-align: center; padding-right: 20px;"> <math display="block">\begin{array}{cc} \underline{\underline{H}} &amp; \underline{\underline{H}} \\ \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} \end{array}</math> </td> <td style="text-align: center; padding-right: 20px;"> <math display="block">\begin{array}{cc} \underline{\underline{H}} &amp; \underline{\underline{H}} \\ \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} \end{array}</math> </td> <td></td> </tr> <tr> <td style="vertical-align: top;">c.</td> <td style="vertical-align: top;"> <i>je</i>    <i>la</i><br/> his    glass<br/> ‘his glass’ </td> <td style="vertical-align: middle; text-align: center;">→</td> <td style="vertical-align: top;"> [<i>je</i>    <i>la</i>] </td> </tr> </table>   |  |   |                             | $\begin{array}{cc} \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$   | $\begin{array}{cc} \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$   |  | c. | <i>je</i> <i>la</i><br>his    glass<br>‘his glass’                 | → | [ <i>je</i> <i>la</i> ]     |
| $\begin{array}{cc} \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$   | $\begin{array}{cc} \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$   |   |                             |  |  |  |    |  |   |                             |
| c.   | <i>je</i> <i>la</i><br>his    glass<br>‘his glass’   | → | [ <i>je</i> <i>la</i> ]     |  |  |  |    |  |   |                             |
| <table style="border: none; width: 100%;"> <tr> <td style="text-align: center; padding-right: 20px;"> <math display="block">\begin{array}{ccc} \underline{\underline{L}} &amp; \underline{\underline{H}} &amp; \underline{\underline{H}} \\ \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} \end{array}</math> </td> <td style="text-align: center; padding-right: 20px;"> <math display="block">\begin{array}{ccc} \underline{\underline{L}} &amp; \underline{\underline{H}} &amp; \underline{\underline{H}} \\ \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} &amp; \underline{\underline{\quad}} \end{array}</math> </td> <td></td> </tr> <tr> <td style="vertical-align: top;">d.</td> <td style="vertical-align: top;"> <i>né</i>    <i>tʃiho</i><br/> with    island<br/> ‘with island’ </td> <td style="vertical-align: middle; text-align: center;">→</td> <td style="vertical-align: top;"> [<i>né</i>    <i>tʃiho</i>] </td> </tr> </table>   |  |   |                             | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$  | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$  |  | d. | <i>né</i> <i>tʃiho</i><br>with    island<br>‘with island’          | → | [ <i>né</i> <i>tʃiho</i> ]  |
| $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$  | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} & \underline{\underline{\quad}} & \underline{\underline{\quad}} \end{array}$  |   |                             |  |  |  |    |  |   |                             |
| d.   | <i>né</i> <i>tʃiho</i><br>with    island<br>‘with island’  | → | [ <i>né</i> <i>tʃiho</i> ]  |  |  |  |    |  |   |                             |

The nouns in (1) do not cause nor undergo any changes. The high tone is realized around 280 Hz. Pitch traces of the data in (1) are shown in Appendix A.

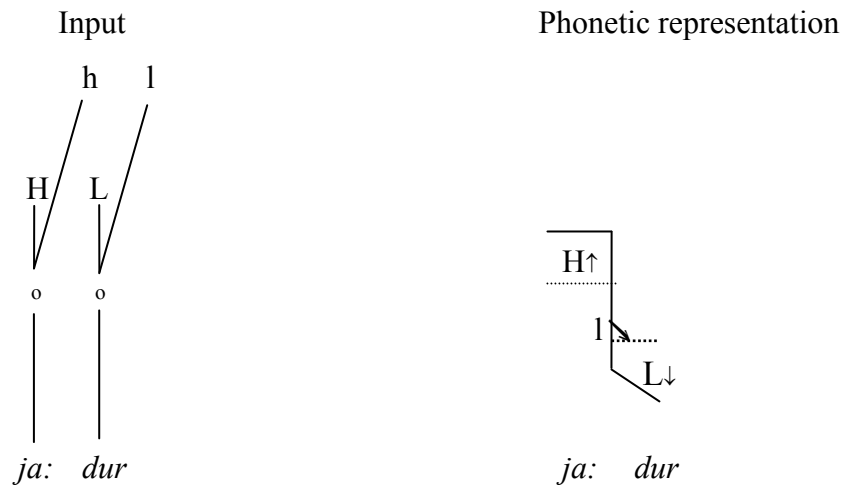
## 4.2 L melody

The underlying low melody surfaces as Low on all syllables. However, when this melody occurs at the end of an utterance, the tone is realized as a low fall (i.e., a low tone whose pitch falls even further). Consider the

following data (notice that the down arrow, ↓, that occurs after the final low tone indicates the fall):

- |   |   |   |
|---|---|---|
| $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} \end{array}$ |   | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} \end{array}$           |
| (2) a. <i>bama</i> <i>je</i>  | → | [ <i>bama je</i> ]  |
| prostitution his  |   |   |
| ‘his prostitution’  |   |   |
| $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} \end{array}$ |   | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} \end{array}$           |
| b. <i>wunu</i> <i>je</i>  | → | [ <i>wunu je</i> ]  |
| peanut his  |   |   |
| ‘his peanut’  |   |   |
| $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} \\ \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} \end{array}$ |   | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}}\downarrow \\ \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{>}} \end{array}$ |
| c. <i>nə</i> <i>wunu</i>  | → | [ <i>nə wunu</i> ]  |
| with peanut   |   |   |
| ‘with peanut’   |   |   |
| $\begin{array}{cc} \underline{\underline{H}} & \underline{\underline{L}} \\ \underline{\underline{=}} & \underline{\underline{=}} \end{array}$  |   | $\begin{array}{cc} \underline{\underline{H}} & \underline{\underline{L}}\downarrow \\ \underline{\underline{=}} & \underline{\underline{>}} \end{array}$  |
| d. <i>ja:</i> <i>dur</i>  | → | [ <i>ja: dur</i> ]  |
| which robe  |   |   |
| ‘which robe’  |   |   |

In some African languages, the low tone falls or downglides utterance finally. It is pronounced at the lowest pitch level. Appendix B shows pitch traces of the data in (2). The final low tone falls from about 110 Hz to around 60 Hz. The downgliding of the final low tone is accounted for, in Njyem, by assuming that it is the effect of *intonation* that causes any utterance-final associated low tone to be realized as a low-falling tone. The following representation in figure 3 shows this realization.



**Figure 3.** Downgliding of final low tone

Notice that this fall is attributed in the phonetic component to low tones that are utterance-final. The slanted nature of the final tone shows that the pitch falls even lower than that of a normal low tone.

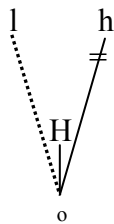
### 4.3 HL melody

On disyllabic nouns, the HL melody is realized as a high tone on the first syllable and a low tone on the second. On monosyllabic nouns, it is realized as a HL tone glide. However, when a high-toned morpheme follows the HL melody, the following high tone is automatically downstepped, as shown in the data below. Notice that downdrift and downstep of high tones is triggered by a specific phonological tone, typically a low tone in many African languages. In this paper, I follow Stewart (1965) and refer to the lowering that is triggered by an associated low tone as automatic downstep (downdrift) and that which is triggered by a floating low tone as non-automatic downstep (downstep). Some linguists still think, however, that the floating tone analysis of downstep has the disadvantage that there is no segmental precedent for a floating, phonetically unrealized feature exerting ongoing phonological effects. Amongst them, Clark (1990) and Yip (2002) prefer to talk about *covert low tones* that fail to surface. Even though this issue remains unsettled, it is agreed that there is a low tone, either floating or covert, that is present in a downstep environment. Observe the data in (3):



- (3) a.  $\begin{array}{ccc} \underline{\underline{LH}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{---}} & \underline{\underline{---}} & \underline{\underline{---}} \end{array}$        $\begin{array}{ccc} \underline{\underline{LH}} & \underline{\underline{L}} & \underline{\underline{\downarrow H}} \\ \underline{\underline{---}} & \underline{\underline{---}} & \underline{\underline{---}} \end{array}$   
 a. *ntama*      *je*      →      [*ntama*      *je*]  
 pepper      his  
 ‘his pepper’
- b.  $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{---}} & \underline{\underline{---}} & \underline{\underline{---}} \end{array}$        $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{\downarrow H}} \\ \underline{\underline{---}} & \underline{\underline{---}} & \underline{\underline{---}} \end{array}$   
 b. *dina*      *je*      →      [*dina*      *je*]  
 reception      his  
 ‘his reception’
- c.  $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{---}} & \underline{\underline{---}} & \underline{\underline{---}} \end{array}$        $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{\downarrow H}} \\ \underline{\underline{---}} & \underline{\underline{---}} & \underline{\underline{---}} \end{array}$   
 c. *kura*      *je*      →      [*kura*      *je*]  
 blow      his  
 ‘his blow’

The account I suggest for these data is that the Low of the HL spreads its register to and delinks the following high register, following the rule of l-spread and h-delink formulated in figure 4. The high tone that follows the HL is therefore realized on the preceding low register, leading to automatic downstep. The first high tone is realized around 280 Hz but the second is realized at about 240 Hz. Pitch traces of the data in (3) are given in Appendix C.



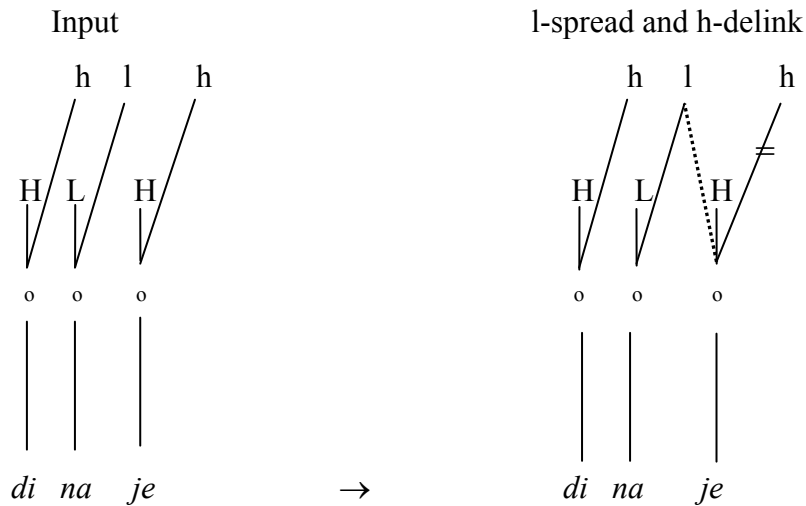
**Figure 4.** l-spread and h-delink

According to this rule, a low register feature spreads onto the following TRN, and, in a subsequent process, delinks the high register feature from that node.

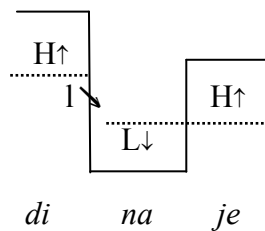
As said above, automatic downstep describes a situation where a high tone lowers after an overt low tone. It has been observed, for example, in Chumburung (a Kwa language spoken in Ghana) that

whenever a high tone follows a low tone within a phonological phrase, there is automatic downstep; i.e., the High is realized on the same (lower) register as the Low (Snider 1999: 74).

This assumption is also true for Njyem, as shown in the data above. The spreading affects all of the TBUs that are linked to the TRN since the target of the spread is the TRN. The following derivation accounts for the above data:



Phonetic representation



**Figure 5.** Downstep of high tone in HLH sequence

To handle this type of situation, it has also been observed that in a HLH sequence the low

causes its own syllable to have a pitch at the low end of the pitch range. Second, it causes the whole pitch range to move down. This in turn means that the second H

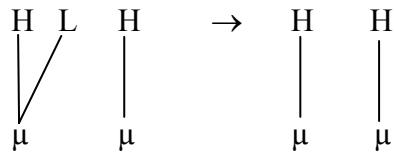
has a lower phonetic pitch than the first H, so that phonetically we get something like [H L M]. (Yip 2002: 11.)

The monosyllabic nouns with the same HL melody behave differently when a high-toned morpheme is appended to them. Observe the examples below.

- |        |  |   |   |   |   |
|--------|--|---|---|---|---|
|        | $\begin{array}{c} \text{HL} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ |   | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ |
| (4) a. | <i>kul</i>   | <i>je</i>   | → | [ <i>kul je</i> ]   |   |
|        | race   | his   |   |   |   |
|        | ‘his race’   |   |   |   |   |
|        |  |   |   |   |   |
|        | $\begin{array}{c} \text{HL} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ |   | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ |
| b.     | <i>lam</i>   | <i>je</i>   | → | [ <i>lam je</i> ]   |   |
|        | trap   | his   |   |   |   |
|        | ‘his trap’   |   |   |   |   |
|        |  |   |   |   |   |
|        | $\begin{array}{c} \text{HL} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ |   | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ | $\begin{array}{c} \text{H} \\ \underline{\quad} \\ \underline{\quad} \end{array}$ |
| c.     | <i>na</i>  | <i>je</i>   | → | [ <i>na je</i> ]  |   |
|        | claw   | her   |   |   |   |
|        | ‘her claw’   |   |   |   |   |

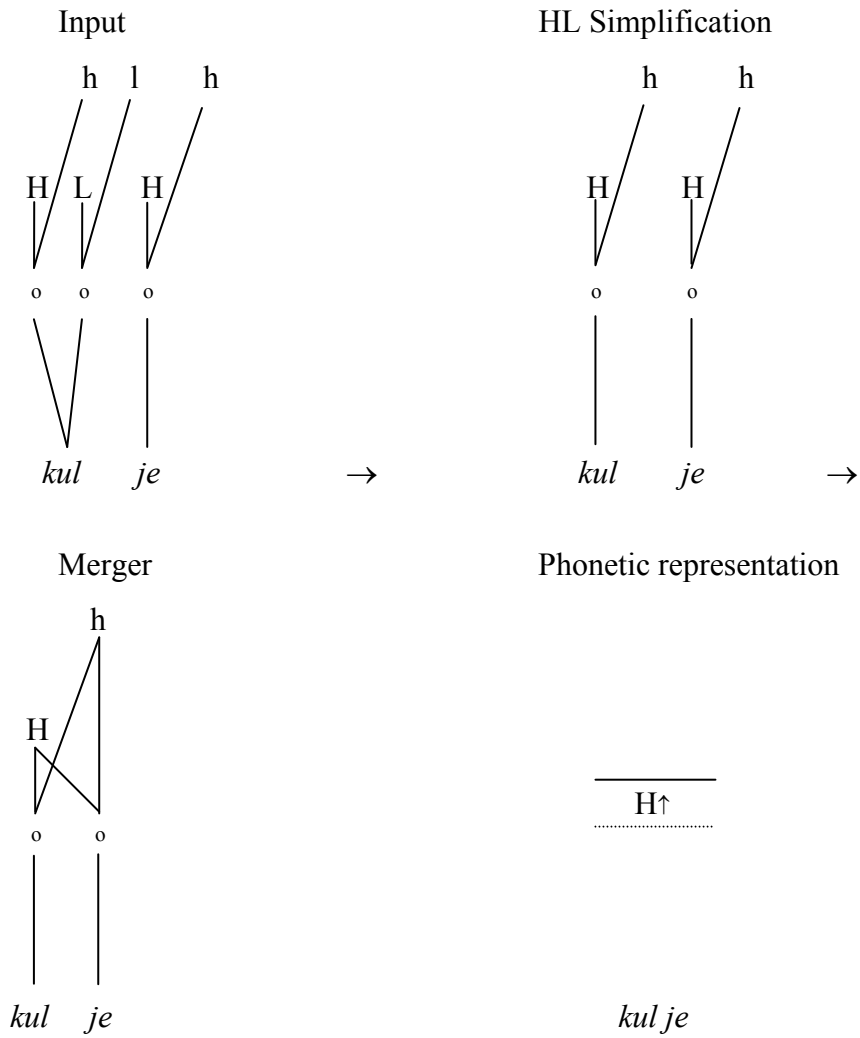
In these data, the HL melody is realized as High, yet its register is identical to that of the following high tone suffix that is attached after it. Both morphemes are realized at about 280 Hz. Pitch traces of the data in (4) are shown in Appendix D. To account for the fact that both morphemes are realized on a high tone, it is assumed that the HL contour tone is simplified to a high tone when it occurs before another high tone, as shown in the rule in figure 6. This is followed by the merging of the two high tones (motivated by the OCP<sup>1</sup>), allowing both to be realized on the same register.

<sup>1</sup> The OCP is a cover term for a set of principles that conspire in many languages to prohibit the occurrence of adjacent identical features on nonskeletal tiers (cf. McCarthy 1986; Odden 1986, 1988; Myers 1997; Snider 1999). In Njyem this principle prohibits adjacent identical tones within a single morpheme, across morpheme boundaries, as well as across word boundaries.



**Figure 6.** HL Simplification

This rule says that a HL contour tone is simplified to a high tone when it is followed by a high tone. To understand how these processes work, follow the derivation below.



**Figure 7.** HL Simplifies to H

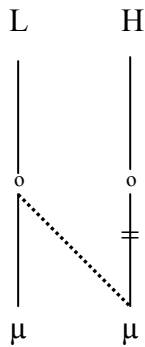
*Merger* is a repair strategy that languages use to satisfy OCP constraints.

#### 4.4 LH melody

For its part, the LH melody surfaces as a non-falling Low on all syllable types, as reflected in the following words.

- |  |   |  |
|--|---|--|
| $\begin{array}{c} \text{LH} \\ \text{—} \\ \text{—} \end{array}$   | → | $\begin{array}{c} \text{L} \\ \text{—} \\ \text{—} \end{array}$  |
| (5) a. <i>gʊ</i><br><i>madman</i><br>‘madman’  |   | $[\text{gʊ}]$  |
| $\begin{array}{c} \text{LH} \\ \text{—} \\ \text{—} \end{array}$   | → | $\begin{array}{c} \text{L} \\ \text{—} \\ \text{—} \end{array}$  |
| b. <i>kɔb</i><br><i>fault</i><br>‘fault’   |   | $[\text{kɔb}]$   |
| $\begin{array}{c} \text{L} \quad \text{H} \\ \text{—} \quad \text{—} \\ \text{—} \quad \text{—} \end{array}$ | → | $\begin{array}{c} \text{L} \quad \text{L} \\ \text{—} \quad \text{—} \\ \text{—} \quad \text{—} \end{array}$ |
| c. <i>sɔgɔ</i><br><i>duck</i><br>‘duck’  |   | $[\text{sɔgɔ}]$  |

These data show that the underlying LH melody surfaces as a non-falling Low, realized around 120 Hz. Appendix E shows the pitch traces of the data in (5). The data in (5) can be analysed as follows: the low tone of the LH melody spreads its TRN to the high tone and delinks it completely. Notice that this happens within a given domain of tone, in this case a phonological word. This is captured by the following rule:



**Figure 8.** Low Tone Spread (LTS)

This rule says that a low tone spreads from its TRN onto the following high TBU, and in a separate process, delinks that high tone.

It could be argued that the high tone is floating in this melody and remains as such in environments where this melody surfaces as Low and in environments where it surfaces as LH it docks leftwards. This assumption is discarded by the fact that the docking or failure to dock of this floating high tone will not be constant. Consider, for example, what happens with the following sets of data.

- (6) a.  $\begin{array}{c} \text{LH} \\ \text{Z} \\ \text{---} \end{array} \quad \rightarrow \quad \begin{array}{c} \text{L} \\ \text{---} \\ \text{---} \end{array}$   
*kɔb* → [*kɔb*]  
 fault  
 ‘fault’
- b.  $\begin{array}{c} \text{L} \quad \text{H} \\ \text{---} \quad \text{---} \\ \text{---} \end{array} \quad \rightarrow \quad \begin{array}{c} \text{L} \quad \text{L} \\ \text{---} \quad \text{---} \\ \text{---} \end{array}$   
*tʃila* → [*tʃila*]  
 taboo  
 ‘taboo’
- c.  $\begin{array}{c} \text{LH} \quad \text{H} \\ \text{Z} \quad \text{---} \\ \text{---} \end{array} \quad \rightarrow \quad \begin{array}{c} \text{L} \quad \text{H} \\ \text{---} \quad \text{---} \\ \text{---} \end{array}$   
*kɔb jin* → [*kɔb jin*]  
 fault your  
 ‘your fault’

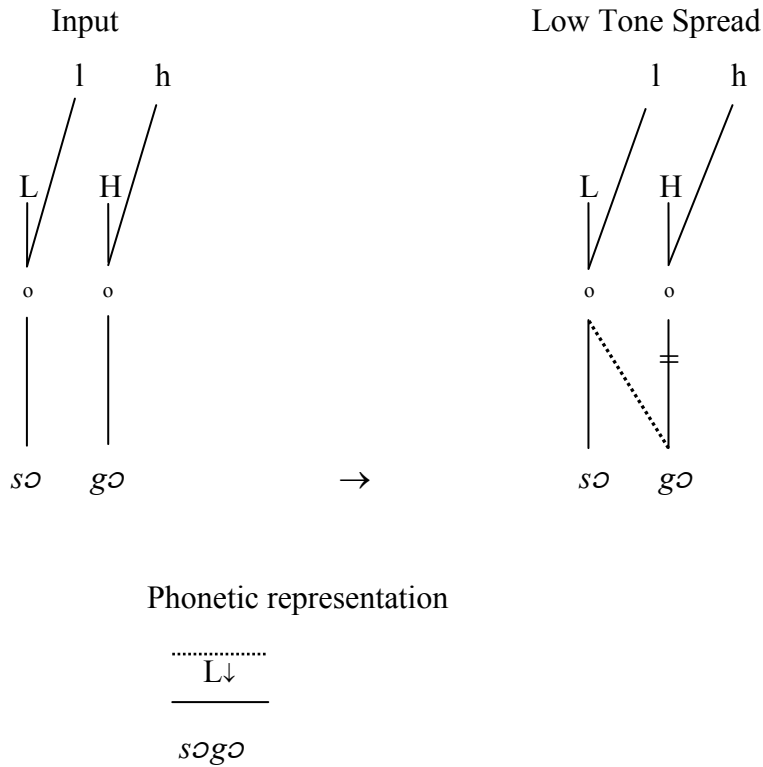
$\begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{H}} \\ \underline{\quad} \quad \underline{\quad} \end{array}$	$\begin{array}{c} \underline{\underline{H}} \\ \underline{\quad} \end{array}$	→	$\begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{L}} \quad \underline{\underline{H}} \\ \underline{\quad} \quad \underline{\quad} \quad \underline{\quad} \end{array}$
d. <i>sɔgɔ</i>	<i>gwɔr</i>		[ <i>sɔgɔ gwɔr</i> ]
duck	one		
‘one duck’			

$\begin{array}{c} \underline{\underline{LH}} \quad \underline{\underline{L}} \\ \underline{\quad} \quad \underline{\quad} \end{array}$	→	$\begin{array}{c} \underline{\underline{LH}} \quad \underline{\underline{L}}\downarrow \\ \underline{\quad} \quad \underline{\quad} \end{array}$
e. <i>kɔb ni</i>		[ <i>kɔb ni</i> ]
fault this		
‘this fault’		

$\begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{H}} \quad \underline{\underline{L}} \\ \underline{\quad} \quad \underline{\quad} \quad \underline{\quad} \end{array}$	→	$\begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{H}} \quad \underline{\underline{L}}\downarrow \\ \underline{\quad} \quad \underline{\quad} \quad \underline{\quad} \end{array}$
f. <i>sɔgɔ ja:</i>		[ <i>sɔgɔ ja:</i> ]
duck that		
‘that duck’		

In (6a–b) nouns are given in isolation. High-toned morphemes are appended to the LH melody in (6c–d), and low-toned morphemes follow those in (6e–f). In (6a–b) and (6c–d), docking fails to occur but in (6e–f), it does. If a claim is made that docking fails to apply because the floating tone is followed by a high-toned morpheme, it will still be required to say why it does not apply to the forms in (6a–b). Again an explanation will still have to be given for the absence of the low tone on the second syllable of two-syllable nouns like [sɔgɔ] that would be expected to surface as \*[sɔgɔ] if there were a floating high tone that docked. This renders the picture more complicated. Even if it were possible to simplify the formulations and conclude that there is an underlying floating high tone, it still does not allow one to collapse the L and LH melodies into one because of the failure of low tones to downglide utterance-finally in the LH melody.

Notice that this nondowngliding Low, which in such environments does not fall, contrasts with the gliding low tone shown in section 4.2. Since utterance-final low tones are phonetically realized as falling in many African languages (Snider 1999: 119), the fact that the Low of this LH melody is not utterance-final (due to the final floating High, that results from Low Tone Spread) provides a reasonable explanation for its failure to downglide. Consider the derivation that follows.

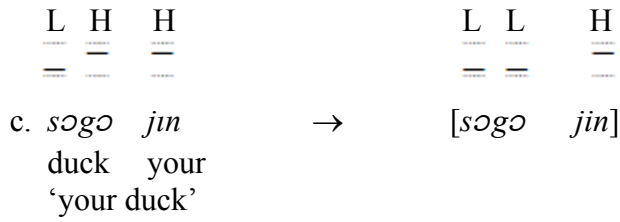


**Figure 9.** Application of Low tone spread

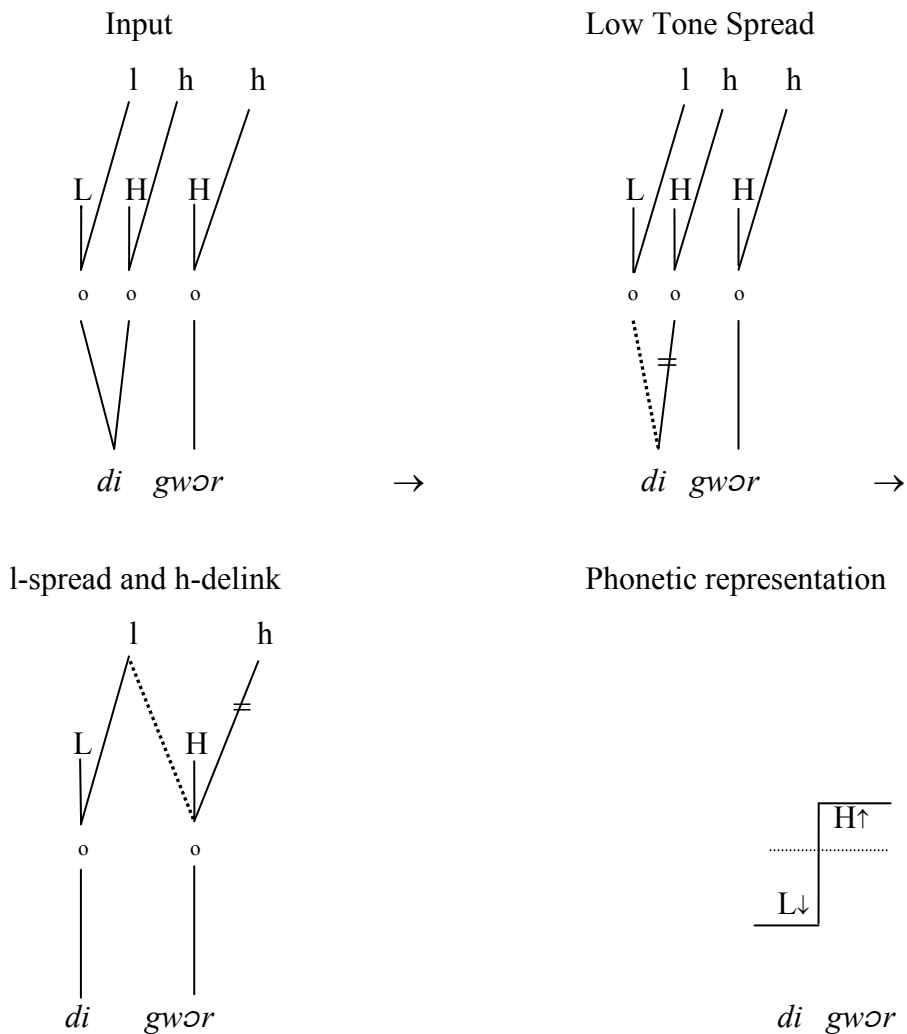
Similarly, as mentioned above, when a high-toned morpheme follows the LH melody, spreading and delinking still occur within this melody as the examples in (7) demonstrate.

- (7) a.  $\begin{array}{c} \underline{\underline{LH}} \quad \underline{\underline{H}} \\ \textit{sula} \quad \textit{jin} \end{array} \rightarrow \begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{L}} \quad \underline{\underline{H}} \\ [\textit{sula} \quad \textit{jin}] \end{array}$   
 sermon your  
 ‘your sermon’
- b.  $\begin{array}{c} \underline{\underline{LH}} \quad \underline{\underline{H}} \\ \textit{di} \quad \textit{gwɔr} \end{array} \rightarrow \begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{H}} \\ [\textit{di} \quad \textit{gwɔr}] \end{array}$   
 residence one  
 ‘one residence’





These data show that the underlying LH melody is realised as Low (around 120 Hz) when found before a high-toned morpheme. Pitch traces of the data in (7) are shown in Appendix F. The data in (7) can therefore be derived as follows.

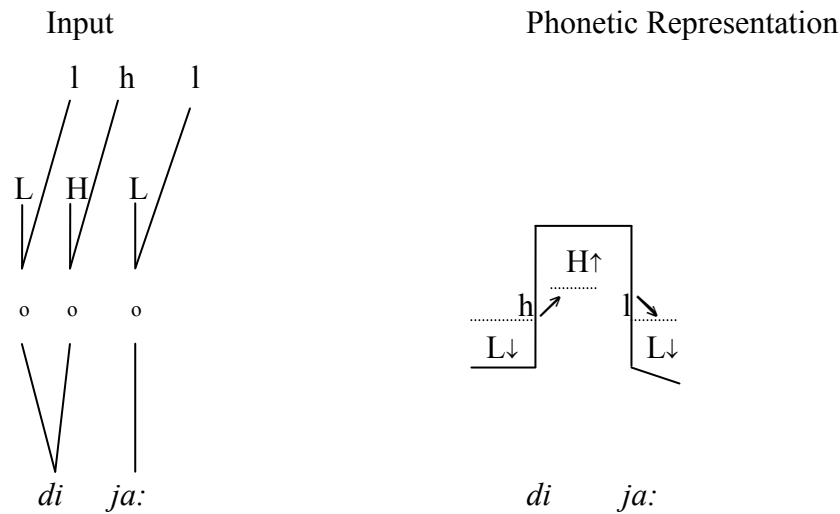


**Figure 10.** LH realized as L before H

However, as said briefly above, when a low-toned suffix is added after the LH melody, this LH melody surfaces as the underlying LH. Examples are presented in (8).

- (8) a.  $\begin{array}{cc} \overline{\text{LH}} & \overline{\text{L}} \\ \text{<} & \text{=} \end{array}$        $\rightarrow$        $\begin{array}{cc} \overline{\text{LH}} & \overline{\text{L}\downarrow} \\ \text{<} & \text{>} \end{array}$   
*ntu*      *ni*       $\rightarrow$       [*ntu ni*]  
 quarrel this  
 ‘this quarrel’
- b.  $\begin{array}{cc} \overline{\text{LH}} & \overline{\text{L}} \\ \text{<} & \text{=} \end{array}$        $\rightarrow$        $\begin{array}{cc} \overline{\text{LH}} & \overline{\text{L}\downarrow} \\ \text{<} & \text{>} \end{array}$   
*di*      *ja:*       $\rightarrow$       [*di ja:*]  
 residence that  
 ‘that residence’
- c.  $\begin{array}{ccc} \overline{\text{L}} & \overline{\text{H}} & \overline{\text{L}} \\ \text{=} & \text{=} & \text{=} \end{array}$        $\rightarrow$        $\begin{array}{ccc} \overline{\text{L}} & \overline{\text{H}} & \overline{\text{L}\downarrow} \\ \text{=} & \text{=} & \text{>} \end{array}$   
*ʃùlá*      *nì*       $\rightarrow$       [*ʃula ni*]  
 sermon this  
 ‘this sermon’

The fact that this LH melody occurs as such on the surface suggests that the low tone morpheme appended to these roots blocks Low Tone Spread from occurring, allowing the surface forms to remain the same as the underlying LH melody. This could also be viewed as an OCP constraint, involving low tones. The representation that follows shows that if Low Tone Spread occurs, the OCP will be violated.



**Figure 11.** LH realized as LH before L

Pitch traces of the data in (8) are shown in Appendix G.

## 5. Tonal effect of noun class prefixes

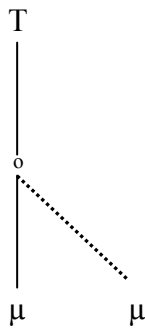
Njyem nouns may consist of a prefix followed by a stem. Most class 1 nouns and all classes 2, 4, 5, 6, 7, 8, and 11 nouns have prefixes. A few nouns in class 1 occur without a prefix. All nouns in classes 3, 7, and 9 occur without prefixes. Generally, when prefixes occur in citation form, they bear low tones. However, when a high-toned morpheme precedes a noun the nominal prefix surfaces with a high tone. Consider the following data:<sup>2</sup>

- (9) a. *lè-pihò*  
 C5-behind  
 ‘behind’
- b. *mì-nùm*  
 C4-mouth  
 ‘mouths’

<sup>2</sup> In a Njyem noun phrase, the head noun can occupy the initial position and be followed by modifying elements where they occur. However, in question formation, the interrogative adjective obligatorily occupies the initial position. The possessive pronoun ‘his/her’, on its part behaves in a flexible manner, occurring either before or after the head noun in a noun phrase. Whether this freedom is determined by functions in discourse structure remains an open question.

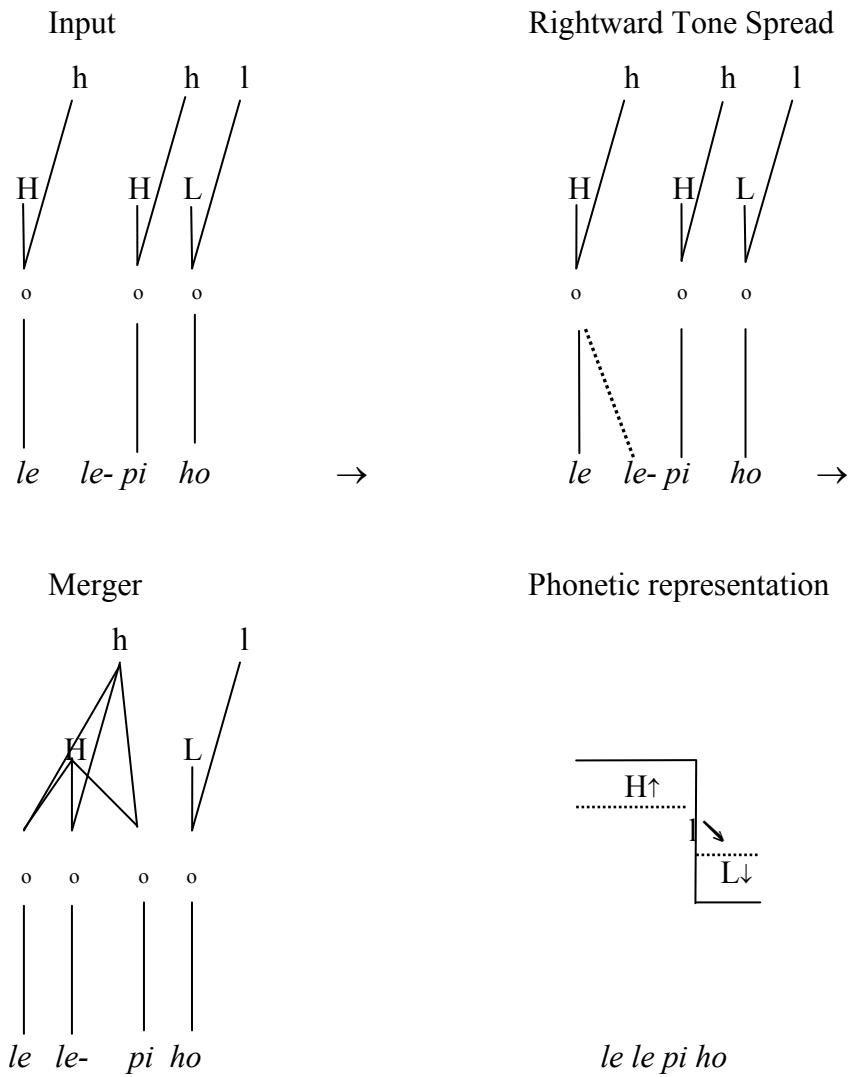
- c. *nà lè-píhò*  
with C5-behind  
'with behind'
- d. *nà mì-nùm*  
with C4-mouth  
'with mouths'
- e. *lé lé-píhò*  
his C5-behind  
'his behind'
- f. *mjé mì-nùm*  
his C4-mouth  
'his mouths'

These data suggest that the prefix is toneless and receives its tone by default as in (9a–b) or through spreading from the preceding TBU. This explains why the prefixes in (9c–d), which are preceded by a low-toned morpheme, bear low tones whereas those that are preceded by high-toned morphemes in (9e–f) bear high tones. The following rule captures how tone spread occurs.



**Figure 12.** Rightward Tone Spread (RTS)

This rule says that a tone spreads from its TRN onto the following toneless TBU. The data in (9) can therefore be derived as follows:



**Figure 13.** Application of Rightward tone spread

When a morpheme that ends in a vowel is added before a noun whose prefix is a vowel, the prefix vowel is deleted, as can be seen in the following data.

- (10) a. *wé símsá* cf. *ì-sìmsá*  
 his thought  
 'his thought'
- b. *wé kúrgá* cf. *ì-kúrgá*  
 his ill-luck  
 'his ill-luck'

c. *nà kúmá* cf. *ì-kúmá*  
 with wealth  
 ‘with wealth’

In these data, it is assumed that the vowel of the class prefix is deleted because it occurs after another vowel, giving that a sequence of such vowels is not accepted in Njyem (Akumbu 2006). The derivation in figure 14 shows how the data in (10) are derived.

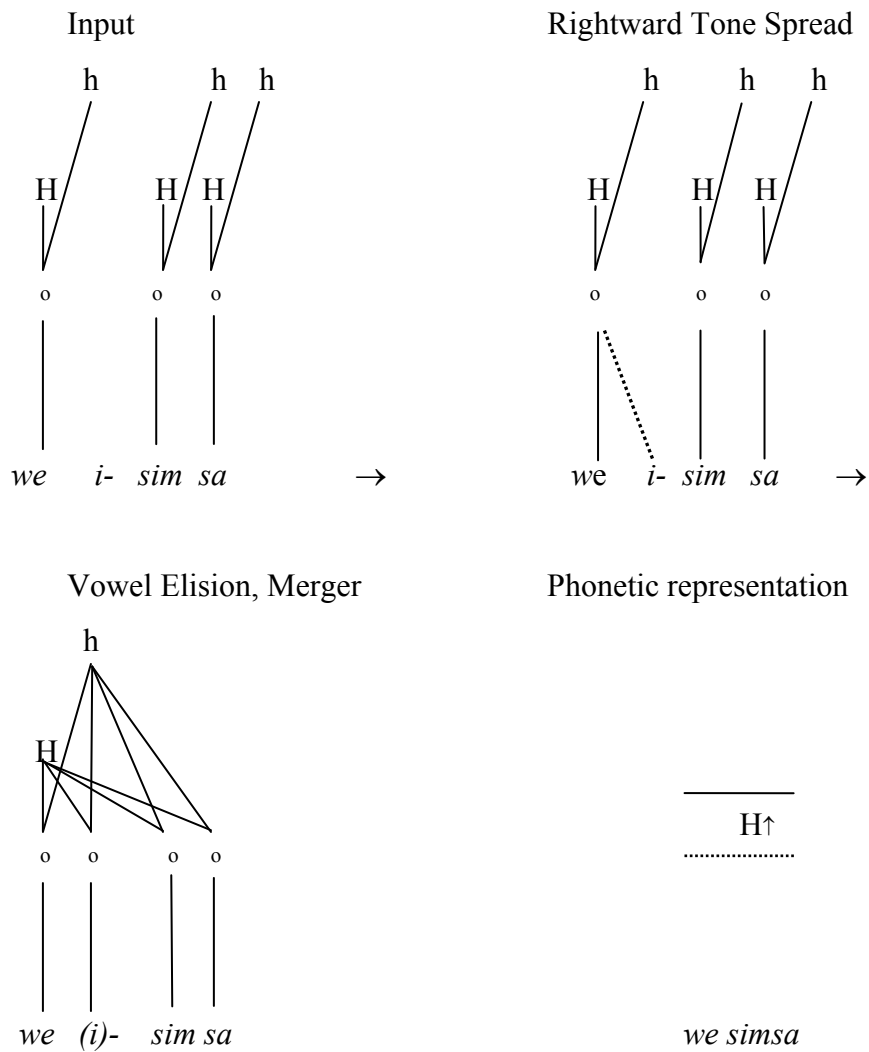


Figure 14. Prefix vowel deletion

## 6. Associative constructions

The associative constructions in Njyem can be grouped into three sets depending on the type of associative marker that they take. The marker can either be null, an overt high-toned morpheme or a floating high tone. In the following table, the various noun classes are grouped following the associative marker that occurs with them.

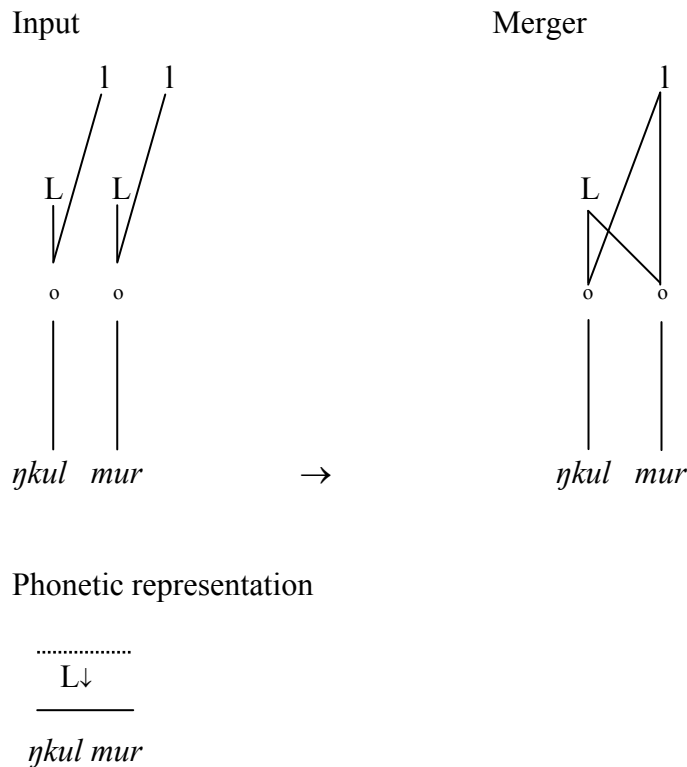
**Table 3.** Associative markers

Class	Association Marker
C1 and 9	zero morpheme ( $\emptyset$ )
C2, 4, 5, 6, 8, and 11	overt high-toned morpheme (bé, mí, lé, mé, and bí)
C3 and 7	floating high tone (´)

The first set of examples that follows contains classes 1 and 9 nouns in initial position (N1 position). In this set, there is neither an overt morpheme nor a tone that marks *association*. The data that follow are illustrative.

- (11) a. *m-ùr*      *ø-ηkàná*  
           C1-person C9-town  
           ‘city dweller’
- b. *m-ùmá*      *ø-sòη*  
           C1-woman C1-father  
           ‘father of woman’
- c. *ø-ηkùl*      *m-ùrím*  
           C9-force C1-man  
           ‘strength of man’

In these data, the classes 1 and 9 nouns neither undergo nor cause any tonal changes in the associative construction when they occur as the initial nouns. Similarly, the fact that non-automatic downstep does not occur with the H#H examples shows that there is no intervening low tone which typically marks agreement in C1 and C9 in Bantu (Meeussen 1967). This therefore confirms that there is no intervening tone that represents the associative marker in these cases. The following derivation represents such forms.



**Figure 15.** Realization of low tone in classes 1 and 9 nouns in Associative constructions

This derivation shows that the two low tones are coalesced by *merger*.

The next set of associative constructions contains classes 2, 4, 5, 6, 8, and 11 nouns. The associative marker in this set is an overt morpheme. It takes a high tone. If this morpheme occurs before an identical noun prefix, that prefix is deleted. Observe the following cases:

- (12) a. *mì-mò*      *mí*    *bé-ɲòŋ*  
C4-stomach    AM    C2-mother  
'mothers' stomachs'

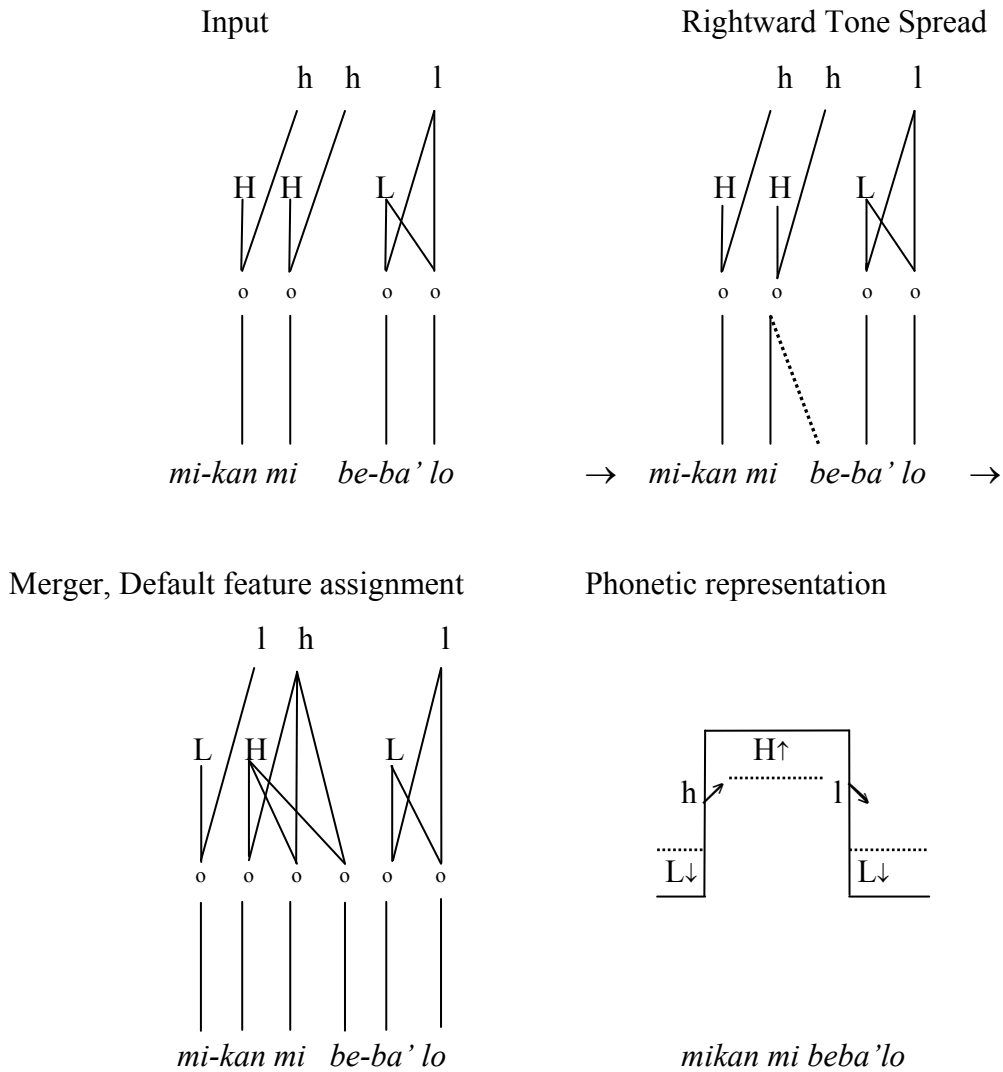
- b. *mì-kán*    *mí*    *bé-bà'lò*  
C4-cloth    AM    C2-guard  
'guards' clothes'

- c. *lè-mú'ú*    *lé-bú'ú*                    /*le-mú'ú lé le-bú'ú*/  
C5-jaw    C5-anger  
'jaw of anger'



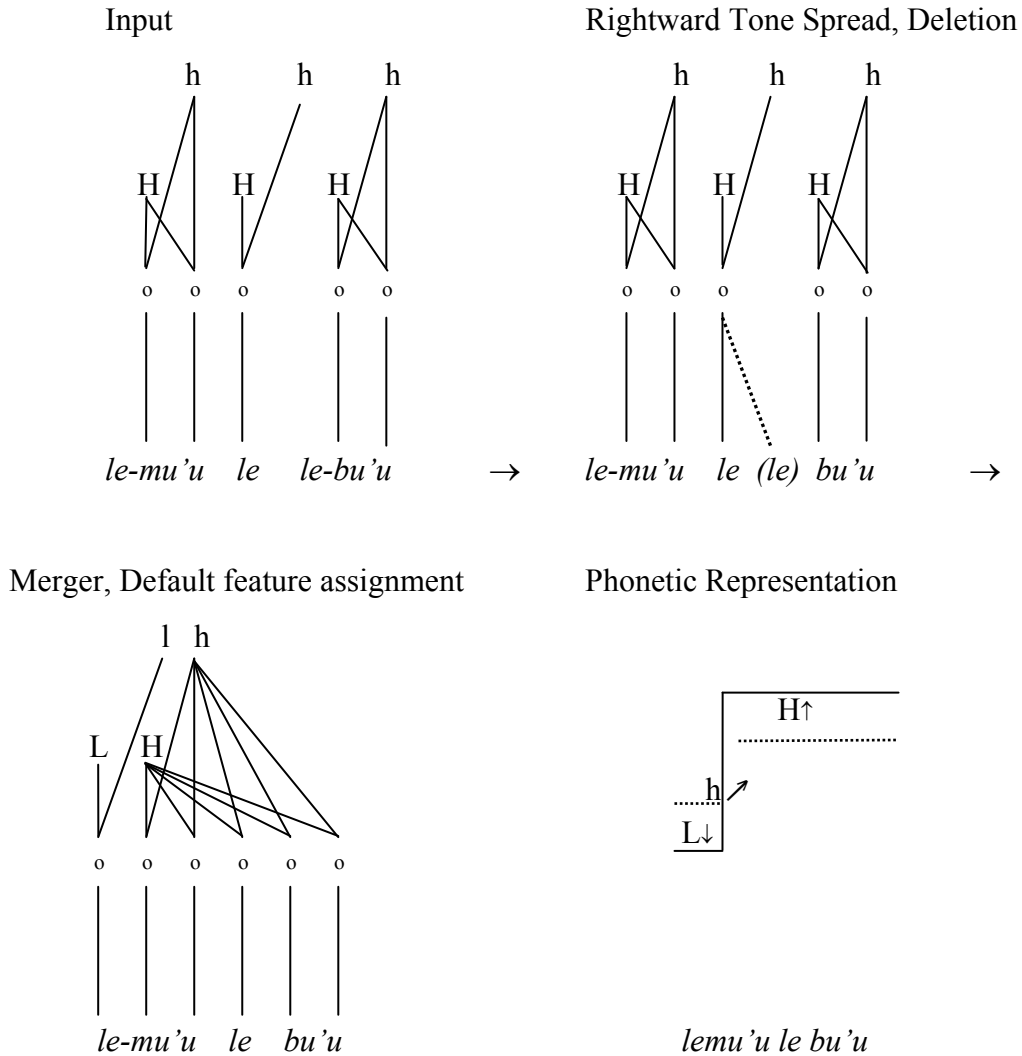
d. *mè-tjè'*      *mé-mpóm*      /*me-tiè'* *mé me-mpóm*/  
 C6-softness   C6-face  
 'softness of face'

In the examples in (12a–b), the associative marker [*mi*] occurs before the noun prefix [*bè*] but deletion does not occur because they are not identical. The associative marker simply spreads its high tone to the prefix that follows it, as shown in this derivation.



**Figure 16.** Rightward Tone Spread in Associative constructions

However, in (12c–d) where the associative marker and the following noun class marker are identical, only one of them occurs. It is assumed that the prefix is deleted in order to avoid redundancy. The fact that non-automatic downstep does not apply in this environment actually confirms the assumption that the prefix is toneless. See the derivation in figure 17.



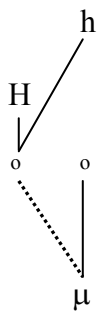
**Figure 17.** Rightward Tone Spread and Vowel Deletion in Associative constructions

The last set of associative constructions involves classes 3 and 7 nouns. Here, the associative marker is a floating high tone that occurs between the nouns. In many African languages, the associative construction is conveyed by means of a tonal morpheme (Williamson 1986; Chumbow & Nguendjio 1991). The floating high tone docks onto the noun on the right to form a

falling contour tone if it meets a low tone. The data that follow show such constructions (notice that /d/ is realized as [r] in word-final position).

- (13) a. *ø-kwún mî-kán* /kúún ' mi-kán/  
 C3-tail C4.AM-cloth  
 'cloth of tail'
- b. *ø-kàlò lé-tàṅlò* /kàlò ' le-tàṅlò/  
 C3-root C5.AM-story  
 'story of root'
- c. *ø-sámá ø-tʃím* /sámá ' tsím/  
 C7-group C7-AM.cry  
 'cry of group'
- d. *ø-dàlà m-úr* /dàlà ' mùd/  
 C7-pot C1-AM.person  
 'someone's pot'

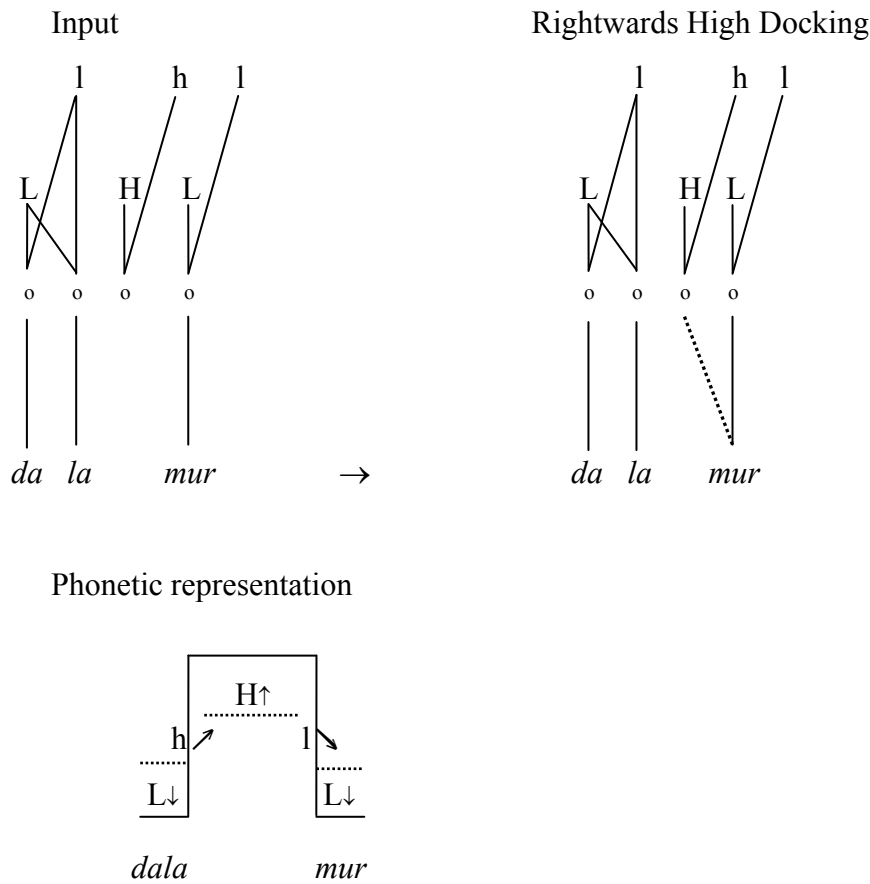
These examples show that the floating high tone that marks *association* docks onto the first TBU of the following noun. The rule that follows shows how this occurs.



Condition: It must be the high tone of the associative marker.

**Figure 18.** Rightwards High Docking

According to Rightwards High Docking the floating high tone of the associative marker docks onto the TBU to its right. Consider the derivation that follows.



**Figure 19.** Application of Rightwards High Docking

## 7. Conclusion

In this article, the morpheme structure of noun roots has been shown. In order to account for the surface melodies found on noun roots, their contrastive underlying tonal melodies have been given and the realization on the surface of each melody discussed within the framework of Register Tier Theory. Where the analysis is not transparent, supporting examples have been given to elucidate the arguments. This article has ended up by presenting the associative constructions in order to show how tones behave when nouns are collocated in larger nominal constructions. Some tone rules have been used to account for the data in this paper: l-spread and h-delink have been used to account for automatic downstep of high tones. HL Simplification shows that a HL contour tone is simplified to a high tone when followed by another high tone. Low Tone Spread prevents some utterance-final low tones from downgliding. Rightward tone spread has

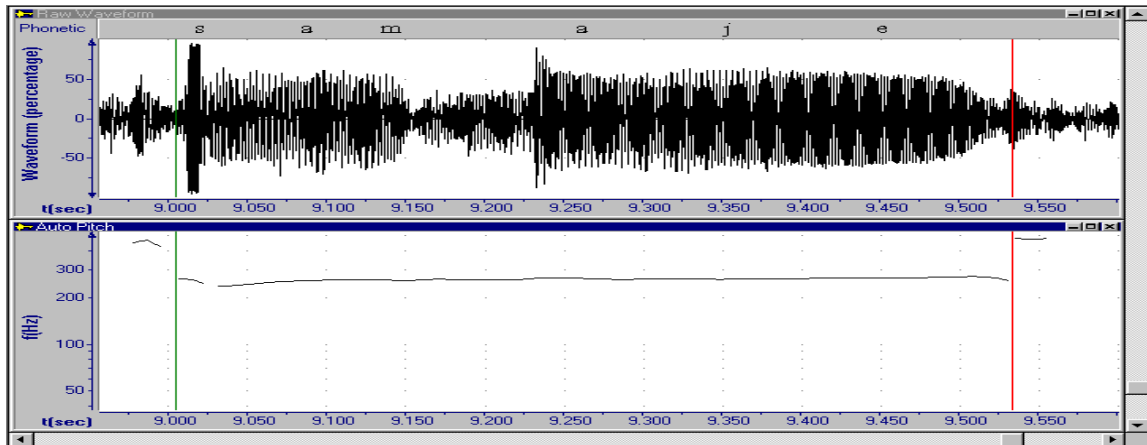
been used to attribute a tone to toneless prefixes. Rightwards High Docking accounts for the associative constructions that take a floating high tone. Derivations have been given to illustrate how the rules apply. Finally, it has been demonstrated in this paper that Register Tier Theory is useful in accounting for tonal processes that Njyem nouns undergo.

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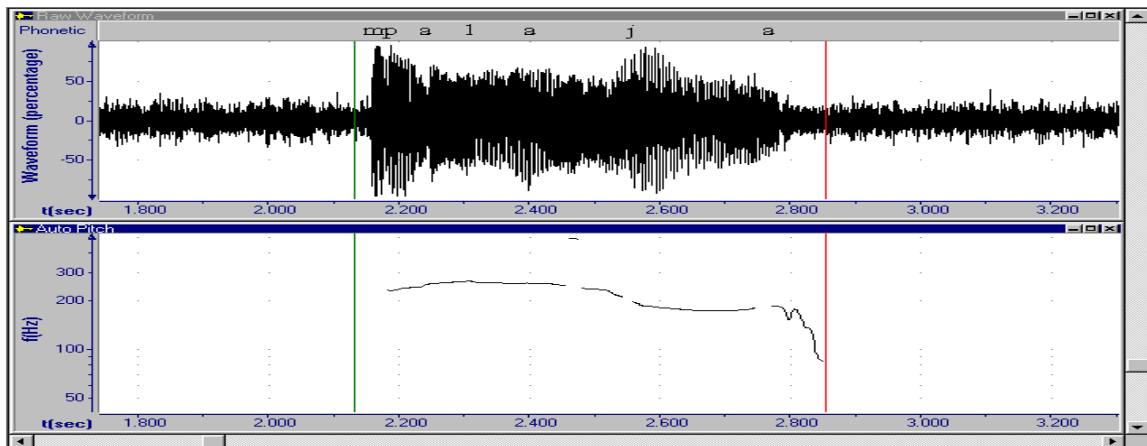
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## Appendices

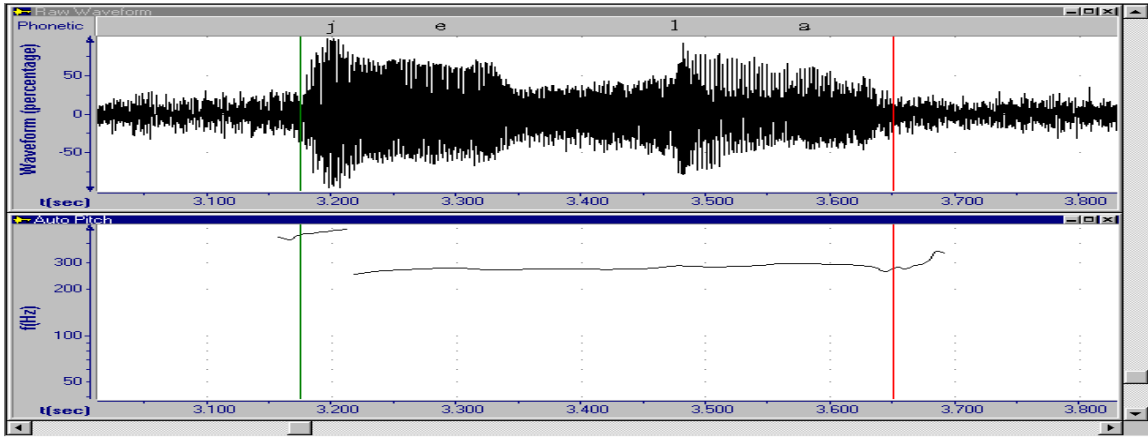
### Appendix A. H melody is realized as H.



his group

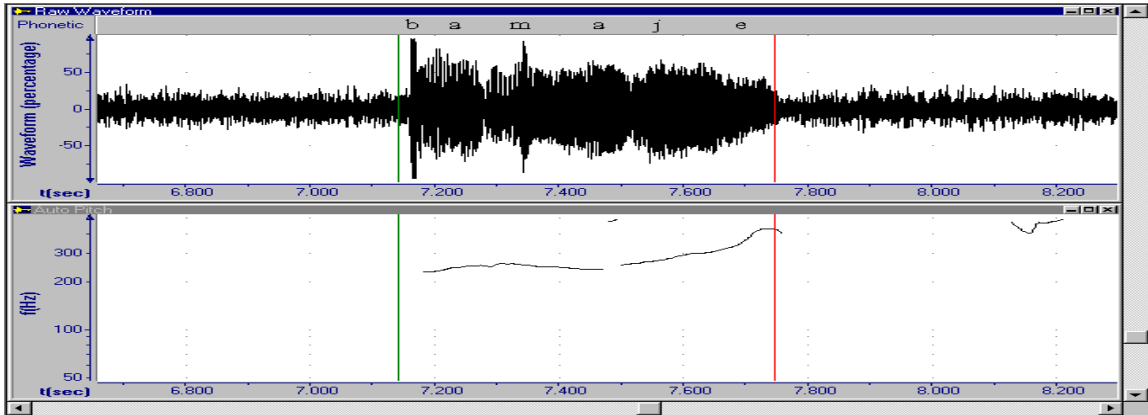


his camp

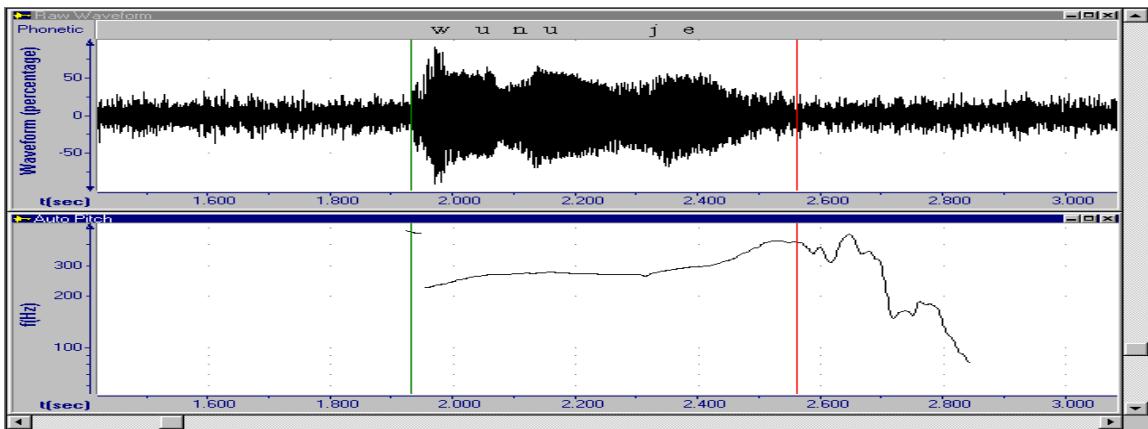


his glass

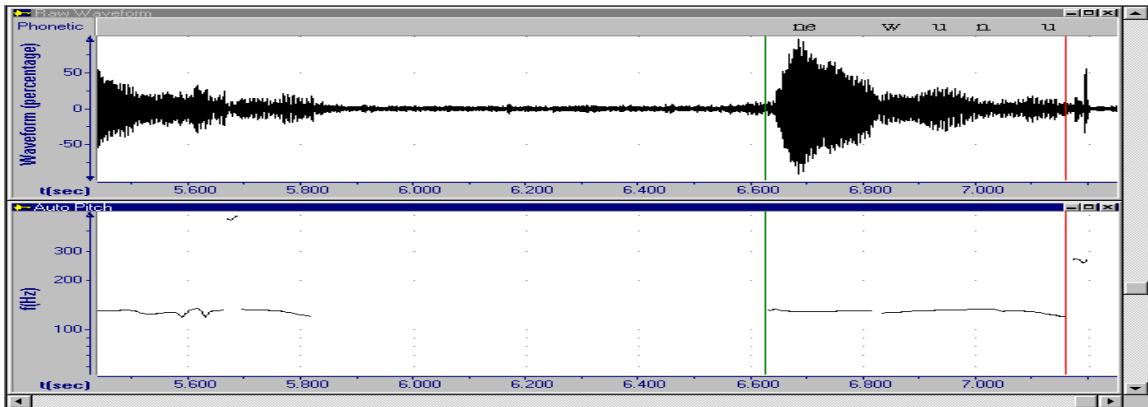
**Appendix B.** Final low tone downglides.



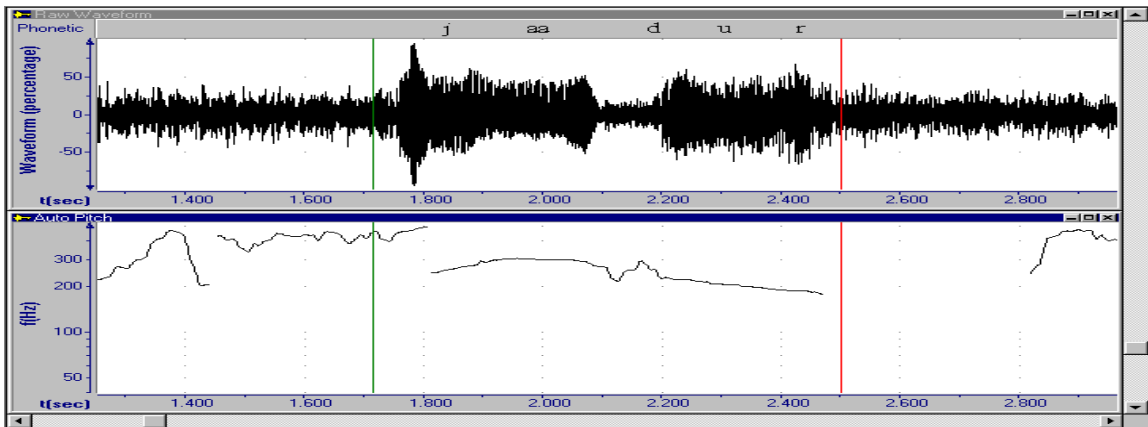
his prostitution



his peanut

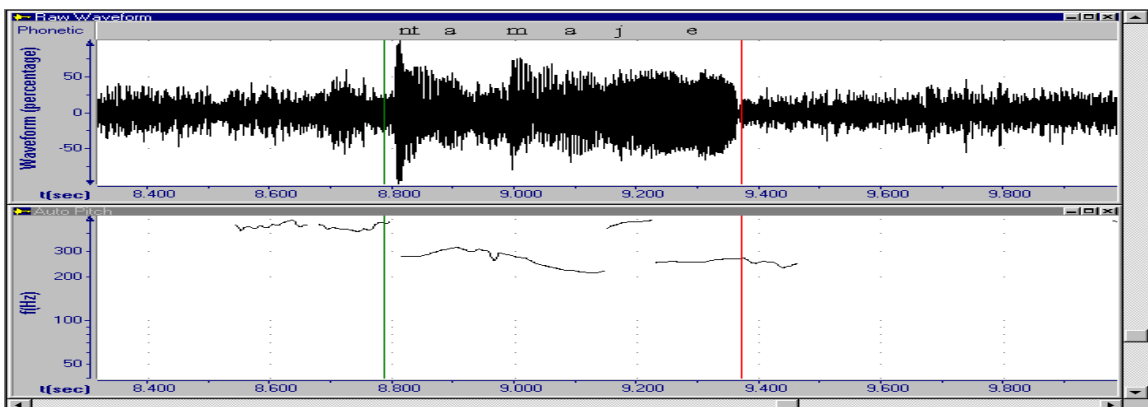


with peanut



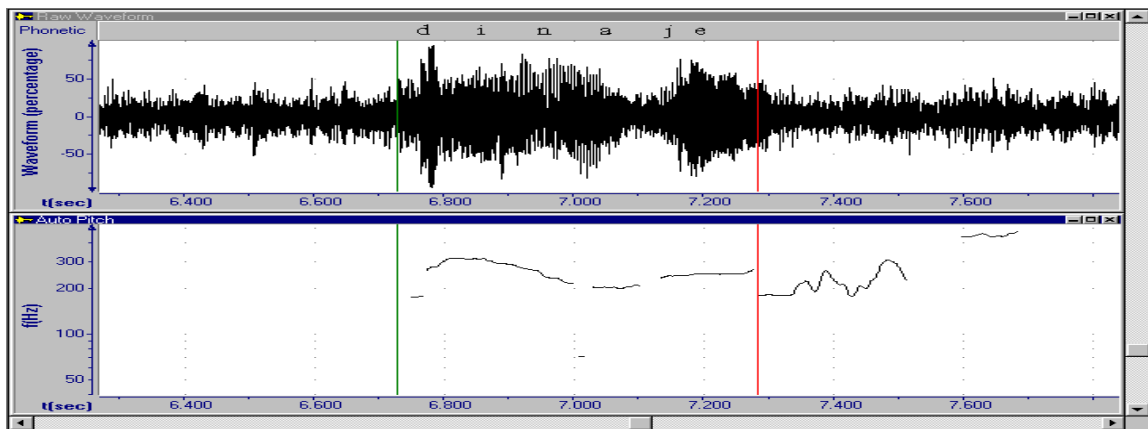
which robe

**Appendix C.** Downstep of second H in a H L H sequence.

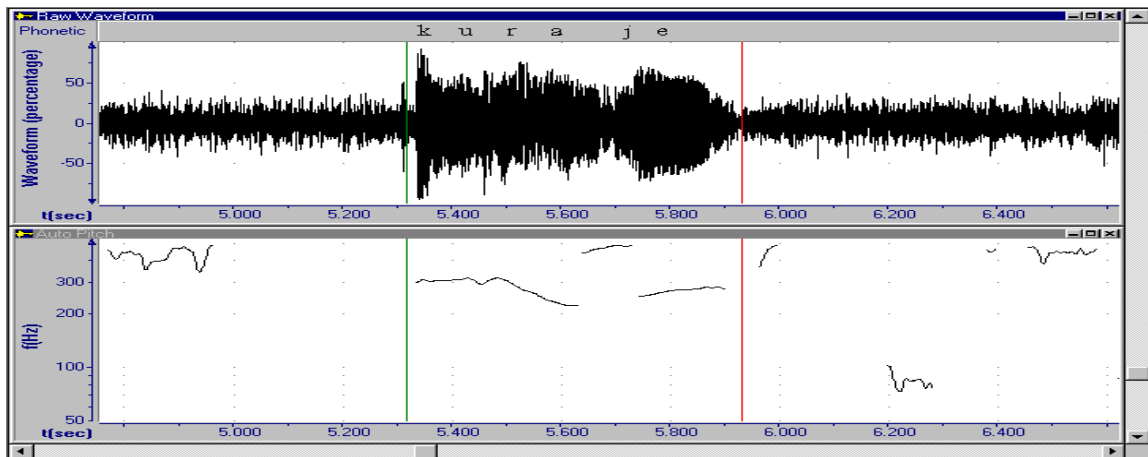


his pepper



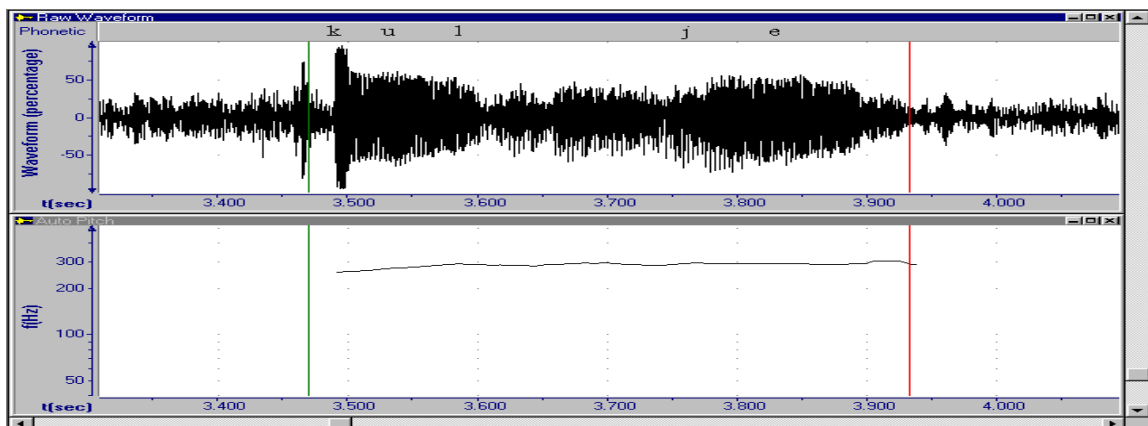


his reception

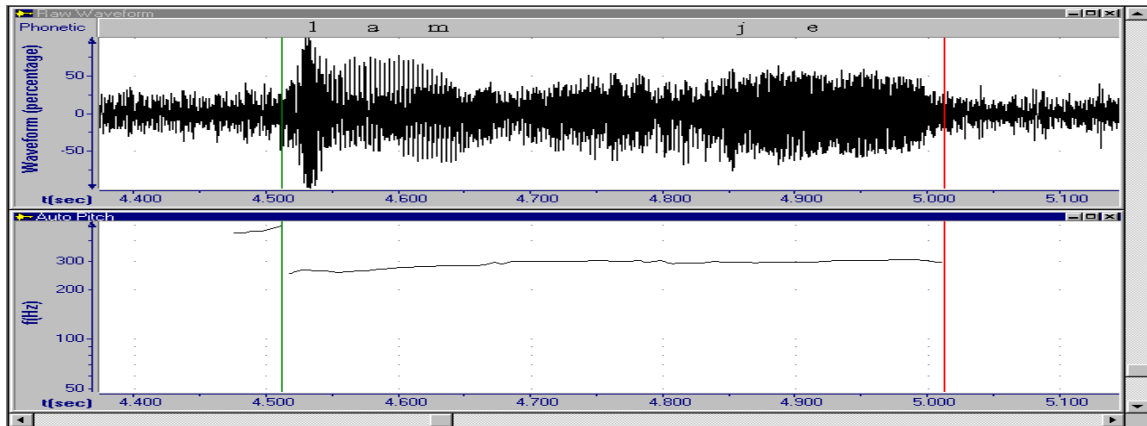


his blow

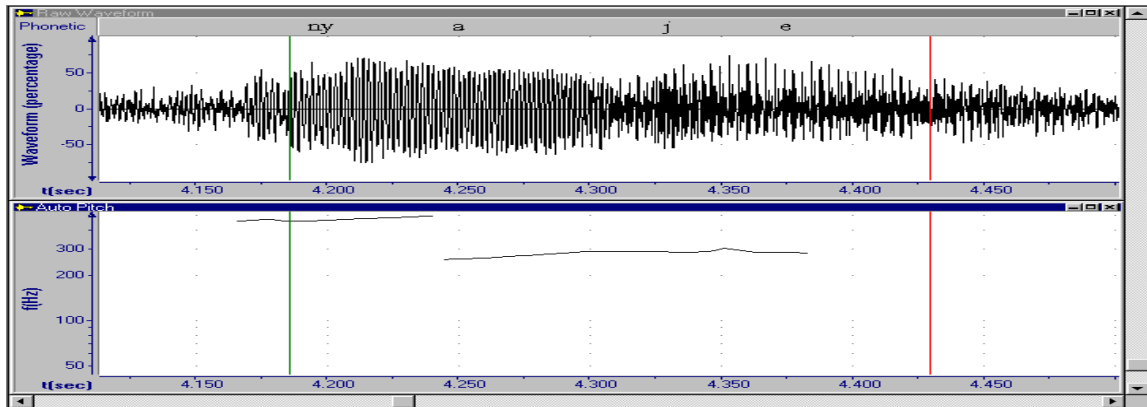
#### Appendix D. HL H surfaces as H.



his race

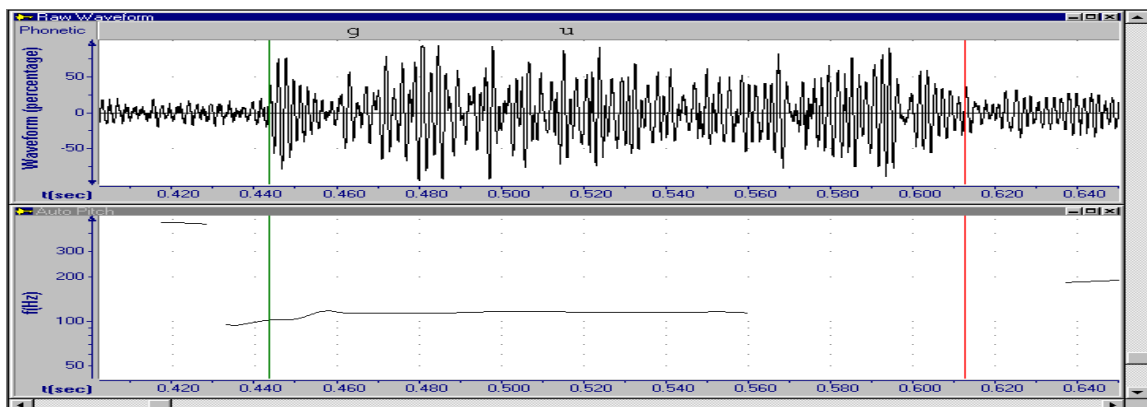


his trap

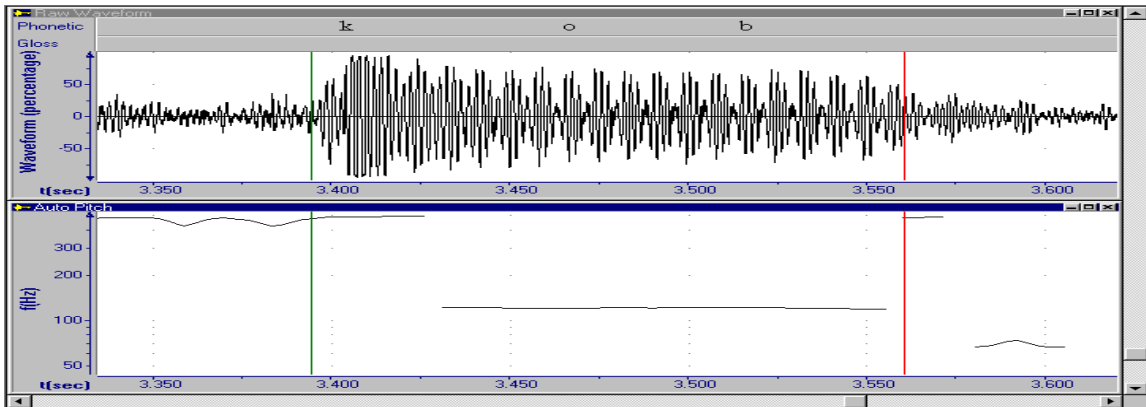


his claw

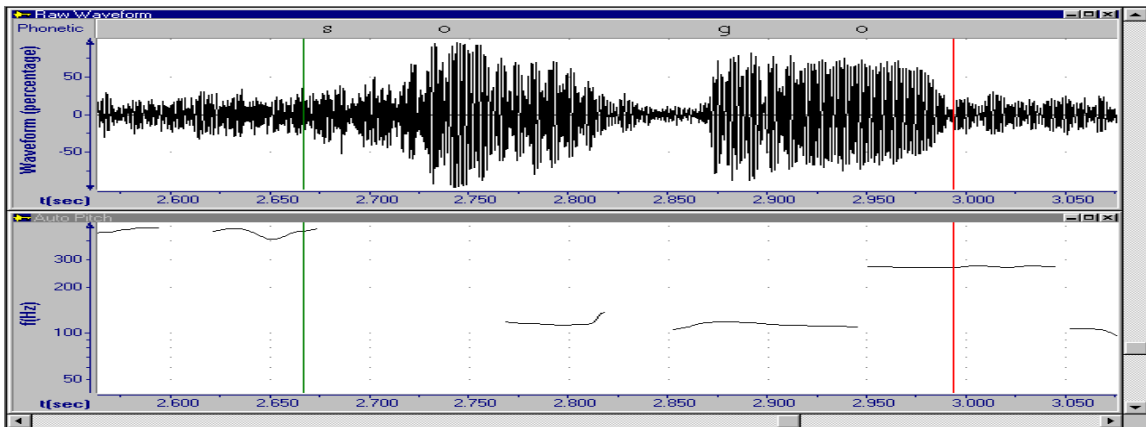
Appendix E. LH Melody surfaces as L.



madman

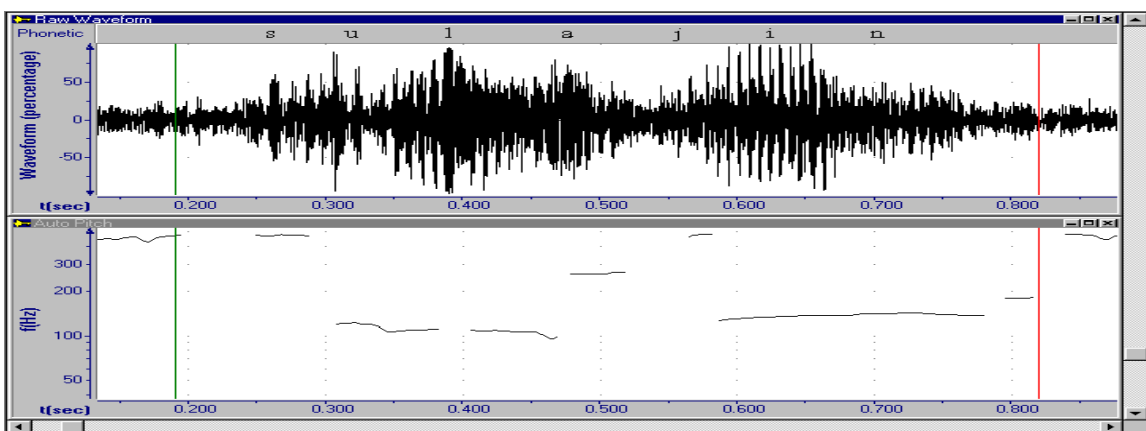


fault

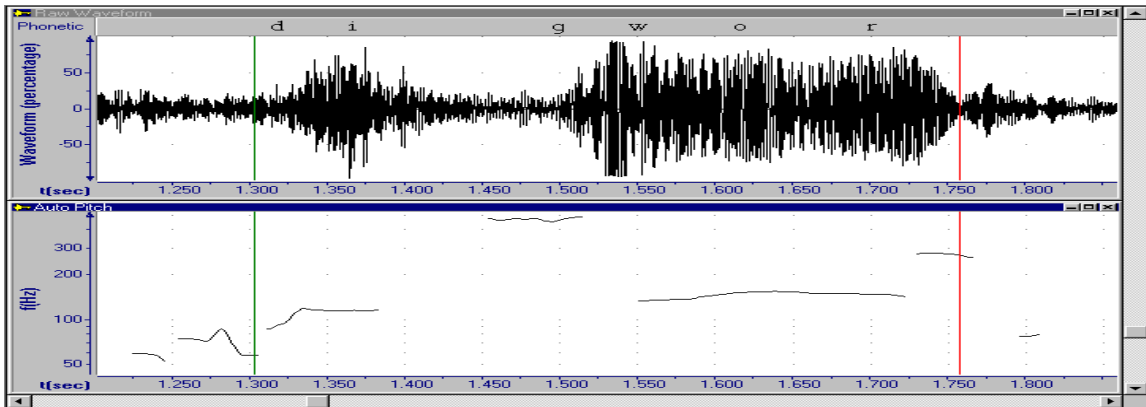


duck

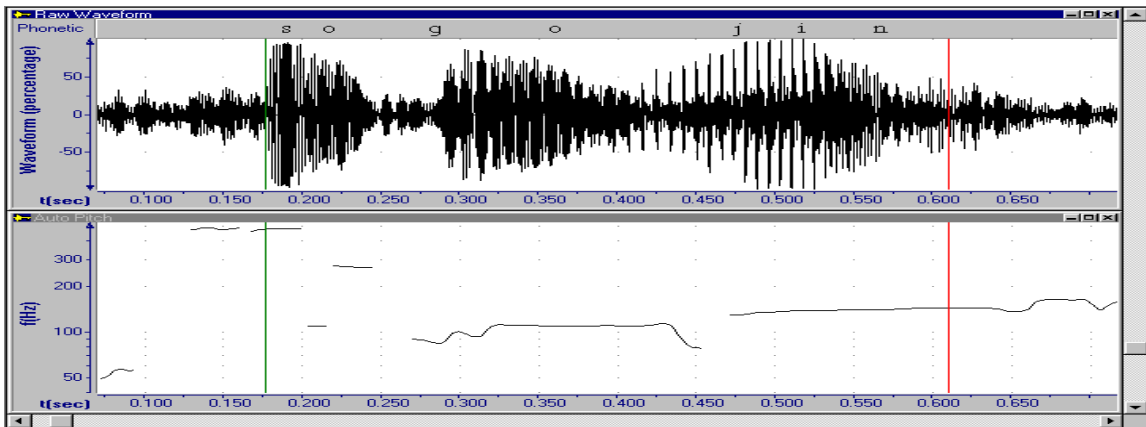
### Appendix F. LH Melody is realized as L before H.



your sermon

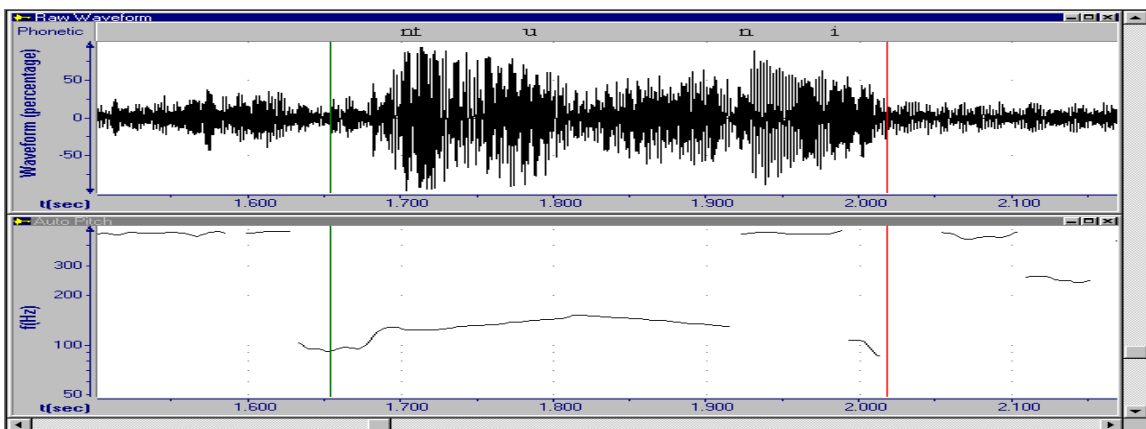


one residence

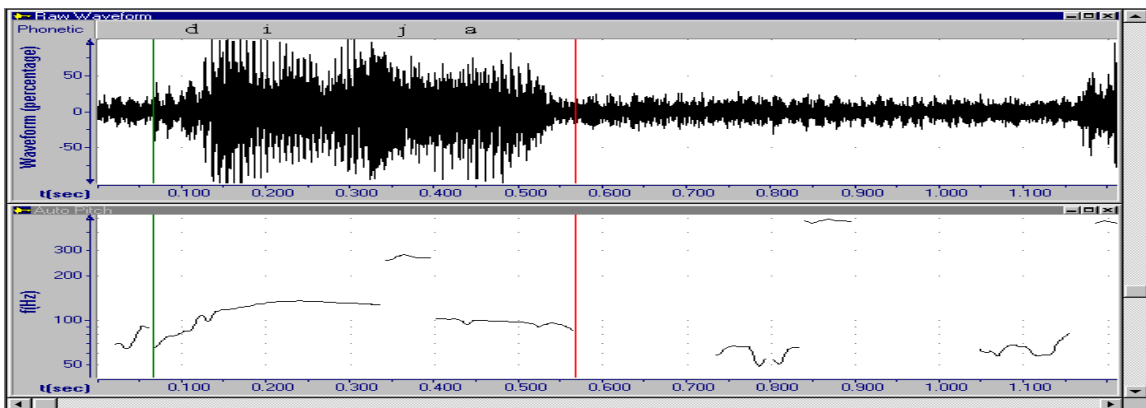


your duck

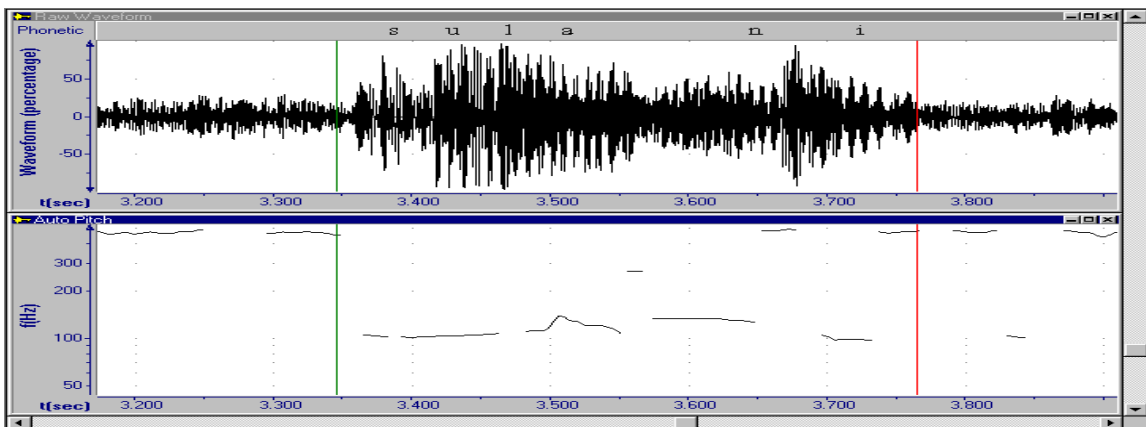
**Appendix G.** LH melody surfaces as LH before L.



this quarrel



that residence



this sermon

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