Tonal Changes in Associative Constructions in Ngwo

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1.0 Introduction

Ngwo is a Western Grassfields Bantu language spoken in the North West province of Cameroon. Ngwo, like almost all Bantu languages, is a tone language. This implies that tone is an indicator of meaning in the same way as segmental phonemes. Tone is also very relevant in grammatical constructions in Ngwo, and in this paper we examine tonal changes in associative constructions.

The associative construction is used to express a number of relations, especially possession, content and origin. The associative construction in Ngwo is obtained by juxtaposing Noun1 and Noun2. Noun1 is the possessed or head noun, while the possessor or specifier is Noun2.

1)   a. ŋ́gĺi 'nail' + ābwó 'hand'   →   ŋ́gĺibwō 'nail of hand' fingernail

        b. āká̋ 'bowl' + n̄ɗim 'water' →   āká̋nɗim 'bowl of water'

Associative constructions in West African languages are often marked by a floating tone between the first noun and the second noun, with or without the presence of segmental morphemes. In some languages, including Bini (Amayo 1976, 1986), and Yekhee (Elimelech 1978), the floating tone is H. In other languages, including Ibibio (Urua 2001), the postulated floating tone may be HL. In this paper we describe another variety, one in which there is neither a floating tone nor a segmental morpheme. In this case, the associative construction domain is the domain of the tonal Obligatory Contour Principle between two nouns, and two other tonal processes. This paper provides a detailed account of the tonal processes in this domain.

2.0   Tonal Contrast

On the surface, Ngwo contrasts three tones, High, Mid and Low, as the near-minimal pairs in (2) illustrate. Lexical items can be distinguished in Ngwo solely on the basis of these tones as can be observed from the following examples:

2) a.   ànà 'cocoyam'

           ānà 'name'

           ànā 'black ants

   b.   āmáná 'elopment'

           àmānà 'name'

           āmànà 'frial'

   c.   ńdō 'spice'

           n̄dō 'name'

ńdò? 'to oil'

Alongside the basic tones are complex ones, rising and falling tones. The complex tones are a concatenation of the three basic tones. The different tonal patterns can be observed from examples of nouns below:

3) Ngwo complex tones
    a. M ml
        ēlô 'marriage
        ēklô 'mouth'
    b. ml
        ɲêm 'meat'
        ɲô 'hair'
    c. H lh
        ŋ́kpe 'gossip'
        élo 'toe'
    d. Lml
        àŋwâ 'cat'
        ànâ 'black ant'

The contour tones in Ngwo i.e. rising and falling complex derive from a concatenation of at least two of the three basic tones. These complex tones are limited to monosyllabic words and to the final syllables of words with more than one syllable. If they were units, they would occur in initial and other non final positions.

When suffixes are added to nouns linked to these complex tones, for example in the formation of plural, the complex tones split. The root syllable and the suffix syllable are each associated to one part of the split complex tone. This can be observed from the following examples:

4) a.   Singular   Plural
         ɲô 'hair'   ɲōrò 'hair (pl)'
         ɲêm 'meat'   ɲēmɛ̄rɛ̀ 'meat (pl)'

If these complex tones were units, we would not have such splits resulting into the above forms. We should have had forms like the following;

b.   Singular   Plural

         ɲɔ̂ 'hair'   *ɲɔ̄rɔ̂

         ɲɛ̀m 'meat'   *ɲɛ̀mɛ̄rɛ̂

However, this is not the case, suggesting that the tone complexes are not units.

In addition to the problem of complex tones, there are constraints on tone distribution. First, there is only one noun with an MM tonal configuration. However, unlike a generality of the nouns of Ngwo, which begin with either a noun class prefix vowel or a noun class prefix syllabic homorganic nasal, this MM noun does not begin with a noun class prefix. Finally, in the associative constructions we discuss in this paper this noun patterns, without exception, like a HH noun. One of the aims of this paper is to show that this noun is an HH noun, and conclude that there are no MM nouns in Ngwo. However we will first proceed by listing it as an MM noun, but note its patterning with HH nouns at each point.

3.0 Tonal Patterns in disyllabic nouns

In the formation of associative constructions the interesting tonal changes are best observed between disyllabic nouns. Since Ngwo is a three tone language, there are nine possible tonal patterns on disyllabic nouns. We present examples of the different disyllabic nouns according to their different tonal configurations or patterns in (5) – (13).

5) H H
   a. ŋ́glí   'nail' fingernail
   b. ébít   'faeces'
   c. ńtsá   'caterpillar'
   d. ŋ́gwá   'salt'
   e. ákɛ́   'plantain leaf'

6) HM
   álō   'leg'
   ákām   'monkey'
   áwā   'ice'
   émā   'kernel'
   áwō   'tobacco'
   éfɪ   'kolanut'

7) H L
   ádɔ̌   'child'
   tʃitʃà   'teacher'
   pósà   ' purse'

mótò   ' motor car'
ákwàʔ   'chick'

8) M H
ēsá́   'broom'
ēkέp   'money'
ātán   'chair'
ākᾱ   'bowl/dish/plate'
ējé   'wives'

9) M L
ītì   'orphan'
ākjὲ   'gorrila'
āmbὲ   'tree specie'
ākɔ̀m   'dirt/filth'

10) L H
ǹɗí   'clothes'
ŋ̀kí   'bitterleaf'
pìnɗí   'sour milk'
bàbá   ' grandfather/father'

11) L M
ǹtōʔ   'cup'
ŋ̀gōʔ   'trouble/problem'
àdzō   ' bee'
àndwā   'worm'
àmbō   'whistle'

12) L L
ānà̀   'cocoyam'
àŋkàm   'basket'
m̀ɟfɔ̀   'chief'
ŋ̀kpὲ   'drum'
ǹdɔ̀   'grandmother'

13) M M
kɛ̄rɛ̄   '(a kind of fruit)'

4.0 Tonal Changes in Associative Constructions

Given the nine possible tone patterns in disyllabic nouns exemplified above, there are eighty-one possible combinations of these nouns. The eighty-one patterns are presented and discussed in the following sections. The tonal effect of the Noun1-Noun2 combinations is manifested on the second noun. Our presentation of the Noun1-Noun2 combinations will therefore be guided by this observation. We will have nine subsections, based on the nine patterns of Noun1, as presented in (5) – (13) above. Keeping Noun1 constant, we will then see how we will vary the tone of Noun2, again following the list in (5) – (13).

Before proceeding to the presentation of these nouns a number of general observations are crucial. The noun class vowel prefixes of Noun2 get deleted together with their tones, and if the noun class prefix of Noun2 is a homorganic nasal the tone associated with it is deleted but the nasal remains. Secondly, apart from M M + M M and M M +M L, the combination of Noun1 and Noun2 disyllabic nouns of the nine tonal configurations result broadly in nouns ending in just two tones in the final position, M or L. Our task is essentially to explain how this turns out to be the case.

The broad generalizations on the tonal outputs are as follows. All Noun1-Noun2 Ngwo associative constructions can be spilt into two broad categories: those in which Noun2 end in L tone, and those in which Noun2 end in H or M tone. On the surface, the latter group (ending H or M) end in (or neutralize to) M tone, and the former group (ending in L) remain L. The tone of the first noun remains unchanged.

## 4.1 HH in Noun 1 position
4.1.1   Forms resulting in output HHM

14) H H   +   H H   →   HHM
ákɛ́   ébít   ákɛ́bīt 'leaf of faeces' ie leaf smeared with faeces

15) H H   +   LH   →   HHM
ńtsá   ǹkǐ   ńtsáŋkī 'caterpillar of bitterleaf'

16) H H   +   M H   →   HHM
ŋ́gwá 'salt'   ēkɛ́p 'money' ŋ́gwákɛ̄p 'salt of money'ie expensive salt

17) H H   +   L M   →   HHM
ŋ́gǐi 'nail'   ǹgō?   'ŋ́gǐiŋgō? 'nail of problem' ie problem nail

18) H H   +   M M   →   HHMM
ákɛ́ 'leaf'   kɛ̄rɛ̄   ákɛ́kɛ̄rɛ̄ 'leaf of a specie of fruit'

The associative constructions in (14) – (16) involve a combination of HH in Noun1 with another Noun2 that ends in H. In each case the configuration results in an output **HHM**. We propose the following account. First, the initial vowel (noun class prefix) of the

second noun is deleted with its tone. The resulting configuration is that the first noun is HH and the remaining vowel of the second noun is either H or M. When the resulting configuration is HH + H, in order to prevent an Obligatory Contour Principle violation (Leben 1973, Goldsmith 1976, Myers 1997, etc.) the H of the second noun is lowered to M. The forms ending in M in the last two nouns above have no problem with the combination, so they surface as M. This explains the HHM resulting from the Noun1 + Noun2 combinations above. The two processes involved here: vowel deletion and tone lowering by the Obligatory Contour Principle, are illustrated in (19) below. We define the Obligatory Contour Principle for H tones as in (19).

19) Obligatory Contour Principle (OCP H-tone)
Adjacent identical specification of H tones is prohibited between two words.

20) Illustration:

á   k   ɛ́   +   (é)   b   ît   vowel deletion

á   k   ɛ́   +   b ít   Obligatory Contour Principle
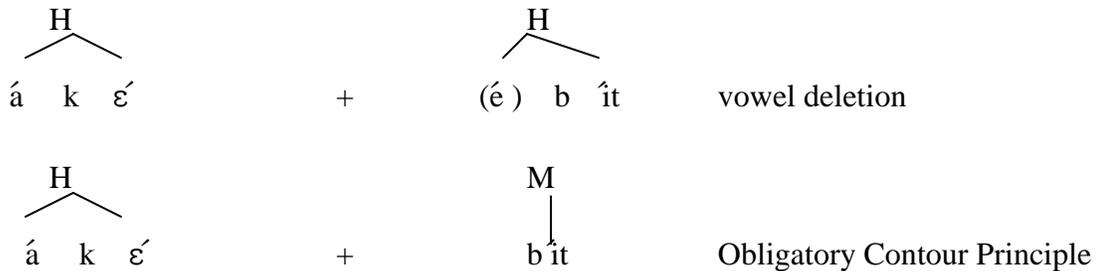
The forms in which the Noun2 (kērɛ̄ "fruit") is MM require additional comment. In earlier noted that this noun behaves like an HH noun. In the above examples, it is not crucial whether assume the underlying form is MM or HH, since the OCP will lower the final output to M if the latter input assumed. The crucial input assumption (of HH) will matter when the OCP is not invoked in section 4.2.

Henceforth, we will assume the application of the first process, vowel deletion, and concentrate on the second process, which changes the tone of the second noun, and which is crucial in the determination of the output of the final tonal configuration of all associative constructions.

4.1.2 Forms resulting in Output HHL

21) H H   +   HM   →   HHL
    ákɛ́ 'leaf'   éfi 'kolanut'   ákɛ́fì   'leaf of kolanut'

22) H H   +   HL   →   HHL
    ŋ́gĺi 'nail'   ákwàʔ 'chick'   ŋ́gĺikwàʔ 'nail of chick'

23) H H   +   M L   →   HHL
    ŋ́gwá 'salt'   ītí 'orphan'   'ŋ́gwátì 'salt of orphan'

24) H H   +   L L   →   HHL
    ákɛ́ 'leaf'   ànà 'cocoyam'   ákɛ́nà 'leaf of cocoyam'

In the forms in (22) – (24), after the deletion class prefix together with the tones, these forms combine with HH noun1 to produce an HHL output. What all the Noun2 have in common is the L tones in the final positions, except the HM nouns (in 21) which pattern with them in this position. This suggests that HM is actually HL in the final position. In Ngwo associative constructions all isolation HM nouns result in the same surface form with HL, without exception, and thus neutralizing with underlying HL nouns.

4.2 HM in Noun 1 position
4.2.1   Forms resulting in output HMM

25) H M   +   H H   →   HMM
émā 'kernel'   ébít 'faeces' émābīt 'kernel of faeces;i.e. kernel smeared with
faeces'

26) H M   +   M H   →   HMM
éfi   ēkɛ́p 'money' éfikɛp 'kolanut of money' i.e. money giving
kolanut'.

27) H M   +   L H   →   HMM
áwā   ǹkí 'bitterleaf' áwāŋkī 'ice of bitterleaf'

28) H M   +   M M   →   HMHH[1]
áfō 'weed'   kɛ̄rɛ̄ 'fruit' áfōkɛ́rɛ́ 'weed of a specie of fruit'

29) H M   +   L M   →   HMM
álō 'leg'   ǹgōʔ 'problem' álōŋgōʔ 'leg of problem'

The resulting outputs in the above data have been partially encountered before. The nouns ending with H tones in Noun2 position are lowered to M when combined with HM in Noun1. This is what happened to the HH nouns in Noun1 presented earlier. We propose that the H tone lowering in this case is the result of the OCP. Rather, High tones are lowered to M by any lower tone preceding it, whether L or M, across morphemes. The same lowering process occurs when Noun1 is HL, ML, LM, and LL. We call this process **H-Tone Lowering**. The H-tone lowering constraint is stated informally as in (30).

30) **H-Tone Lowering**
A High tone is lowered to M after a preceding lower tone, L or M, across words.

The nature of **H-Tone Lowering**, triggered by either M or L tone, is not specific to Ngwo. Armstrong (1968) reports a similar process in Yala-Ikom, where an H tone is lowered by a preceding M or L.
It is interesting to note that, when HM combines in Noun1 position with the only MM noun, we have a final HH, as seen above. First, this is indicative that MM is HH as observed earlier. Secondly, there are three configurations in which **H-Tone Lowering** fails, all relating to the single MM (underlying /HH/) noun. The process does not apply

when Noun1 ends in L or M, as we will also see later in sections 4.3, 4.6.1 and 4.8.1. In the cases, it seems the preceding M or L tone does not lower the underlying /HH/ of [kɛ̄rɛ̄].

The Obligatory Contour Principle (OCP H-tone) in (19) and the H-Tone Lowering (30) above, together with vowel deletion, are the crucial ingredients that we need to account for most of the output tonal configurations that we see in Ngwo associative constructions. The remaining sections of the paper will confirm this point.

4.2.2   Forms resulting in output HML

31) H M   +   H M   →   HML
    áfō   éfi 'kolanut' áfōfì 'weed of kola nut'

32) H M   +   H L   →   HML
    álō 'leg'   mótò 'car' álōmótò 'leg of car' i.e. motor tyre

33) H M   +   M L   →   HML
    éfi 'kolanut' ītì 'orphan' éfitì 'kolanut of orphan'

34) H M   +   L L   →   HML
    álō 'leg'   ŋ̀fɔ̀ 'chief' álōŋfɔ̀ 'leg of chief'

Here, the combinations with HM as Noun1 and nouns ending with L as Noun2 result in output forms with HML tonal configuration. All of the outputs can be accounted for, with proposal already made. As already noted above, HM nouns are realized as HL, when in phrase final position.[2] This goes to add credence to our claim made earlier that HM in final position is HL. Hence in this position it behaves like the other nouns ending in a low tone.

4.3 HL in Noun 1 position
4.3.1 Forms resulting in output HLM

35) H L   +   H H   →   HLM
    ádɔ̌ 'child'   ńtsá 'caterpillar' ádɔ̌ntsā 'child of caterpillar'

36) H L   +   L H   →   HLM
    ádɔ̌ 'child'   ǹɗí 'clothes' ádɔ̌nɗī 'child of clothes' i.e owner of clothes.

37) H L   +   M H   →   HLM
    ádɔ̌ 'child'   ēkɛ́p 'money' ádɔ̌kɛ̄p 'child of money' i.e rich child

38) H L   +   M M   →   HLHH
    ádɔ̌ 'child'   kɛ̄rɛ̄ 'specie of fruit' ádɔ̌kɛ́rɛ́ 'child of specie of fruit'

39) H L   +   L M   →   HLM
    ádɔ̌ 'child'   ŋ̀gō? 'problem' 'child of problem' i.e problem child

When Noun2 forms ending in H or M are juxtaposed with Noun1 HL forms, the H tones are lowered to M. One interesting observation is that the L tone does not lower an M tone to L in any of these forms. This confirms that the realization of the final M of HM forms as L in Noun2 positions is not the effect of a preceding tone. The realization of the single surface MM noun as MM can result from the effect of a preceding L, if it is HH as proposed here. If it is assumed to be MM underlyingly, we do not expect any change, since L does not lower M tones, as already noted. However, data in the following sections confirm that MM must be underlyingly HH as proposed here.

4.3.2 <u>Forms resulting in output HLL</u>

40) H L   +   H M   →   HLL
    ádɔ̌ 'child'   éfì 'kolanut' ádɔ̌fì 'child of kolanut'

41) H L   +   H L   →   HLHL
    mótò 'car'   tʃîtʃà 'teacher' mótòtʃîtʃà 'car of teacher'

42) H L   +   M L   →   HLL
    ádɔ̌ 'child'   ŋ̄gwè 'god' ádɔ̌ŋgwè 'child of god'

43) H L   +   L L   →   HLL
    ádɔ̌ 'child'   ànà 'cocoyam' ádɔ̌nà 'child of cocoyam'

As we have seen above, a preceding L tone does not lower a following M tone across words. Therefore the final L in [ádɔ̌fì] "child of kolanut" cannot be attributed to the preceding L tone from the word "child". Otherwise forms like [ádɔ̌kɛ̄p] "rich child" from the preceding section will be impossible to explain. We conclude therefore that the HM nouns are actually HL in phrase final positions, and they pattern with other forms ending in L in this position. It is very important to note that nouns with HL tonal pattern are scarce in Ngwo. Apart from ádɔ̌ and ákwàʔ which are indigenous, the other nouns with this tonal pattern are loans from English and Fulani.

4.4 MH in Noun 1 position
4.4.1 <u>Forms resulting in output MHM</u>

44) M H   +   H H   →   MHM
    āká̋ 'plate'   ébít 'faeces' ēɲóbīt 'plate of faeces'

45) M H   +   L H   →   MHM
    āká̋ 'bowl'   ŋ̀kí 'bitter leaf' āká̋ŋkī 'bowl of bitter leaf'

46) M H   +   M H   →   MHM
    āká̋ 'bowl'   ēkɛ́p 'money' āká̋kɛp 'bowl of money'

47) M H   +   L M   →   MHM

ēsá 'broom'   ŋ̀gōʔ 'problem' ēsáŋgōʔ 'broom of problem'

48) M H   +   M M   →   MHM

āká 'bowl'   kɛ̄rɛ̄ 'fruit'   ākákɛ̄rɛ̄ 'bowl of fruit'

When MH nouns are juxtaposed with nouns ending in H tones as Noun2, the Obligatory Contour Principle effect takes place such that the H of Noun2 are lowered to M, as seen originally in (19). Nouns ending in M remain unchanged. Again the single MM noun surfaces as MM. This is the output that we predict whether the input is assumed to be HH or MM, as noted earlier. If the input is HH as proposed here, then the OCP lowers the H to M. The OCP is of course inapplicable if the input is assumed to be MM.

4.4.2 Forms resulting in output MHL

49) M H   +   H M   →   MHL

āká 'bowl'   éfì 'kolanut' ākáfì 'bowl of kolanut'

50) M H   +   H L   →   MHL

ēsá 'broom'   ádɔ̌ 'child'   ēsádɔ̌   'broom of child'

51) M H   +   M L   →   MHL

ēsá 'broom'   īlī 'orphan' ēsātì 'broom of orphan'

52) M H   +   L L   →   MHL

āká 'bowl'   ànà 'cocoyam' ākánà 'bowl of cocoyam'

All of the forms resulting in output configuration MHL are straightforwardly accounted for. All of these forms consist of Noun1 with MH and Noun2 with a final L tone. The only exception is the HM noun. As we have noted several times this configuration patterns with nouns ending in L when in final position, hence the output MHL.

4.5 MM in Noun 1 position
4.5.1 Forms resulting in output HHM

53) M M   +   H H   →   HHM

kɛ̄rɛ̄ 'fruit'   ébít 'faeces' kɛ́rɛ́bīt 'fruit of faeces'

54) M M   +   L H   →   HHM

kɛ̄rɛ̄ 'fruit'   ŋ̀kí 'bitter leaf' kɛ́rɛ́ŋkī 'fruit of bitter leaf'

55) M M   +   M H   →   HHM

kɛ̄rɛ̄ 'fruit'   ēkɛ́p 'money' kɛ́rɛ́kɛ̄p 'fruit of money'

56) M M   +   L M   →   HHM

kɛ̄rɛ̄ 'fruit'   ŋ̀gōʔ 'problem' kɛ́rɛ́ŋgōʔ 'fruit of problem'

57) M M   +   M M   →   HHMM

kɛ̄rɛ̄ 'fruit'   kɛ̄rɛ̄ 'fruit'   kɛ́rɛ́kɛ̄rɛ̄ 'fruit of fruit'

Configurations in which the Noun1 is the so-called MM noun [kɛ̄rɛ̄]"fruit" turn out to be the most interesting in Ngwo associative constructions. They are interesting for two reasons. First, in all such forms, the output of Noun1 suddenly takes an HH pattern. Secondly, the input HH nouns in Noun2 position dissimilate to become M, just as they do after other HH nouns. Unless the single MM noun is analysed as HH in the input, as proposed here, these points lack a coherent explanation. While one can assume a "polarity" account, saying that MM + MM changes to HHM, this account is not available when the input is MM + HH. A tonal metathesis account, reversing the order of the tones in MM + HH also makes no sense. This is because configurations like MM + LM also result in HHM. However, if the single MM noun is analysed as HH in the input, the account is straightforward. The noun behaves like other HH nouns in all configurations, including the dissimilation triggered by the Obligatory Contour Principle (OCP H-tone). Therefore, we must conclude that Ngwo has no MM nouns, and that the noun "fruit" is actually HH underlyingly. Given this conclusion, all of the forms with MM as Noun1 parallel the forms with HH as Noun1 in section 4.1.1, and the same account given in 4.1.1 applies to them.

4.5.2 Forms resulting in output HHL

58) M M   +   H M   →   HHL
    kɛ̄rɛ̄ 'fruit'   álō 'leg'   kɛ́rɛ́lò 'fruit of leg'
59) M M   +   H L   →   HHL
    kɛ̄rɛ̄ 'fruit'   ádɔ̂ 'child'   kɛ́rɛ́dɔ̂ 'fruit of child'
60) M M   +   M L   →   HHL
    kɛ̄rɛ̄ 'fruit'   ītì 'orphan'   kɛ́rɛ́tì 'fruit of orphan'
61) M M   +   L L   →   HHLL
    kɛ̄rɛ̄ 'fruit'   ŋ̀fɔ̀ 'chief'   kɛ́rɛ́ɱfɔ̀ 'fruit of chief'

Once the MM noun kɛ̄rɛ̄ 'fruit' is correctly assigned an input HH tone, all the forms in this section have the same analysis as those in section 4.1.2.

4.6 ML in Noun 1 position
4.6.1 Forms resulting in output MLM
    62) M L   +   H H   →   MLM
    ītì 'orphan'   ńtsá 'caterpillar'   ītìntsā 'orphan of caterpillar'
    63) M L   +   L H   →   MLM
    ākjɛ̀ 'gorilla'   ŋ̀kí 'bitter leaf'   ākjɛ̀ŋkī 'gorilla of bitter leaf'

64) M L   +   M H   →   MLM

    ītì 'orphan'   ēkɛ́p 'money'   ītìkɛp 'orphan of money'

65) M L   +   L M   →   MLM

    ākjɛ̀ 'gorilla'   ŋ̀gōʔ 'problem'   ākjɛ̀ŋgōʔ 'gorilla of problem'

66) M L   +   M M   →   MLHH

    ākjɛ̀ 'gorilla' kɛ̄rɛ̄ 'fruit'   ākjɛ̀kɛ́rɛ́ 'gorilla of fruit'

In all of these forms, in which Noun2 ends in an H tone, combining with ML in the Noun1 position, the H tone is lowered to M by **H-Tone Lowering** (30). The only exception here is the noun [kɛ̄rɛ̄] "fruit", which we have analysed as having input HH. As noted in section 4.2.1, this is one of the two configurations in which the **H-Tone Lowering** (30) fails to apply, both relating to the noun "fruit".

      When the Noun2 ends in an M, as in the form "gorilla", the M is not lowered to L, confirming our proposal that the L tone does not lower a following M.

4.6.2 <u>Forms resulting in output MLL</u>

67) ML   +   HM   →   MLL

    ītì 'orphan'   éfῖ 'kolamut' ītìfĩ̀ 'orphan of kolamut'

68) ML   +   HL   →   MLL

    ākjɛ̀ 'gorilla' ádɔ̂ 'child'   ākjɛ̀dɔ̂ 'gorilla of child'

69) ML   +   ML   →   MLL

    ākjɛ̀ 'gorilla' ītì 'orphan'   ākjɛ̀tì 'gorilla of orphan'

70) ML   +   LL   →   MLL

    ītì 'orphan'   ànà 'cocoyam' ītìnà 'orphan of cocoyam'

When ML in Noun1 combines with a Noun2 whose final tone is L, the output configuration is MLL as can be observed above. Again, this output follows from the proposals made here. Unlike OCP H-tone, there is no equivalent for the L tone. We may assume that the L tones simply merge to satisfy the OCP, instead of dissimilating (see Myers 1997) for various methods of satisfying the OCP.

4.7 LH in Noun 1 position
4.7.1 <u>Forms resulting in output LHM</u>

71) LH   +   HH   →   LHM

    ǹdí 'clothes' ébít 'faeces'   ǹdíbīt 'clothes of faeces'

72) LH   +   LH   →   LHM

    ǹdí 'clothes'   ŋ̀kí 'bitterleaf' ǹdīŋkí 'clothes of bitter leaf'

73) LH   +   MH   →   LHM

    ǹdí 'clothes'   ēkɛ́p 'money'   ǹdíkēp 'clothes of money' ie. Expensive clothes

74) LH   +   LM   →   LHM

    ǹdí 'clothes'   ŋ̀gōʔ 'problem' ǹdíŋgōʔ 'clothes of problem'

75) LH   +   MM   →   LHMM

    ǹdí 'clothes'   kērē 'fruit'   ǹdíkērē 'clothes of fruit'

When LH in Noun1 combines with a Noun2 ending in H, once more to avoid OCP H-tone violation Final H is lowered to M. When the Noun2 ends in an M tone, this tone remains unchanged.

4.7.2 <u>Forms resulting in output LHL</u>

76) LH   +   HM   →   LHL

    ǹdí 'clothes'   álō 'leg'   ǹdílō 'clothes of leg'

77) LH   +   HL   →   LHL

    ǹdí 'clothes'   ádɔ̂ 'child'   ǹdídɔ̂ 'clothes of child'

78) LH   +   ML   →   LHL

    ǹdí 'clothes'   ītì 'orphan'   ǹdítì 'clothes of orphan'

79) LH   +   LL   →   LHL

    ǹdí 'clothes'   m̄jfɔ́ 'chief'   ǹdím̄jfɔ́ 'clothes of chief'

When LH in Noun1 combines with a Noun2 ending in L, the output as expected is again LHL. When the Noun2 is HM, it again patterns with L final nouns as expected.

4.8 LM in Noun 1 position
4.8.1 <u>Forms resulting in output LMM</u>

80) LM   +   HH   →   LMMM

    ŋ̀gōʔ 'problem'ébít 'faeces'   ŋ̀gōʔōbīt 'problem of feaces'

81) LM   +   LH   →   LMMM

    ǹtōʔ 'cup'   ŋ̀kí   ǹtōʔōŋkī 'cup of bitter leaf'

82) LM   +   MH   →   LMMM

    ǹtōʔ 'cup'   ēkɛ́p 'money' ǹtōʔōkēp 'cup of money'

83) LM   +   LM   →   LMMM

    ǹtōʔ 'cup'   ŋ̀gōʔ 'trouble' ǹtōʔōŋgōʔ 'cup of trouble'

84) LM   +   MM   →   LMMHH

    ǹtōʔ 'cup'   kērē 'kind of fruit'   ǹtōʔōkɛ́rɛ́ 'cup of fruit'

When LM nouns in Noun1 position combine with nouns ending in H in Noun2 position, the final H is lowered to M, following H tone Lowering (30). However, the M tone of LM fails to lower the HH of [kɛ̄rɛ̄]. This is the third and final exception to H-tone lowering, all relating to the H tone of the noun [kɛ̄rɛ̄]. This exception must therefore be seen as a peculiarity of this noun, rather than an exception to H tone lowering in general, in the language. As expected, however, the noun [kɛ̄rɛ̄] shows up with its underlying H tone in all three cases.

4.8.2 Forms resulting in output LML

85) LM   +   HM   →   LML
    ǹtō̄ʔ 'cup'   éfĩ 'kolanut'   ǹtō̄ʔōfĩ 'cup of kolanut'
86) LM   +   HL   →   LML
    ǹtō̄ʔ 'cup'   ádɔ̃̂ 'child'   ǹtō̄ʔōdɔ̃̂ 'child' 'cup of child'
87) LM   +   ML   →   LML
    ǹtō̄ʔ 'cup'   ītì 'orphan'   ǹtō̄ʔōtì 'cup of orphan'
88) LM   +   LL   →   LML
    ǹtō̄ʔ 'cup'   m̀ŋfɔ̀ 'chief'   ǹtō̄ʔōŋfɔ̀ 'cup of chief'

Nouns in Noun2 position ending in L, and preceded by LM nouns, retain their final L tone, giving the output LML. And, as expected, the HM noun in Noun2 position patterns with them.

4.9 LL in Noun 1 position
        Finally, LL nouns require a special comment. Their output forms neutralize with nouns whose input form is LM. The question that arises here is why, and how may we account for this. At first blush, it would seem that this is the equivalent of OCP H-tone for the L tone; that is L tone on Noun1 dissimilates. But while this approach works for LL followed by another LL, it fails to account for LL in Noun1 followed by the other six tone patterns that begin with M or H, namely MH, MM, ML, and HH, HM, HL. If we assume that the L tone is raised in these latter set, then we run into trouble accounting for the lack of L-raising in all other cases when Noun1 ends in L and Noun2 ends in M or H. We propose instead that all LL nouns in Noun1 position undergo a minor process of L-raising. Is this L raising triggered by the presence of a floating H tone? We propose that it is not. The reason for this is simply that if there is an associative marker, which is a floating tone, we must assume the same tone in all the configurations. Assuming an H tone that raises L here fails to account for the tone-lowerings that we have seen so far.

4.9.1 Forms resulting in output LMM
    89) LL   +   HH   →   LMM
        ànà 'cocoyam' ńtsá 'caterpillar' ànāntsā 'cocoyam of caterpillar'

90) LL   +   LH   →   LMM

    ànà 'cocoyam' ŋ̀kí 'bitter leaf' ànāŋkī 'cocoyam of bitter leaf'

91) LL   +   MH   →   LMM

    ànà 'cocoyam' ēkɛ́p 'money' ànākēp 'cocoyam of money'

92) LL   +   LM   →   LMM

    ànà 'cocoyam' ŋ̀gō? 'problem' ànāŋgō? 'cocoyam of problem'

93) LL   +   MM   →   LMHH

    ànà 'cocoyam' kērē 'fruit'   ànākɛ́rɛ́ 'cocoyam of fruit'

Once we assume that the final L of an LL noun, in Noun1 position, is raised to M, all of the output patterns here follow earlier proposals. This raising can be seen as a type of morpheme internal dissimilation. Nouns ending in H in Noun2 position are realized as M, and those ending in M retain the M tone.

4.9.2 <u>Forms resulting in output LML</u>

94) LL   +   HM   →   LML

    ànà 'cocoyam' éfĩ 'kolanut' ànāfĩ 'cocoyam of kolanut'

95) LL   +   HL   →   LML

    ŋ̀kpè 'drum'   ádɔ̂ 'child'   ŋ̀kpēdɔ̂ 'drum of child'

96) LL   +   ML   →   LML

    ànà 'cocoyam' ītì 'orphan'   ànātì 'cocoyam of orphan'

97) LL   +   LL   →   LML

    ànà 'cocoyam' ɱ̀fɔ̀ 'chief'   ànāɱfɔ̀ 'cocoyam of chief'

Finally, when an LL Noun1 is juxtaposed with another noun ending in L we have an LML configuration. Here, the HM nouns also patterns with nouns ending in L.

5.0 An Alternative Account

        In section 4, we started out with a generalization, that all Noun1-Noun2 Ngwo associative constructions can be spilt into two broad categories: those in which Noun2 end in L tone, and those in which Noun2 end in H or M tone. On the surface, the latter group (ending H or M) end in (or neutralize to) M tone, and the former group (ending in L) remain L. The tone of the first noun remains unchanged (except it is LL, as we see in section 4.9).

        There are other possible alternative accounts of this outcome that do not assume the Obligatory Contour Principle, as done here. One possibility is to assume that there is a "floating L" tone between Noun1 and Noun2, and that this floating L tone lowers the final H tone of HH nouns to M. In addition, the final M tone of HM nouns is lowered to L. While the assumption of a floating L tone is attractive in causing H to lower to M, the account runs into trouble because the assumed floating L tone **does not** lower all final M

tones to L. In fact the only final M that ever gets realized as L is that of HM, which we have proposed is realized as HL in phrase final position. There is one additional problem for any account that assumes a floating tone: two types of floating tone, L and H, and not just L, must be assumed. The floating L will be used when the Noun1 ends in an H, and the floating H will be used when the Noun1 ends in an L. This is already a type of polarity. If we assume the Obligatory Contour Principle, as done here, then there is no use for the floating tone. We believe that the account proposed here is superior to one that assumes a floating tone (or floating tones).

6.0 Summary and conclusion

Tonal changes in particular tonal contexts are common features in Bantu languages. Assimilation and dissimilation are some of the main causes of such changes. In the associative construction in Ngwo, two main tonal activities, which result in dissimilation are responsible for the surface tonal changes exhibited by the data above. The activities caused by dissimilation involve tone lowering.

In the first group of words where HH nouns in Noun1 are juxtaposed with H-ending nouns in Noun2 position; the Noun2 H tones are lowered to M. (Traditionally, this process is referred to as "non-automatic downstep", or simply "downstep"). As we mentioned earlier, this is an instance of dissimilation. Here, we are confronted with a good example of the OCP influence on the tonal phonology of the language. The OCP bans sequences of adjacent identical H-elements. In this case, there is a ban on the occurrence of adjacent H tones across word boundary in associative constructions. This is a well documented process in Bantu. (See Myers (1997) for details on Shona (Odden 1981, 1986; Myers 1987) and Kishambaa (Odden 1982)). However the processes used to resolve the OCP violation in Shona and Kishambaa are different from that applied in Ngwo.

In Shona, to prevent an OCP violation, where there are sequences of adjacent H tones, there is a deletion of the second H tone. This is an instance of the Meeusen's rule, which is widespread in Bantu tonology. In Kishambaa there is downstep of the second H tone. On the other hand, in Ngwo, as observed in the data above the second H is lowered to a Mid. The second forms of nouns ending with L tones above result from automatic tone lowering. H tones on Noun2, when preceded by L or M tones are lowered to M.

Finally a tone raising process is observed among L tones. This occurs when LL tones are juxtaposed with another noun. This is a process, which neutralizes an LL nouns and LM nouns in Noun1position in associative constructions.

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[1] See below for an explanation of the HH pattern of the second noun [kere] 'fruit'

[2] It is indeed possible that the underlying form of HM nouns is HL, and that the L is raised to M after H in non-final position. However, this position is counter-exemplified by all the forms in section 4.3, where underlying HL forms do not raise to HM. See Njwe (2005) for proposals along this direction.