TONE AND MORPHEME RULES IN BAMILEKE-NGYEMBOON

by

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# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.1. Language and People</td>
<td>1</td>
</tr>
<tr>
<td>1.2. Consonants and Vowels</td>
<td>4</td>
</tr>
<tr>
<td>2.0. Tone Rules</td>
<td>6</td>
</tr>
<tr>
<td>2.1. Previous Work</td>
<td>12</td>
</tr>
<tr>
<td>2.2. Nouns</td>
<td>15</td>
</tr>
<tr>
<td>2.2.1. In isolation</td>
<td>16</td>
</tr>
<tr>
<td>2.2.2. In associative noun phrases</td>
<td>28</td>
</tr>
<tr>
<td>2.3. Verbs</td>
<td>52</td>
</tr>
<tr>
<td>2.3.1. With realis/irrealis tones</td>
<td>60</td>
</tr>
<tr>
<td>2.3.2. With imperfective aspect</td>
<td>88</td>
</tr>
<tr>
<td>2.3.3. With tense markers</td>
<td>104</td>
</tr>
<tr>
<td>2.3.4. With progressive aspect markers</td>
<td>150</td>
</tr>
<tr>
<td>2.3.5. With negative markers</td>
<td>167</td>
</tr>
<tr>
<td>2.4. Between Phrases</td>
<td>176</td>
</tr>
<tr>
<td>2.4.1. Between subject and verb</td>
<td>176</td>
</tr>
<tr>
<td>2.4.2. Between object and verb</td>
<td>208</td>
</tr>
<tr>
<td>2.5. Overall Rule Ordering</td>
<td>232</td>
</tr>
<tr>
<td>3.0. Verb Paradigms</td>
<td>246</td>
</tr>
<tr>
<td>3.1. Remote Past (P₄)</td>
<td>252</td>
</tr>
<tr>
<td>3.2. Distant Past (P₃)</td>
<td>257</td>
</tr>
<tr>
<td>3.3. Yesterday Past (P₂)</td>
<td>263</td>
</tr>
<tr>
<td>3.4. Today Past (P₁)</td>
<td>268</td>
</tr>
<tr>
<td>3.5. Zero (P₀ and PRES)</td>
<td>278</td>
</tr>
<tr>
<td>3.6. Today Future (F₁)</td>
<td>288</td>
</tr>
<tr>
<td>3.7. Tomorrow Future (F₂)</td>
<td>292</td>
</tr>
<tr>
<td>3.8. Distant Future (F₃)</td>
<td>298</td>
</tr>
<tr>
<td>3.9. Remote Future (F₄)</td>
<td>301</td>
</tr>
<tr>
<td>4.0. Morpheme Rules</td>
<td>306</td>
</tr>
<tr>
<td>5.0. Conclusion</td>
<td>339</td>
</tr>
<tr>
<td>References</td>
<td>344</td>
</tr>
<tr>
<td>Appendix A</td>
<td>347</td>
</tr>
<tr>
<td>Appendix B</td>
<td>351</td>
</tr>
</tbody>
</table>
CHAPTER 1

1.0. Introduction

The present dissertation is concerned with the complex tonal phenomena found in the Grassfields Bantu languages of Cameroon, specifically the Ngymbɔɔn [ŋ-gyɛ̃-bɔː] language spoken in the Western Province. The primary aim of this dissertation is to present a systematic and explanatory account of various tone and morpheme rules. To facilitate this purpose, an autosegmental phonological theory will be employed to present the tonal phenomena in as explicit a framework as possible. A secondary aim of this dissertation is to account for a wider scope of tonal data than has previously been possible in a Grassfields Bantu language.

1.1. Language and People

The Ngymbɔɔn language is part of the Bamileke language group which is spoken mostly in the Northwestern corner of the Western Province of the United Republic of Cameroon. According to the 1976 unofficial census, some 80,000 Ngymbɔɔn speakers live in the five rural chiefdoms listed below:
It can be seen from the preceding figures that the Njëmboòn people have a high population density, averaging over 700 people to the square mile. In fact, this area contains one of the most dense concentrations of people found in any rural area in all of Cameroon.

In addition to the rural population, many Njëmboòn have moved into various towns and cities of Cameroon where their principal occupation is usually storekeeping. The towns and cities having the greatest numbers of Njëmboòn speakers are Mbouda, Dschang, Bafoussam, Nkongsamba, Douala and Yaounde. If one counts these urban speakers, and also assumes a population growth rate of 2 percent per year over the past six years, the total population of Njëmboòn speakers probably approaches 100,000.

Most of the Njëmboòn people living in the rural chiefdoms make their living by agriculture. The division of labor is such that men cultivate the cash crop of coffee while women cultivate the food crops. Most of the
urban dwellers, on the other hand, are involved in various commercial activities or governmental duties.

Linguistically, the Ngyembɔɔn language belongs to the Bamileke sub-group of the Mbam-Nkam sub-division of the Grassfields Bantu language family. This follows the classification of the GBWG (Grassfields Bantu Working Group, as in Stallcup, 1980:54 and Leroy, 1977:17-18), which lists the village of Bangang as representative of the Ngyembɔɔn language, as below:

(2) A) WESTERN GRASSFIELDS

1. **Ring**: Lamnso, Aghem, etc.

2. **Menchum**: Obang.

3. **Widikum**: Moghamo, Ngie, etc.

4. **Lower Mundani–Njen**: Lower Mundani, Njen.

B) MBAM-NKAM

1. **Nkambe**: Limbum, etc.

2. **Nun**: Bamun, Mungaka, etc.

3. **Ngemba**: Mankon, Bafut, etc.

4. **Bamileke**: Bangang, Dschang, Fe’fe’, Bandjun, Bangangtê, etc.

The author has been living in the village of Bangang and studying this particular language off and on since early 1974.
1.2. Consonants and Vowels

The following inventory of Ngyemboon phonemes (consonants and vowels) is taken from Anderson (1976:98,112):

<table>
<thead>
<tr>
<th>(3)</th>
<th>Consonants</th>
<th>Vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t</td>
<td>i</td>
</tr>
<tr>
<td></td>
<td>k</td>
<td>u</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>e</td>
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<tr>
<td></td>
<td>d</td>
<td>o</td>
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<tr>
<td></td>
<td>g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>m</td>
<td>ɛ</td>
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<tr>
<td></td>
<td>n</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>ɳ</td>
<td>o</td>
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<tr>
<td></td>
<td>pf</td>
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<td></td>
<td>ts</td>
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<td>f</td>
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<td>s</td>
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<td>v</td>
<td></td>
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<td></td>
<td>z</td>
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<tr>
<td></td>
<td>ſ</td>
<td>y</td>
</tr>
<tr>
<td></td>
<td>w</td>
<td>w</td>
</tr>
</tbody>
</table>

It should be noted that several phonological processes produce a wide variety of phonetic realizations for the various units charted above. Since the Ngyemboon language is spoken in a region where French is the official language, the Ngyemboon orthography has been modified to include the writing of various allophones. The following orthographical symbols are currently in use:
<table>
<thead>
<tr>
<th>Consonants</th>
<th>Vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>i</td>
</tr>
<tr>
<td>t</td>
<td>u</td>
</tr>
<tr>
<td>k</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>e</td>
</tr>
<tr>
<td>d</td>
<td>o</td>
</tr>
<tr>
<td>g</td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>e</td>
</tr>
<tr>
<td>n</td>
<td>a</td>
</tr>
<tr>
<td>ɲ</td>
<td>o</td>
</tr>
<tr>
<td>pf</td>
<td></td>
</tr>
<tr>
<td>ts</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td></td>
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<tr>
<td>s</td>
<td></td>
</tr>
<tr>
<td>sh</td>
<td></td>
</tr>
<tr>
<td>v</td>
<td></td>
</tr>
<tr>
<td>z</td>
<td></td>
</tr>
<tr>
<td>j</td>
<td></td>
</tr>
<tr>
<td>l</td>
<td></td>
</tr>
<tr>
<td>ŵ</td>
<td></td>
</tr>
<tr>
<td>y</td>
<td></td>
</tr>
<tr>
<td>w</td>
<td></td>
</tr>
</tbody>
</table>

This dissertation will follow the general rules of the Ngyembōn orthography with the single exception of glottal stop, which is analyzed as the syllable-final variant of the phoneme /k/ in the phonology (Anderson, 1976:98), but is indicated in the orthography by an apostrophe. In this dissertation, the glottal stop is always indicated by the ? sign in order that it not be confused with downstep which is signalled in this dissertation by the apostrophe but remains unwritten in the normal orthography. The manner of writing Ngyembōn tones will be more complex in this dissertation than in the official orthography. The system of writing tones adopted in the following section will allow us to make all the distinctions necessary for a dissertation which is focusing on tonal phenomena.
CHAPTER 2

2.0. Tone Rules

In a study of tone universals by Hombert (1974:177-8), the adjacent language of Dschang was cited as unique among the world’s languages in possessing two related tonal phenomena: downstepped high tones without automatic downdrift and downstepped low tones. The Ngyemböön language shares both of these characteristics with its neighbor. The unique character of the tonal phenomena in these two languages makes their data all the more important for any comprehensive theory of phonology. It is with a view of further exemplifying this unusual kind of system while keeping in mind the theoretical issues involved that the present study is offered.

The theoretical approach adopted in this dissertation will be autosegmental. The essence of an autosegmental approach is that segmental and supersegmental phenomena are represented on separate "tiers." The units of these tiers are "associated" with units on other tiers by means of association lines. Positing a segmental syllabic tier (where syllabic units are symbolized by capital letters like A, B, C, etc.) and a tonal tier (where high and low tones are symbolized by H and L respectively), constructions like the following are typical:
Since associating and reassociating tones to various syllables is one of the major tasks of such a theory, various conventions have been posited to aid in this task. One principle that was posited as a universal means of associating "floating" (unassociated) or "free" tones was the "Well-Formedness Condition" (WFC), the following being the version of Goldsmith (1976:27):

(6) **Well-Formedness Condition**

1. a. All vowels are associated with at least one tone;
   b. All tones are associated with at least one vowel.
2. Association lines do not cross.

One of the results of the preceding WFC is that no tones are left floating for very long. Various linguists (like Clements and Ford, 1979:208) have shown that the preceding WFC is too strong and have therefore proposed eliminating part 1b. We have found this kind of restricted approach to also be the most productive for Ngyêmboôn. Our particular analysis turns the condition on all vowels being associated to at least one tone (1a above) into a well-formedness tone rule (WFR)
described in section 2.3.1. below. Our analysis does not accept the restriction that all tones are associated to at least one vowel (1b above). We are therefore left with only the restriction that association lines never cross, and therefore adopt the following modified version as our WFC:

(7) **Well-Formedness Condition (Modified Version)**

Association lines do not cross.

The practical difference between the Goldsmith’s WFC and our combination of a WFR and a much-restricted WFC is that the Goldsmith’s fuller version always associates any tones found to be floating at any time in the derivation. Our restricted version does not do this, allowing us the possibility of tones floating even at the end of derivations. This is crucial for our analysis in that the frequent downsteps found in Ngyêmboôn are posited to result from just such floating tones at the end of derivations.

Various restrictions on the power of autosegmental theories have been proposed, several under the heading of "Obligatory Contour Principle." For the present dissertation, we shall adopt the restriction proposed by Hyman (1982a:5) that precludes any language from having morphemes which contain two adjacent identical tones as part of their dictionary entries. Thus, the tone series HH and LL can never result from a single underlying morpheme.
The tone rules in this dissertation will be examined in three stages, starting with those necessary in the associative noun phrase, continuing with those needed in the verb phrase, and finishing up with those which operate between phrases.

To aid the reader, the various tones in Ngyembön will be referred to in various ways. The four discrete tonal levels will be referred to by either their name, numeral or diacritic. The numerals given in the following charts are given as examples of the level of the tone when it immediately follows pause (i.e. in the absence of the influence of other downsteps):

<table>
<thead>
<tr>
<th>Name</th>
<th>Numeral</th>
<th>Diacritic</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1</td>
<td>á</td>
</tr>
<tr>
<td>Downstepped-High</td>
<td>2</td>
<td>ā</td>
</tr>
<tr>
<td>Low</td>
<td>3</td>
<td>à</td>
</tr>
<tr>
<td>Downstepped-Low</td>
<td>4</td>
<td>à</td>
</tr>
</tbody>
</table>

In addition, a tone glide can be formed by joining on a single syllable certain combinations of various levels, as below:
Finally, in certain highly restricted environments, a double
downstepped high tone will occur. It has the unusual qualities of being a
real (i.e. phonological) high tone while being realized phonetically at the
same level as a normal low tone, as below:

In addition to the preceding naming devices, the symbols H and L will
be used in the text of the dissertation and in the autosegmental rules to
refer to high and low tones respectively. The diacritics will be used
primarily to indicate the tone found on a specific syllable in an example
in relation to the tone of the preceding syllable. These
diacritics will thus indicate the systematic phonetic level, a level preceding the application of the accumulative downstep rule. The numerals, on the other hand, will be used to indicate the tone of a syllable in relation to the tone register at the beginning of the sentence. The use of the numerals will enable us to keep track of the actual phonetic level of a specific syllable in longer utterances with multiple downstepping of the tonal register. This is crucial for a language like Ngyemboon where the frequent occurrence of downstep will result in phonetic levels of 8 or 9 by the end of a clause or sentence (where a pause allows the speaker to reset his tone register). A clear example of such multiple downstepping can be created by forming a long associative noun phrase using the same word over and over, as below:

(11) lètyō lètyō lètyō lètyō lètyō lètyō lètyō lètyō lètyō lètyō
    3 3 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9
    "the point of the point of the point of the point ..."

The preceding example shows that downstep lowers the entire tone register. This lowering is also shown to be cumulative, leading to a phonological H tone at the end of the phrase which is pronounced on a much lower level (9) than the L tone at the beginning of the phrase (3). It is only when the Ngyemboon speaker actually pauses that he resets his
lowered tone register back up to its original level. The prediction of actually when the speaker will lower his tone register one or even two notches is one of the major challenges to interested linguists.

2.1. Previous Work

Any dissertation on the difficult tonal phenomena of a Bamileke language is necessarily built upon the previous work of other linguists. Various linguists have made major contributions to the ongoing study of Bamileke tonal perturbations, each building upon the foundations laid by the former. First, in his 1971 work on nominals in the Bangangte language, Voorhoeve suggested underlying tri-tonal patterns consisting of only high and low tones. Since most nouns in Bamileke languages do not contain three syllables, he was led to posit the existence of "floating tones" (tones unattached to syllables), at least on the deepest level of phonological representation. He then went on to work out some of the tonal rules necessary to reach various surface phonetic realizations.

Voorhoeve’s pioneering work in this area was followed by Hyman’s phonological examination of the Fe?fe? language (1972). In this more wide-ranging work, Hyman not only posited tonal patterns, floating tones and tonal rules similar to Voorhoeve’s, but he attempted to expand their application from solely noun phrase contexts to include various changes
in the verb phrase. In this respect, he says: "The more difficult problems center around tone alternations in verbs (1972:151)."

Then in 1974, Tadadjeu examined the Dschang language and found the rare tonal phenomena of downstep without automatic downdrift and downstepped low tones in addition to the more common downstepped high tones. Since the Ngyemboon language is directly adjacent to that of Dschang, it is not surprising that Ngyemboon also shares these same characteristics.

This work was followed by a more comprehensive analysis of underlying tonal patterns in the entire Mbam-Nkam language family, with special emphasis on Dschang tonology. Hyman and Tadadjeu (hereafter referred to as "H&T") combined on this project and their report (1976) managed to go even further into the verbal tone derivations. Nevertheless, they conclude by stating, "Needless to say, much more work is needed in this complex part of the tonal grammar so as to permit us to reconstruct with certainty the tense, aspect, and mood markers present in Proto-Mbam-Nkam (1976:106)." It was in response to this stated need to press on from the work on noun phrase tonal perturbations to include as well those of the verb phrase that the present study was first undertaken.

After the research for the present study had already begun, an article was published by Anderson (1981) which reanalyzed the Dschang data from the autosegmental perspective of Goldsmith (1976). This article
seems to have brought the unusual Dschang data to the attention of those working on the further refinement of autosegmental phonology. The main linguists involved in the ensuing dialogue have been Stewart (1981), Pullyblank (1982) and Hyman (1982a). These studies have been most interested in constructing a theory which is powerful enough to handle unusual tonal perturbations like those of Dschang while not being so powerful as to provide multiple solutions to the same data.

In an unpublished paper, Pullyblank (1982:11) posited the existence of a tonal metathesis rule which simplified the tonal rules needed, and a similar rule has been adopted in this study as well. Stewart (1981:118) actually formalized the downstep phenomena as a feature which he then metathesized. Finally, Hyman (1982a:8) adopted Pullyblank’s metathesis rule and then argued for the adoption of a somewhat modified version of Leben’s (1978) Obligatory Contour Principle (OCP). The results of all these papers have led to various refinements in our analysis which in turn have resulted in a simpler analysis accompanied by tone rules devoid of strict external ordering. Our solution is offered in this dissertation as yet another contribution to the ongoing dialogue regarding autosegmental tone theory and Bamileke tonal systems.
2.2. Nouns

The aim of this section is to present a new analysis of the tone perturbations found in the Ngyemboon noun phrase. To date, most of the comprehensive analyses of Bamileke tone systems (Hyman, 1972; H&T, 1976; and Anderson, 1981) have all posited underlying tri-tonal patterns for nouns. These tri-tonal patterns were posited as a reflex of earlier Bantu structures where most nouns contained three syllables with either high or low tones. However, since most nouns in present-day Bamileke languages contain only a mono-syllabic noun root preceded by a mono-syllabic noun class prefix, various conventions and rules had to be developed to account for the disparity between the number of underlying tones and the number of surface tones, as well as to explain the complex tonal perturbations caused by the historical loss of syllables. H&T accomplished this purpose by referring to various "floating tones" (tones unattached to segmental vowels, first posited for Bamileke languages by Voorhoeve, 1965). Anderson (1981) reworked their data using the more explicit autosegmental phonological model of Goldsmith (1976), while nevertheless retaining H&T’s underlying tri-tonal patterns.
2.2.1. In isolation

Previous attempts by Anderson (1976 and 1978) to explain Ngyembreon tonal perturbations also followed similar lines and posited underlying tri-tonal patterns consisting of only high (H) and low (L) tones. The following chart compares the patterns previously proposed for Dschang (Tadadjeu, 1974:285 and H&T, 1976:66) and Ngyembreon (Anderson, 1978:8), with the morpheme boundaries explicitly marked by "+"): 

(12) Disyllabic Nouns

<table>
<thead>
<tr>
<th>Underlying</th>
<th>Dschang</th>
<th>Ngyembreon</th>
</tr>
</thead>
<tbody>
<tr>
<td>L+LL</td>
<td>3+34</td>
<td>3+34</td>
</tr>
<tr>
<td>L+LH</td>
<td>3+3</td>
<td>3+3</td>
</tr>
<tr>
<td>L+HL</td>
<td>3+2</td>
<td>3+2</td>
</tr>
<tr>
<td>L+HH</td>
<td>3+1</td>
<td>3+31</td>
</tr>
</tbody>
</table>

The preceding chart shows that the underlying low tone (L) at the beginning of the tonal pattern results in a surface low tone (3) on the noun class prefix. This leaves the last two underlying tones of each pattern to interact with their environments in such a way that they result in the various surface tones of the noun roots. The only tonal difference between Ngyembreon and Dschang nominals is that the tonal pattern yielding a
high tone on the root in Dschang yields a rising tone in Ngyemboon. In fact, this same pattern also results in a rising tone on the noun root in certain areas of the Bafou chiefdom of Dschang (see H&T, 1976:91, footnote 25). The regular occurrence of rising tones in Ngyemboon will occasion an extra tone rule that is not needed for most of Dschang, as we shall see in the course of the following discussion.

The previous analyses of Bamileke tone systems have made great progress in rendering explainable previously unexplainable tonal perturbations. In trying to account for the same data with a more economical use of tones and rules, we have found it helpful to follow Stewart (1981:115) in allowing two tones in any one morpheme only if those two tones are dissimilar. We thus propose the following underlying tone patterns for Ngyemboon disyllabic nouns, each with a typical example drawn from noun class 5 whose prefix is /lè-/:

(13)

<table>
<thead>
<tr>
<th>Underlying</th>
<th>Surface</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>L+L</td>
<td>3+34</td>
<td>lèkãŋ &quot;magic&quot;</td>
</tr>
<tr>
<td>L+LH</td>
<td>3+3</td>
<td>lèlàŋ &quot;pineapple&quot;</td>
</tr>
<tr>
<td>L+HL</td>
<td>3+2</td>
<td>lèkãŋ &quot;kind of tree&quot;</td>
</tr>
<tr>
<td>L+H</td>
<td>3+31</td>
<td>lèkyë &quot;lye&quot;</td>
</tr>
</tbody>
</table>
The first tonal pattern that we will examine is where an underlying L+L tone pattern results in a 3+34 surface realization when it is pronounced in isolation. An example of such a word is given below (where /mè-/ is the noun class prefix of class 6 nouns):

\[(14) \quad \text{mèlù} \quad "\text{wine}" \]

\[3 \ 34\]

In order to derive our various surface realizations, we will be following the general convention of autosegmental phonology by positing the existence of various "tiers." These tiers are made up of units which are linked to units on other tiers by means of association lines. These association lines may be drawn in accordance with posited universal principles or simply as the result of language-specific rules. The two tiers that we shall be concerned with in this dissertation are the segmental and tonal. To simplify our description, we shall represent the syllabic units on the segmental tier by means of the capital letters (A, B, etc.). The tonal tier, on the other hand, will contain only the symbols H and L representing the underlying high and low tones.

As in most languages, a general mapping rule associates each syllable with one tone on the tonal tier, proceeding from left to right. Thus, with
"/" symbolizing pause-group boundaries and "+" for morpheme boundaries, our underlying pattern of L + L would appear as below after the initial association lines have been drawn:

(15)  

```
//  A + B  //
```

```
//  L + L  //
```

While the preceding pattern appears to be very straightforward, it must be remembered that the ultimate surface realization is 3 + 34 and not 3 + 3. As noted by Voorhoeve (1971:47), underlying L tones that are absolutely utterance-final (i.e. not followed by a floating H tone, as seen further below), always have a downglide. We will follow Stewart (1981:116) in interpreting this downglide as being a downstep. Our final downglide will be generated by the following tonal rule:

(16) **Rule 1: Final Downglide**

```
L Ø Ø  / ___//
```

The preceding rule states that whenever a L tone is associated
(symbolized by a solid line) with a syllable (symbolized by "$\$")
immediately before a pause (symbolized by "//"), an additional H and L
tone are added after the associated L tone and the new L tone is
associated by the rule (symbolized by the dashed line) with the same
syllable. When we apply this rule to our preceding noun structure, we get
the following:

\[(17) \quad /// A + B ///
/// L + L Ø Ø ///
\]

\[
\begin{array}{c}
\downarrow \\
\downarrow \\
H L
\end{array}
\]

Now that we have a floating H tone preceding an associated L tone,
we need a downstep rule which will lower the tonal register. For the
register-lowering part of our rule, we follow Clements (1979:550) in
adding one pitch level to each succeeding syllable, since in our numbering
system a higher number indicates a lower pitch. The first part of our rule
is different from previously posited downstep rules and more general than
we need for our present pattern in that it lowers the tone register
whenever an associated tone is immediately preceded by a floating tone of
exact opposite character (i.e. H vs. L as indicated by "$\alpha$" and "-$\alpha$"), as in
the following preliminary version of our downstep rule (see (261) below
for a revised rule):
The preceding rule states that any syllable where an associated tone (αT) is immediately preceded by an opposite floating tone (-αT), the entire tone register shall be lowered one tone level (indicated by an increase of the numerical value of each following syllable by one). This lowering of the tone register has two crucial properties. First, the lowering does not just take place for the syllable following the floating tone, but is similarly lowered for all syllables until a major pause boundary allows the speaker to reset his tonal register. Second, this lowering of the tonal register can occur several times in any one utterance and the effect is cumulative. Thus a high tone at the end of a sentence can easily be pronounced on a phonetic tone level lower than a low tone at the beginning of a sentence, and a low tone at the end of a sentence with several downsteps might actually reach a phonetic level of 8 or 9. All of this is caused in Ngyemboon by the presence of a floating tone immediately preceding an associated tone that is not identical. Thus a floating L before an associated H always results in a downstepped H, and
a floating H before an associated L always results in a downstepped L. This analysis of downstepped highs and lows shares the advantages of both symmetry and simplicity over other suggestions as to their origins.

The downstep rule applies very late in the derivational process. Its effects on the pitch register are shown in the following representation by the change from pitch level 3 to pitch level 4 on the last syllable:

\[
\begin{array}{c}
(19) \\
// A + B // \\
// L + L H L // \\
3 - 3 4 \\
\end{array}
\]

The second tonal pattern that we will examine is where an underlying L + LH tone pattern results in a level (i.e. non-downglided) 3 + 3 surface realization when it is pronounced in isolation. An example of such a word from noun class 7 (which takes an optional /à-/ prefix) is as below:

\[
(20) \\
\hat{a}ff\hat{o} "leaf" \\
3 3 \\
\]

The double "f" above is the orthographic convention used to indicate a long consonant in Ngyembôon (Anderson 1982:64). Since the example in focus has only two syllables but three underlying tones, the general mapping rule leaves the H tone unassociated, as below:
The preceding pattern gives us the straightforward derivation of our surface $3 + 3$ result. The function of the final floating H tone is that it blocks the operation of our final downgliding rule (tone rule 1 described above), which only applies if the last associated L tone is immediately followed by pause.

We will now examine our third tonal pattern where an underlying L + HL pattern results in a $3 + 2$ surface realization (a low tone on the noun class prefix followed by a downstepped high tone on the noun root) when it is pronounced in isolation. An example of such a word from noun class 4 (which takes a /mèn-/ prefix) is as below:

(22) mènkā? "fields"

Once again we have a pattern with only two syllabes yet three underlying tones. In this case, the final L tone is left unassociated by our general left-to-right mapping rule, as below:
It is at this point that one of our most important rules comes into play. The idea of a metathesis rule in this situation was first suggested by Stewart for the neighboring language of Dschang. His "Non-assimilatory up-down simplification" rule actually metathesized a H tone and a downstep feature (1981:116). Our rule follows the later formulations of Pullyblank (1982:11) and Hyman (1982a:8) which simply metathesizes an associated H and an unassociated L tone. Our rule is given a preliminary formalization immediately below, but will be further revised later in this dissertation (see (62) below):

(24) **Rule 3: Metathesis**

The preceding rule states that whenever a syllable ($) is associated to a H tone which is immediately followed by a floating L tone and also immediately preceded by another syllable which is associated to a L tone, the floating L tone is moved in front of the H tone. By applying the metathesis rule, our pattern is converted into the following:
Our downstep rule now comes along and sees a floating L tone immediately preceding an associated H tone. This triggers the operation of downstep which lowers the tonal register one notch. The result is the following pattern where the pitch level of 2 shows that the H tone has undergone one application of register-lowering:

\[
\begin{array}{c}
\text{(26)}
\end{array}
\]

\[
\begin{array}{c}
/\text{A} + \text{B}/ \\
/\text{L} + \text{LH}/
\end{array}
\]

\[
\begin{array}{c}
3 - 2
\end{array}
\]

We will now examine our fourth and final tonal pattern. In this case, an underlying L + H pattern results in a 3 + 31 surface realization (a low tone on the noun class prefix followed by a rising tone on the noun root) when it is pronounced in isolation. An example of such a word from noun class 9 (which takes a tone-bearing syllabic nasal prefix /ñ/- as its noun class prefix) is as below:

\[
\begin{array}{c}
\text{(27)}
\end{array}
\]

\[
\begin{array}{c}
\text{ñzso} "\text{cloth}"
\end{array}
\]

\[
\begin{array}{c}
3 31
\end{array}
\]
The preceding example appears as below after our general mapping rule has operated:

\[(28) \quad \frac{\boxed{A + B}}{\boxed{L + H}}\]

The preceding representation would be sufficient as it stands in the neighboring language of Dschang, where this pattern usually results in a 3 + 1 on the surface. Since Ngyembɔɔn has a rising tone where Dschang usually has a H tone, we need an additional rule, as below:

\[(29) \quad \text{Rule 4: Rise-Formation} \]

The dotted line in the preceding rule is the autosegmental convention for adding an association line. Thus the rule says that whenever a single H tone is associated with a syllable following another syllable which is associated to a L tone, and both tones occur within the same word (symbolized by the two # word boundaries), an additional association line will be drawn to the immediately preceding L tone. It should be stressed
that this rule is limited to environments where the two tones are found within a single word. This limitation will prove significant as we examine associative noun phrases and various verbal phrases further below. The result of this rule’s application on our present underlying pattern is the correct $3 + 31$ surface realization, as below:

\[
(30) \quad \begin{align*}
\text{//} & \quad \text{A} + \text{B} \quad \text{//} \\
\text{//} & \quad \text{L} + \text{H} \quad \text{//} \\
& \quad \begin{array}{c}
3 - 31
\end{array}
\end{align*}
\]

For the reader not familiar with the complicated tonal perturbations of Bamileke languages, portions of our analysis to this point might seem somewhat ad hoc. It will only be after a thorough examination of the complex tonal perturbations in the associative noun phrase that the complete motivation of our particular underlying patterns and rules will become clear.
2.2.2. *In associative noun phrases* ($N_1$ of $N_2$)

Now that we have examined our four basic disyllabic noun patterns in isolation, we are in a position to combine them in noun-noun associative (or genitive) constructions. It is in this environment that several of the most interesting tonal perturbations occur. Whenever two nouns come together in an associative construction in Grassfields Bantu as well as in Narrow Bantu languages, an intervening "associative marker" (A), determined by the noun class of the first noun, occurs between the nouns. Most Grassfield Bantu languages differ from their Narrow Bantu counterparts in that the segmental content of these associative markers has completely dropped out leaving an associative morpheme consisting of just a tone. In N’gymbon, as in most Bantu languages (both Grassfields and Narrow), the tonal concord marker is L tone for noun classes 1 and 9 and H tone for all the other classes (see Anderson, 1980a, for a discussion of the consonant, vowel and tonal concord markers for each of the ten N’gymbon noun classes).

Since we have four tonal possibilities for the two disyllabic nouns and two tonal possibilities for the tonal morpheme separating them, we thus have 32 separate associative patterns when combining the tonal patterns found in the following chart:
\[(31) \quad \begin{array}{ccc}
N_1 & A & N_2 \\
L+L & L & L+L \\
L+LH & H & L+LH \\
L+HL & & L+HL \\
L+H & & L+H \\
\end{array} \]

The 32 possible combinations of the preceding patterns were first detailed for the Dschang language by H&T (1976:92). They were then reanalyzed according to various autosegmental frameworks by Anderson (1981:80) and Stewart (1981:118-126). The parallel patterns for the Ngyemboon language are shown in the following chart:
<table>
<thead>
<tr>
<th>Isolation</th>
<th>No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-3&amp;3-34</td>
<td>1.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>34</td>
<td>17.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3-3</td>
<td>2.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>18.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3-2</td>
<td>3.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>19.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3-31</td>
<td>4.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>31</td>
<td>20.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3-3&amp;3-34</td>
<td>5.</td>
<td>3</td>
<td>34</td>
<td>4</td>
<td>45</td>
<td>21.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3-3</td>
<td>6.</td>
<td>3</td>
<td>34</td>
<td>4</td>
<td>4</td>
<td>22.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3-2</td>
<td>7.</td>
<td>3</td>
<td>34</td>
<td>4</td>
<td>3</td>
<td>23.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3-31</td>
<td>8.</td>
<td>3</td>
<td>34</td>
<td>4</td>
<td>42</td>
<td>24.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3-2&amp;3-34</td>
<td>9.</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>45</td>
<td>25.</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3-3</td>
<td>10.</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>26.</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3-2</td>
<td>11.</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>27.</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3-31</td>
<td>12.</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>42</td>
<td>28.</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3-31&amp;3-34</td>
<td>13.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>34</td>
<td>29.</td>
<td>3</td>
<td>31</td>
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<td>34</td>
</tr>
<tr>
<td>3-3</td>
<td>14.</td>
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<td>3</td>
<td>3</td>
<td>30.</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3-2</td>
<td>15.</td>
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<td>3</td>
<td>3</td>
<td>2</td>
<td>31.</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3-31</td>
<td>16.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>31</td>
<td>32.</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
The preceding chart is divided into two sections depending upon whether the intervening associative concord tone is H or L. The associative tone patterns have been numbered from 1 to 32 to facilitate later references back to individual patterns. The numbers at the extreme left, outside of the boxes, indicate the isolation tones of the two nouns in question while the numbers inside the boxes indicate their perturbed surface realizations. The capital letters (A through D) at the top of each column indicate the four syllables of the resulting associative utterance.

A typical example of an associative construction would be pattern 14. In the following phrase, the prefix of the first noun is the homorganic syllabic nasal prefix indicated orthographically here by the letter "n."
Since the first noun is from noun class 9 which takes a L tone associative morpheme, the resulting associative phrase is:

(33) nzèm + A + lèkwɔŋ → ñzèm lèkwɔŋ "shadow of a spear"
L H L L LH 3 3 3 3

Since the first noun above has a rising tone in isolation, it can be seen that the rise to H tone has disappeared under the influence of the posited L associative tone. A typical example of the same kind of tonal input with the exception of a H associative tone would be tonal pattern 30. In order to trigger the H associative tone, we have selected a word from noun class 5 which takes both a /lè-/ prefix and H tone concord (used for the
associative tonal morpheme "A"). A typical example of this kind of noun phrase is the following:

(34) letyo + A + lekwọ → lètyọ lékwọ "point of a spear"
    L H H L LH 3 31 1 3

Careful examination of the two preceding examples will show that whereas the rising tone on the first noun disappears completely under the influence of L tone concord, it not only remains with H tone concord, but is accompanied by a change of the following prefix from its underlying L tone to the H tone of the posited associative morpheme.

As an additional help to the reader, we repeat the preceding chart below while changing the "isolation patterns" from their surface realizations to their underlying patterns. The following chart will thus be an additional aid during our examination of the various tonal derivations.
<table>
<thead>
<tr>
<th>Isolation</th>
<th>No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>L+L&amp;L+L</td>
<td>1.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>34</td>
<td>17.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>L+LH</td>
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<td>3</td>
<td>3</td>
<td>18.</td>
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<td>L+HL</td>
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<td>3</td>
<td>2</td>
<td>19.</td>
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<td>2</td>
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<tr>
<td>L+H</td>
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<td>3</td>
<td>3</td>
<td>31</td>
<td>20.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>L+LH&amp;L+L</td>
<td>5.</td>
<td>3</td>
<td>34</td>
<td>4</td>
<td>45</td>
<td>21.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>L+LH</td>
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<td>4</td>
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<td>2</td>
<td>4</td>
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<td>L+HL</td>
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<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>L+H</td>
<td>8.</td>
<td>3</td>
<td>34</td>
<td>4</td>
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<td>24.</td>
<td>3</td>
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<td>2</td>
<td>2</td>
</tr>
<tr>
<td>L+HL&amp;L+L</td>
<td>9.</td>
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<td>4</td>
<td>4</td>
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<td>25.</td>
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<td>2</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>L+LH</td>
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<td>4</td>
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<td>L+HL</td>
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<td>4</td>
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<td>27.</td>
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<td>L+H</td>
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<td>4</td>
<td>4</td>
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<td>28.</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>L+H&amp;L+L</td>
<td>13.</td>
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<td>3</td>
<td>3</td>
<td>34</td>
<td>29.</td>
<td>3</td>
<td>31</td>
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<td>34</td>
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<tr>
<td>L+LH</td>
<td>14.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>30.</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>L+HL</td>
<td>15.</td>
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<td>3</td>
<td>2</td>
<td>31.</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>L+H</td>
<td>16.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>31</td>
<td>32.</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
We will begin our examination of associative tone patterns by examining in detail pattern no. 1. In the following autosegmental representations, the various boundaries will be marked as follows: morpheme boundaries as +, word boundaries as #, and pause boundaries as //. Allowing for evidence from neighboring languages that the tonal associative morpheme functions grammatically as a pre-prefix on the second noun (Gilligan, 1982:6), the underlying representation of tone pattern 1 is as below:

\[
\begin{align*}
(36) & \quad // \ A + B \ # \ + \ C + D // \\
& \quad // \ L + L \ # \ L + L + L //
\end{align*}
\]

The first rule to associate units of the syllabic and tonal tiers is the tone mapping rule which associates each syllable with the leftmost tone within the same morpheme. The straightforward results of this general tone rule on our current example are as below:

\[
\begin{align*}
(37) & \quad // \ A + B \ # \ + \ C + D // \\
& \quad // \ L + L \ # \ L + L + L //
\end{align*}
\]

We now must posit a language-specific rule for Ngeyemboon which associates L tone tonal morphemes to the left, as in the preliminary version of our leftward-docking rule (revised in (384) below), as stated below:
(38) **Rule 5: Leftward-docking L-tone Morphemes**

The preceding rule associates L tones (new association lines symbolized by dashed lines) that make up an entire morpheme to the first syllable on their left. The rule also deletes (deletion of association lines symbolized by two small slashes on the line) the association line of the next tone (symbolized by T) on the left, if that tone immediately precedes the L tone tonal morpheme. It is crucial that the preceding rule only applies when the L tone occurs in a syllable without any segmental material. In the case of our first tonal pattern, tone rule 4 associates the L tone associative morpheme to the left and deletes the association line which was on syllable B, as below:

(39)  //  A  +  B  #  +  C  +  D  //  

//  L  +  L  #  L  +  L  +  L  //

The only other rule which applies to this tone pattern is tone rule 1, which adds the HL tones before the pause boundary giving us the final downdrift typical of underlying L + L patterns. The end result is the 3-3-3-3-4 from our chart, as below:
Though the Leftward docking L associative tone does not make a substantive difference in this pattern, or in patterns 2 through 4 which undergo similar derivations, that same L tone is crucial in patterns 5 through 16, where its presence triggers the appropriate tone changes.

We can now examine tone patterns 5 through 8. Tone pattern 6, which is typical of this group, will appear as below after the left-to-right mapping rule has operated:

Now tone rule 5 docks the L associative tone to the left (onto syllable B), as below:

It is crucial above that when the L associative tone docks onto syllable B, it does not disassociate the L tone already associated with that syllable. The
reason for that is the presence of the floating H tone between the two L tones associated with the same syllable. Tone rule 5 only deletes the association line on the syllable to the left if the tone associated is immediately adjacent to the leftward docking L. Thus, in patterns 5 through 8, the same floating H tone that "protects" the already associated L tone of syllable B remains floating and is responsible for the downstepped nature of the L associative tone. It is thus the floating H tone of these patterns that is responsible for the tone glide from level 3 (regular L tone) to level 4 (downstepped L tone), as below:

\[
\begin{align*}
\text{(43)} & & // & A & + & B & \# & + & C & + & D & // \\
& & // & L & + & L & H & \# & L & + & L & + & L & H & // \\
& & // & 3 & - & 3 & & 4 & - & 4 & - & 4 &
\end{align*}
\]

We are now in a position to examine patterns 9 through 12. We will select tone pattern 11 as characteristic of this group, and start its derivation with the left-to-right mapping rule which results in the following:

\[
\begin{align*}
\text{(44)} & & // & A & + & B & \# & + & C & + & D & // \\
& & // & L & + & H & L & \# & L & + & L & + & H & L & // \\
\end{align*}
\]

In following the derivation of this pattern, we must state a general restriction on the application of the tone rules. Although the tone rules are for the most part unordered (except for the general mapping rule which
obviously must come first and the low-level interpretive downstep rule which must come last), their ordering in any particular derivation is controlled by a left-to-right restriction on the application for each tone. We thus proceed on the tonal tier from left to right and ask ourselves whether each tone in turn meets the requirements for any of the tone rules. Proceeding in this manner for the pattern in question, the first rule to operate is tone rule 3 which metathesizes the tones of syllable B while keeping the H tone associated, as below:

(45) // A + B # + C + D //

The next rule that operates is tone rule 5 which docks the associative L tone to syllable B and deletes the association line between syllable B and the H tone since that tone immediately precedes the associative L tone at the moment that tone rule 5 operates. It is thus crucial that tone rule 3 operates on syllable B before tone rule 5 docks the associative L tone there. If these two rules had operated in the opposite order, the association line between syllable B and the H tone would have wrongly been left intact. The result of tone rule 5 is therefore the following:
The final rule to operate on this particular pattern is tone rule 3, which this time metathesizes the tones of syllable D, as below:

With a floating H preceding the associated L for syllable B and a floating L preceding the associated H of syllable D, this pattern has two places where the register-lowering downstep rule applies. The cumulative nature of these downsteps is shown in this particular pattern by the final H tone being phonetically realized on the same pitch level (3) as the initial L tone (3). Thus the final result of our derivation:

We now come to tone patterns 13 through 16 which present us with an unusual phenomenon. We saw above that an underlying L+H pattern is realized on the surface as 3-31 when in isolation. In associative noun phrases where the
first noun has a L+H pattern and the associative tone is L, the H tone is not just modified into a rising tone as in isolation, but the H tone is lost completely. In order to examine this phenomenon, we will follow the derivation of tone pattern 16, which appears as below after the operation of the left-to-right mapping rule:

\[
\begin{align*}
\text{(49)} & \quad \text{// A + B # + C + D //} \\
\text{/} & \quad \text{L + H # L + L + H //}
\end{align*}
\]

The first rule to operate is tone rule 4 which forms a rising tone on syllable B, as below:

\[
\begin{align*}
\text{(50)} & \quad \text{// A + B # + C + D //} \\
\text{/} & \quad \text{L + H # L + L + H //}
\end{align*}
\]

Once this rule has operated, we need a new rule which deletes completely the H tone of syllable B. Since we will further revise this rule in (170) below, the present version of this deletion rule is only preliminary, as below:

\[
\begin{align*}
\text{(51) Rule 6: Rise-Deletion} \\
\end{align*}
\]
The preceding rule deletes the H tone of a rising tone only in the event that it is immediately followed by a L tone tonal morpheme. One result of this rule is that the tonal contrast between tone patterns 1 through 4 and their respective counterparts in 12 through 16 is neutralized. This rule operates on our present pattern to produce the following:

(52)  // A + B # + C + D //
     // L + H # L + L + H //

The next rule that operates is tone rule 5 which docks the associative L tone to syllable B. Since the H tone has been deleted by this time, the association line between syllable B and the first L tone of our pattern is also deleted, as below:

(53)  // A + B # + C + D //
     // L + # L + L + H //

The final step of this particular pattern is for tone rule 4 to construct a rising tone on syllable D. This terminates the derivation and results in the correct surface realization of 3-3-3-31, as below:
This concludes our examination of the 16 associative noun tone patterns which contain an intervening L associative tone. Each of the patterns not directly examined follow a derivation almost identical to those detailed above.

We now move on to tone patterns 16 through 32, which are characterized by a H associative tone occurring between the two nouns. With the L tone associative patterns examined above, we had neutralization of contrast between patterns where the first word was 3-34 in isolation and corresponding patterns where the first word was 3-31. Now with H tone concord, we find even more neutralization of contrast. With H tone concord, any pattern where the second word was 3-2 in isolation neutralizes its tonal contrast with the corresponding pattern where the second word was 3-31. Moreover, these patterns neutralize to H tone and to downstepped H tone in different environments. In addition, tone patterns where the first word was 3-34 in isolation neutralize their contrast this time with their respective counterparts where the first word
was 3-3. We will now examine in detail the exact causes of these different cases of neutralization.

Our first group of tone patterns is 17 through 20 where the first word has an underlying L+L pattern. We will examine pattern 19 of this group in detail as having a derivation typical of the others. This pattern appears as below after our left-to-right mapping rule has operated:

\[
\begin{array}{c}
\text{(55)} & // A + B \# + C + D // \\
& // L + L \# H + L + H L //
\end{array}
\]

It is important to note that the above pattern has a H tone associative morpheme separating the two noun patterns. This H tone associates to the right instead of to the left as with the L associative tone. We must therefore state the preliminary version of a language-specific rule (revised in (323) below) which associates H tone tonal morphemes to the right, as below:

(56) **Rule 7: Rightward-docking H-tone Morphemes**

\[
\begin{array}{c}
+ + S \\
\text{ } \\
+ H + T
\end{array}
\]

The preceding rule associates H tones that make up an entire morpheme to the first syllable on their right. The rule also deletes the association line of the
immediately following tone if that tone is also associated to the same syllable. It is crucial that the preceding rule applies only when the H tone occurs in a syllable without any segmental material. When tone rule 7 applies to pattern 19, the result is the following:

\[
\begin{align*}
(57) & \quad / / \quad A \quad + \quad B \quad \# \quad + \quad C \quad + \quad D \quad / / \\
& \quad / / \quad L \quad + \quad L \quad \# \quad H \quad + \quad L \quad + \quad H \quad L \quad / / 
\end{align*}
\]

Since syllable C now has an associated H tone followed by a floating L tone, it meets the requirements of our metathesis rule which moves the floating L tone of syllable C in front of the H associative tone, as below:

\[
\begin{align*}
(58) & \quad / / \quad A \quad + \quad B \quad \# \quad + \quad C \quad + \quad D \quad / / \\
& \quad / / \quad L \quad + \quad L \quad \# \quad H \quad + \quad L \quad + \quad H \quad L \quad / / 
\end{align*}
\]

It is crucial in the preceding derivation that the operation of the tone rule 7 on syllable C bled syllable D of the metathesis rule. Since the metathesis rule requires that the preceding syllable be associated with a L tone, the docking of the H associative tone and its parallel deletion of an association line changed the environment of syllable D resulting in a floating L tone at the end of the pattern which has no observable effect before pause. The floating L tone preceding the associative H tone is thus
the only tone which triggers our register-lowering downstep rule, as below:

(59)  
\[
\begin{array}{cccc}
\text{A} & \text{B} & \# & \text{C} + \text{D} \\
\text{L} & \text{L} & \text{L} & \text{H} + \text{H} + \text{L} \\
3 & 3 & 2 & 2
\end{array}
\]

Our next group of tone patterns is 21 through 24. We will select pattern 24 as being characteristic of this group and follow its derivation starting from immediately after application of the left-to-right mapping rule, which results in the following:

(60)  
\[
\begin{array}{cccc}
\text{A} & \text{B} & \# & \text{C} + \text{D} \\
\text{L} & \text{L} & \text{H} & \text{H} + \text{L} + \text{H} \\
\end{array}
\]

Tone rule 7 then comes along and docks the associative H tone to the right and "floats" the L tone that was already attached to syllable C, as below:

(61)  
\[
\begin{array}{cccc}
\text{A} & \text{B} & \# & \text{C} + \text{D} \\
\text{L} & \text{L} & \text{H} & \text{H} + \text{L} + \text{H} \\
\end{array}
\]

It should be noticed that the operation of the rightward-docking H tone tonal morpheme rule has disassociated the L tone from syllable C and thereby bled syllable D of a potential application of the rise-formation rule.
At this point, it is crucial that our metathesis rule operates on syllable C even though there exists a floating H tone between the associated L tone of syllable B and the associative tone. Our former rule (first stated in (24) above) can be allowed to operate in the present derivation with a slight revision in the rule’s formulation, as below:

(62) **Rule 3’: Metathesis**

![Diagram]

The preceding revised metathesis rule allows for an optional floating H tone (H), which allows it to apply to our present pattern in the following manner:

(63) // A + B # + C + D //

// L + L H # H + L + H //

Once again, we only have a floating L tone immediately preceding the associative H tone. We thus only get the application of our register-lowering downstep rule on syllable C, which yields the correct surface realization, as below:
Derivations similar to the preceding two are responsible for the tonal neutralization evidenced by patterns 19, 20, 23 and 24.

We are now prepared to handle patterns 25 through 28 of which we will select pattern 27 as a representative. Pattern 27 is especially interesting in that we have three underlying H-L sequences related to three succeeding syllables. After the left-to-right mapping rule has operated, our metathesis rule applies to syllable B, resulting in the following:

Next, our associative H tone docks to the right and also floats the L tone already associated there, as below:

It is crucial at this point that syllable C cannot undergo the metathesis rule because the preceding syllable is associated to a H tone. Syllable D does not
undergo metathesis for the same reason. However, the formerly associated L tone of syllable C is still floating before the H tone of syllable D, which triggers the second application of our register-lowering downstep rule, as seen below:

(67) // A + B # + C + D //
    // L + L H # H + L + H L //

3 - 2 - 2 - 3

Once again, we see the accumulative nature of the downstep on the final H tone which is realized on the same phonetic level (3) as the initial L tone (3).

We are now ready to examine the last four patterns. We choose pattern 32 as characteristic of this group. After our left-to-right mapping rule has operated, tone rule 4 creates a rising tone on syllable B, as below:

(68) // A + B # + C + D //
    // L + H # H + L + H //

At this point, it is crucial that our rise-deletion rule does not apply, because the rise is followed by a H tone tonal morpheme instead of a L tone tonal morpheme. The next rule to operate, therefore, associates the H associative tone to the right and floats the L tone already associated to syllable C, as below:
Once again, the L tone of syllable C that is now floating is not moved by our metathesis rule because the last associated tone of the preceding syllable (B) is not a L tone. This floating L tone that is not fronted is once again responsible for the downstepped H tone of syllable D, as below:

In concluding this section, we will list the rules discussed so far along with a ligature on the left connecting those rules or groups of rules where ordering is crucial. Our current list of rules (revised in (416) below) is the following:
Rule Ordering

Left-to-Right Mapping Rule (universal)

Rule 1: Final Downglide
Rule 3’: Metathesis
Rule 4: Rise-Formation
Rule 5: Leftward-docking L-tone Morphemes
Rule 6: Rise-Deletion
Rule 7: Rightward-docking H-tone Morphemes

Rule 2: Downstep (late adjustment rule)

As indicated by our ligatures above, it is necessary only that our
general (universal) left-to-right mapping rule precede all other tone rules
and that our late (universal) adjustment downstep rule follow all others.
All the other rules thus form a body, sharing two characteristics. These
rules are not strictly ordered with respect to each other. They do share the
general restriction that the resulting derivation proceeds from left to right,
tone by tone. Since the left-to-right mapping rule and the left-to-right
restriction on rule application and the downstep rule might all be
universal principles, characteristic of all tone systems, they are probably
best regarded as part of universal tone theory and thereby not a particular
characteristic of the Nguyể̝m bộn tone system. Therefore, one of the
distinctive features of this particular analysis is the unordered nature of
the basic tone rules, along with their left-to-right local application.
2.3. Verbs

The present dissertation will examine the various kinds of tense, aspect and mode distinctions found in the Ngyemboon language. While concentrating primarily upon constructions in the indicative mood, we will focus our attention on various grammatical features and their role in determining the many different tonal patterns found on the verb stem. In naming our verbal features, we follow Hyman (1980:235) for our tense features and Comrie (1976:25) for our aspectual features. The following eight binary features are needed to generate the basic Ngyemboon indicative constructions:

(72) **Verbal Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODE:</td>
<td>[real]  (realis/irrealis)</td>
</tr>
<tr>
<td>TENSE:</td>
<td>[past]  (past/non-past)</td>
</tr>
<tr>
<td></td>
<td>[fut]   (future/non-future)</td>
</tr>
<tr>
<td></td>
<td>[rem]   (remote/non-remote)</td>
</tr>
<tr>
<td></td>
<td>[near]  (near/far)</td>
</tr>
<tr>
<td>ASPECT:</td>
<td>[perf]  (perfective/imperfective)</td>
</tr>
<tr>
<td></td>
<td>[prog]  (progressive/non-progressive)</td>
</tr>
<tr>
<td>POLARITY:</td>
<td>[neg]  (negative/positive)</td>
</tr>
</tbody>
</table>

As would be expected for any language having this number of basic
verbal distinctions, not all of the mode-tense-aspect-polarity cooccurrence possibilities are actually realized. Since any indicative construction in Ngyemboon has both positive and negative realizations, we will ignore for the moment the question of polarity. Once this is done, we can show by means of a tree diagram the various cooccurrence restrictions that actually exist, as below:

(73)

Verbs

Realis

Irrealis

Past

Present

Present

Future

PRF

IMP

PRF

IMP

IMP

PRF

IMP

0

PROG

0

PROG

0

PROG

0

PROG

In addition to the perfective (PRF), imperfective (IMP) and progressive (PROG) markers, there exists an obligatory realis imperfective marker (see 2.3.1. below) and an optional realis progressive marker (see 2.3.4. below) each of which combines modal and aspectual features in a single marker. Otherwise, most markers in Ngyemboon mark
a **single** verbal category: mode, tense, aspect or polarity. This existence of separate morphemes that are unambiguously either tense, aspect or negation markers is not typical of African languages. Much more common is the existence of various morphemes that combine different tense, aspect and polarity properties in a single marker (Welmers, 1973:343-4).

We can restate the various cooccurrence restrictions shown in the preceding tree diagram by means of the following implicational statements:

\[(74)\]

**Implicational Statements**

If realis, then non-future.
If irrealis, then non-past.
If past, then realis.
If future, then irrealis.
If progressive, then imperfective.
If present perfective, then realis.
If present irrealis, then imperfective.

These prose implicational statements can also be reformulated using our binary grammatical features and an implicational arrow "\(\rightarrow\)" as below:
Formal Implicational Statements

\[
\begin{align*}
[+\text{real}] & \rightarrow [-\text{fut}] \\
[-\text{real}] & \rightarrow [-\text{past}] \\
[+\text{past}] & \rightarrow [+\text{real}] \\
[+\text{fut}] & \rightarrow [-\text{real}] \\
[+\text{prog}] & \rightarrow [-\text{perf}] \\
\end{align*}
\]

\[
\begin{align*}
[+\text{perf}] \\
[-\text{past}] & \rightarrow [+\text{real}] \\
[-\text{fut}] & \end{align*}
\]

\[
\begin{align*}
[-\text{real}] \\
[-\text{past}] & \rightarrow [-\text{perf}] \\
[-\text{fut}] & \end{align*}
\]

So far, we have only referred to past, present and future as temporal distinctions. Actually, it is in tense markers that the Ngyemböön language, like many Bantu languages, is particularly rich. To be specific, Ngyemböön divides both past and future time into four separate semantic categories (the closely related language of Dschang actually divides into five categories, as per Tadadjou, 1975:1). Our time spectrum is thus divided up into nine different sections (instead of eleven), and we must therefore use four grammatical features to fully distinguish each of these meanings from the others. We therefore define the nine Ngyemböön tenses according to the binary semantic feature combinations found in the following table:
The preceding nine tenses include four past tenses (indicated by the symbol "P") and four future tenses (indicated by the symbol "F") as well as the zero tense (indicated by the symbol "Ø") which refers to the present moment. Hyman has shown that the closely related Dschang language may use multiple tense markers to indicate relative time reference (1980:229). The Ngiemboon language, on the other hand, does not seem to use multiple tense markers to indicate relative time reference. As a result, the following list indicates the four degrees of remoteness, both past and future, from the present moment:

<table>
<thead>
<tr>
<th></th>
<th>P₄</th>
<th>P₃</th>
<th>P₂</th>
<th>P₁</th>
<th>Ø</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>past</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>fut</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>rem</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>near</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>
**Tense: Degree of Remoteness**

P₄ : a long time ago
P₃ : some time ago
P₂ : yesterday
P₁ : earlier today
Ø : present or immediate past (see "aspect")
F₁ : later today
F₂ : tomorrow
F₃ : some time from now
F₄ : a long time from now

The basic indication of the various tenses is done by means of different "markers." The zero tense is indicated by the absence of any overt tense morpheme. The future tenses are marked by the presence of various auxiliary verbs, two of the future tenses actually having a choice between two different auxiliary verbs to indicate the same semantic features. Three of the past tenses make use of ordinary tense markers while the unusual P₄ tense is indicated by combining markers for P₃ and F₄. All of these markers and their corresponding tonal perturbations are discussed in detail in section 2.3.3. below.

In previous works by H&T, the methodological strategy adopted has been to take the tone rules developed to handle tone changes in the noun phrase and see how far they will go in explaining the tone changes in the verb phrase. This same strategy has been followed in our research and
presentation. As a result, we will only propose additions or modifications to the rules already developed for the noun phrase as required by the additional data having to do with verbs.

Before beginning our in-depth examination, it would be helpful for the reader to have an idea of the internal structure of the verb itself. Since this includes various tonal morphemes, we list the internal structure of the verb as below:

(78) **Internal Structure of the Verb**

\[
\begin{align*}
\text{verb} & \rightarrow (\text{REIM}) \ PT_1 \ \text{vbst} \ (PT_2) \ (I) \\
\text{vbst} & \rightarrow V \ (S)
\end{align*}
\]

where:

- **REIM** - Realis imperfective prefix
- **vbst** - Verb stem
- **PT_1** - Realis or irrealis polar tones
- **V** - Verb root
- **S** - Verb suffix, toneless /-te/ syllable
- **PT_2** - Irrealis polar tone
- **I** - Imperfective suffix
As can be seen in the preceding formulas, only the verb root and a preceding polar tone morpheme (either realis or irrealis) are obligatorily present in all verbs. The optional items, in parentheses, are present only when their particular features call for them, with the exception of the toneless verb suffix whose presence is specified in the lexicon for each affected verb. The polar tone morpheme preceding the verb stem is only obligatory in that the same position is occupied by both realis and irrealis polar tones, and every sentence is either realis or irrealis in mode. The crucial difference in these two morphemes is that the realis is inserted before the majority of tone rules while the irrealis is inserted when only the late downstep rules remain. The very different surface realizations that result are discussed in detail in the following sub-sections.
2.3.1. With realis/irrealis tones

In the indicative mood, there are five separate possible constructions involving aspectual-modal-type meanings. It is only in the present (zero) tense, however, that all five possibilities are actually permissible, as shown in our chart below (where the first row is prefactive and the last four rows are imperfective):

(79) **Distribution of Verbal Markers**

<table>
<thead>
<tr>
<th>Markers</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>Ø</th>
<th>F0</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø +Ø +Ø</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Ø +N+-I</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ne+N+-I</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ø +Ø +-I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ne+Ø +-I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

In the preceding chart, the /ne/ marker clearly signals progressive meaning and the imperfective verb suffix (symbolized by "-I") signals imperfective aspect, but the homorganic nasal consonant verb prefix
(symbolized by "N-") has a more vague meaning. Our chart shows that this nasal prefix is always present with the imperfective suffix in past tenses, but never present in future tenses. Further below, we shall argue that this nasal prefix signals "realis imperfective" meaning.

First, we must examine more closely the preceding chart while keeping in mind possible grammatical features that may be used to generate all five of these constructions. Since there are five constructions, and not four, we will need a minimum of at least three features. It seems best to use the binary features [perf] and [prog] to generate the features associated with their respective semantic fields, perfective/imperfective and progressive/non-progressive aspect. This leaves in question only the label and meaning of the third feature. We propose in this dissertation the feature [real] (realis/irrealis) to be the third binary grammatical feature. One of the reasons we do this is that certain frequent tone patterns on the verb stem correlate highly with future vs. non-future constructions. We will refer to these highly frequent tone patterns as the "regular" realis or irrealis tone patterns, for reasons that will become apparent below. These regular surface tone patterns are as below:
(80) **Surface Tones**

<table>
<thead>
<tr>
<th>Lexical tones</th>
<th>Realis</th>
<th>Irrealis</th>
</tr>
</thead>
<tbody>
<tr>
<td>H tone verb root</td>
<td>H</td>
<td>'H'</td>
</tr>
<tr>
<td>L tone verb root</td>
<td>'H'</td>
<td>'L'</td>
</tr>
</tbody>
</table>

Each verb stem in Ngyembɔɔn (whether it be monosyllabic or disyllabic) comes with a single lexical tone on the verb root, and that tone is either H or L. The actual surface pitch realization on verbs varies greatly and depends a great deal on the various verbal features of the construction in question. The preceding chart shows that underlying H and L tone verb roots are actually realized on the surface on H and downstepped H tones for most realis constructions. For irrealis constructions, the underlying H and L tone of the verb root is usually bracketed by downsteps, one immediately preceding the verb root and the other immediately following it.

We can now redo the preceding tone chart on tone distribution with various tense and aspect markers, as below:
### Realis/Irrealis Tone Distribution

<table>
<thead>
<tr>
<th>Features</th>
<th>$P_4$</th>
<th>$P_3$</th>
<th>$P_2$</th>
<th>$P_1$</th>
<th>$\emptyset$</th>
<th>$F_1$</th>
<th>$F_2$</th>
<th>$F_3$</th>
<th>$F_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+perf]</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-perf]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

*Note: x/R, x/x, R/R, x/I, I/I indicate different tone distributions.*
In the preceding chart, the "R" stands for a regular realis tone pattern, the "I" for a regular irrealis tone pattern, and the small "x" for those environments where individual morpho-tonological rules result in various idiosyncratic tone patterns. The letter before each slash indicates the tone pattern of the positive sentence while the letter after each slash indicates its negative counterpart. Close examination of the perfective possibilities above shows that future perfectives take regular irrealis tones while non-future perfectives take regular realis tones (at least in the negatives).

Since we have already agreed to the need of the binary [real] feature in order to distinguish the four imperfective patterns from each other, we will further profit from this move by extending the use of this feature to include perfective constructions. Thus the marking of realis or irrealis aspect on perfective verbal constructions will enable us to more easily generate the proper tones on verbs. Dividing the perfective constructions up according to their realis (i.e. non-future) vs. irrealis (i.e. future) nature, we are able to slightly revise our previous chart (with the double line now separating realis from irrealis constructions), as below:
Revised Realis/Irrealis Tone Distribution

<table>
<thead>
<tr>
<th>Features</th>
<th>P₄</th>
<th>P₃</th>
<th>P₂</th>
<th>P₁</th>
<th>Ø</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>+perf -real</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real -prog</td>
<td>x/R</td>
<td>x/x</td>
<td>x/x</td>
<td>R/R</td>
<td>R/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real +prog</td>
<td>R/R</td>
<td>R/R</td>
<td>R/R</td>
<td>R/R</td>
<td>x/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+perf -real</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf -real -prog</td>
<td>x/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf -real +prog</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It should be clearly stated at this time that the major reason that we need a third binary feature like [real] is to predict the occurrence or absence of the nasal prefix before the verb stem in the present (or zero) tense. Once we are forced to posit such a feature, however, the preceding chart shows the same feature can also be useful in predicting the vast majority of actual surface tones that occur on the verb stem.

We are now in a position to notice several things from the preceding chart. First, almost all of the small "x"s indicating special morphophonological rules apply to positive sentences. Since both F₂ and F₄ actually have two separate constructions each (see 2.3.3. below), we can say that fully 33 out of 35 (or 94 percent) of the negative indicative constructions take the regular (unmodified) realis or irrealis tones on their verb roots. This percentage is somewhat less for their positive counterparts, where only 25 out of 35 (or 71 percent) take the regular realis or irrealis tones. This shows us that fully 58 out of 70 (or 83 percent) of the positive and negative constructions can predict their surface tone pattern solely on the basis of the presence or absence of the posited realis feature. This is surely an important side benefit of the necessity of positing such a feature (which we have chosen to label "realis/irrealis"). Another side benefit is that this labeling implies that the more frequent realis and irrealis tonal patterns are less marked than the
various idiosyncratic tonal patterns which are quite rightly regarded as less frequent and more marked.

It should also be mentioned that the irrealis tone marking is much more consistent (i.e. not to be modified by other morpho-tonological rules) than its realis partner. From the preceding chart once again, we can see that fully 39 out of 40 (or 97.5 percent) of the irrealis indicative constructions are realized with the regular irrealis tones. On the other hand, only 19 out of 30 (or 63 percent) of the realis constructions are actually realized phonetically with their realis tones. This is because the various morpho-tonological rules seem to have a special affinity for the positive realis (especially positive perfective realis) constructions which happen to be the most frequently used in normal everyday speech. It therefore seems that the typical speaker is able to remember the unusual tonal patterns of the most commonly used constructions precisely because they are the most frequently spoken and heard in normal verbal interaction.

At this point, we should speak to the subject of the underlying semantic information carried by our newly posited [real] feature. It is apparent from the preceding charts that all past indicative constructions are "realis" and all future constructions are "irrealis." From this we might postulate that the feature has to do with whether the proposition conveyed by the construction is "real" in the sense that it is somehow verifiable at
the moment of speaking. It should be mentioned at this point that [+ real], or "realis," does not mean "realized" in the sense that something has actually come to pass, since "realis" applies to both positive and negative constructions and the express purpose of a past negative realis construction might be to assert that the proposition most certainly did not come to pass. It is therefore best to think of this feature as meaning something like "real," and not "realized."

Since the binary [real] feature also exists in the present tense, and in both its positive and negative realizations where we can compare the meaning more closely, we will examine a couple of these sentences to get a sharper feeling for the semantic field indicated. Our first sentence could be labelled the "present realis progressive" and it is realized as below:

(83) à nè nzǎ?à mbàb "he is in the process of cutting meat"

The preceding sentence has the presence of the imperfective realis nasal prefix (symbolized by the underlined "n") and carries the semantic weight of absolute assurance. This is to be contrasted with the following example which could be labelled the "present irrealis progressive":


(84) á nè zǎ?à mbàb "he is (probably) in the process of cutting meat"

This last example not only lacks the presence of the imperfective realis nasal prefix on the verb, it also communicates to the listener that the speaker is not absolutely sure that what he is saying is true. Thus, one could say that the absence of realis marking in this context communicates a certain degree of uncertainty. This uncertainty is not unlike the uncertainty that necessarily accompanies any pronouncement relating to the future. We can thus see that this certain/uncertain semantic distinction is quite close to the meaning of the binary feature we choose to label "realis/irrealis."

In order to derive the regular realis and irrealis tone patterns using the tone rules already developed in this dissertation, our analysis must posit several tonal morphemes, most notably three different polar tone tonal morphemes where the precise nature of the tone is defined as being the exact opposite of the following associated tone. Our first polar tone tonal morpheme indicates realis mode and it immediately precedes the verb root. The second polar tone tonal morpheme indicates irrealis mode and also immediately precedes the verb root. The crucial difference between these two floating polar tones is that the realis one is inserted in the tone pattern before the tone rules operate, while its irrealis counterpart is
inserted after. The irrealis polar tone morpheme preceding the verb is also accompanied by a second polar tone tonal morpheme which immediately follows the verb root. Both of these irrealis polar tones will be inserted by the same late morpho-tonological rule.

The unusual ordering of this tonal insertion rule after the operation of most of the tonal rules (excluding our late downstep rule) is probably related to the recent historical development of these future (and therefore irrealis) tenses. In fact, the auxiliary verbs which are used to mark future tense now designate the semantic field of futurity but still retain their grammatical status as verbs. The late insertion of these irrealis tones is used solely to trigger the appropriate downstep features on the surface, which for the basic irrealis tone pattern both precede and follow the verb stem. Our posited underlying tone patterns are therefore the following (where "P" symbolizes a polar tone which can only be known when the following tone is also known):

(85) Underlying Tones

<table>
<thead>
<tr>
<th>Lexical tones</th>
<th>Realis</th>
<th>Irrealis</th>
</tr>
</thead>
<tbody>
<tr>
<td>H tone verb root</td>
<td>L-H-Ø</td>
<td>L-H-P</td>
</tr>
<tr>
<td>L tone verb root</td>
<td>H-L-Ø</td>
<td>H-L-P</td>
</tr>
</tbody>
</table>
The preceding underlying tone patterns interact with the tone rules already posited for the noun phrase to give us our four major surface tone patterns. We will now examine each of these four basic derivations in turn. We will limit ourselves in this section to the less marked perfective tone patterns, leaving the more complicated imperfective patterns and unusual patterns for the following sections.

In the remainder of this dissertation, we will cite various examples from Ngyembœn, limiting ourselves almost exclusively to the subject pronoun /à/ "he," the object /mbàb/ "meat," the bipartite negative morpheme /tè...wó/, and the following four verb stems:

\[(\text{86})\begin{array}{|c|c|c|}
\hline
\text{H tone verb root} & \text{Monosyllabic} & \text{Disyllabic} \\
\hline
\text{za?} "cut" & \text{lumte} "bite" \\
\text{gwo?} "grind" & \text{limte} "reheat" \\
\hline
\end{array}\]

The first verb tone pattern that we will examine is with the P₃ tense marker /là/ and the basic realis tonal pattern on a monosyllabic H tone verb root, as in the following example (negative since all positive perfective sentences undergo separate morpho-tonological rules):

\[(\text{87})\quad \text{à la tè za? mbàb wó "he did not cut the meat"} \]

\[3 \quad 3 \quad 3 \quad 1 \quad 3 \quad 1 \quad \text{(yesterday)}\]

he P₃ NEG cut meat NEG
The underlined word in the preceding example is our monosyllabic H tone verb root which is here realized on a H tone level (1). As mentioned above, our analysis derives this pattern by means of a polar tone tonal morpheme which is here a L tone preceding the H tone of the verb root. Our pattern appears as below after the initial tone mapping rule has associated (new association lines continuing to be signaled by slashed lines) the H tone of the verb root to the syllable of the same morpheme (here marked as "V" to signal the verb root):

(88) # + V #

When it is time in the derivation for the regular unordered tone rules to operate from left to right on the tonal tier, our tone rule for associating L tone tonal morphemes to the left (tone rule 5 described in the section 2.2.2. above) operates as below:

(89) S # + V #

The dotted line going to the left in the preceding representation signals that this tone is associated to the adjacent syllable ($) on the left. Since the word preceding a verb almost always ends on a L tone, this
particular tone seldom has an observable effect (see section 2.3.5. below for its role in certain present negative constructions).

Since both tones in our present derivation are associated tones, our late downstep rule does not apply, leaving our lexical H tone to be realized on the pitch level of (1), as below:

\[
\begin{array}{c}
(90) \quad S \# + V \# \\
\quad \# L + H \# \\
\quad 1
\end{array}
\]

Verb stems occasionally have two syllables, usually due to the addition of a toneless /-te/ suffix, as in the following example:

\[
(91) \quad à là à te lúmté mbàb wó \quad "he did not bite the meat"
\begin{array}{ccccccc}
3 & 3 & 3 & 1 & 1 & 3 & 1 \quad (yesterday)
\end{array}
\]

Once again, the verb in the preceding example is underlined, including its toneless /-te/ suffix (symbolized by "S" in the following representations). We therefore have a pattern like the following after the tone mapping rule has operated:

\[
\begin{array}{c}
(92) \quad # + V + S \# \\
\quad \# L + H + #
\end{array}
\]
It is at this point that our regular tone rules come into play. It is important to remember that these rules operate *locally* on the tonal tier, that is to say that they operate one tone at a time (in a left-to-right manner, as in most languages). The first rule that applies to our present pattern is thus the leftward-docking L tone morpheme rule, as in the following representation:

\[(93) \quad \$$ + V + S $$\]

We mentioned above that in our analysis, the part of Goldsmith’s WFC which says that every vowel must be associated to a tone would be made into a well-formedness rule (WFR), which would operate whenever a toneless syllable was found during the normal left-to-right scanning of the tonal tier by the tonal rules. The idea of treating the WFC as a tonal rule (subject to strict ordering) has previously been suggested by Clements and Ford (1979:208). Since the only toneless morpheme which triggers this rule is the toneless verb suffix */-te/*, and it always associates to the first tone on its left, we give a preliminary version of this rule as below (a revised version with a deletion option is described in (184) below):
(94) **Rule 8: Well-formedness Rule (WFR)**

This rule says that whenever a toneless syllable is found (in the left-to-right application of the tone rules), it is associated to the first tone found to its left. The result of the WFR on our present pattern is thus the following:

(95) 

We are now left with a single H tone associated to both of the syllables of our disyllabic verb. Since there are no floating tones to trigger our register-lowering downstep rule, both syllables are realized on pitch level (1), as below:

(96) 

Turning now to our L tone monosyllabic verb root, it appears as below when it is marked for the basic realis tone pattern:
à là bè  gwọ̀ mbàb wó  "he did not pound the meat"
(yesterday)

The underlined verb in the preceding example is realized on a downstepped H tone (2) instead of the underlying lexical L tone (3). This derivation takes place on our underlying tones, which include a polar tone tonal morpheme marking realis mode. Since the polar tone is a H tone here in order to be the opposite of its following lexical L tone, our tone pattern appears as below after the initial tone mapping rule has operated:

(98)  
#  +  V  #

#  H  +  L  #

Now, instead of our leftward-docking L tone morpheme rule, our rightward-docking H tone morpheme rule causes the following tonal changes (where the small slashes // indicate a deleted association line):

(99)  
#  +  V  #

#  H  +  L  #

Since verbs are almost always preceded by syllables (symbolized by "$" in the following representation) which are associated to L tones, the floating H tone after the associated L tone meets the conditions of our
metathesis rule which moves the floating L tone in front of the associated H tone, as below:

\[
\begin{array}{c}
(100) \quad + \quad S \quad \# \quad + \quad V \quad \#
\
+ \quad L \quad \# \quad H \quad + \quad L \quad \#
\end{array}
\]

Since our associated H tone is now preceded by a floating L tone, it triggers our register-lowering downstep rule, which causes the verb root to be realized phonetically on a lowered pitch level (2), as in the following representation:

\[
\begin{array}{c}
(101) \quad \# \quad + \quad V \quad \#
\
\# \quad L \quad H \quad + \quad \#
\end{array}
\]

The same kind of lexical L tone verb root can also be modified by the addition of the lexically toneless /-te/ suffix, as in the following example:

\[
(102) \quad \text{à là të \textcolor{red}{lïmtë} mbàb wó "he did not reheat the meat"}
\]

\[
3 \quad 3 \quad 3 \quad 2 \quad 2 \quad 4 \quad 2 \quad \text{(yesterday)}
\]

Allowing for the same polar tone tonal morpheme being realized as a H tone before the lexical L tone, the basic realis construction appears as below after operation of the tone mapping rule:
Once again, the first tone rule to affect this realis construction with a L tone verb root is our rightward-docking H tone morpheme rule which results in the following:

Now that the L tone is floating, it is moved in front of the associated H tone after an associated L tone by the application of our metathesis rule, as below:

The next rule to operate is our WFR, which now associates the toneless /-te/ verb suffix with the associated H tone of the verb prefix, as below:
It is crucial in the present derivation that the WFR; operates locally going from left to right, or it would have wrongly associated the S syllable to the then associated L tone immediately after the mapping rule. This proves that the WFR acts as a tonal rule, and not as a general convention in Ngyemboon since it behaves like other tonal rules.

The final rule to operate on this pattern is our downstep rule which lowers the pitch register one notch (to 2) because the associated H tone is preceded by a floating L tone. Since the formerly toneless S syllable is now associated to this same lowered H tone, it too is realized on the same pitch level as its predecessor, as below:

(107) 

This concludes our analysis of the regular realis tone patterns as they occur on verbs in indicative perfective constructions. We can now move on to the parallel irrealis patterns. While examining these irrealis patterns, we will continue to limit ourselves to perfective constructions, as in the following example with an underlying H lexical tone and a monosyllabic verb root:
(108) à gè ṭāʔ mbàb "he will cut the meat"

3 3 2 5 (later today)

The preceding example (from the F₁ future tense) shows the two downstep realizations characteristic of irrealis constructions. The two occurrences of downstep (including the underlined verb root in focus here) lower the tone register twice so that the final L tone on the object is realized on pitch level 5 instead of the pitch level 3 of a L tone at the beginning of a sentence. In focus at this moment are the downstep feature on the verb root and the downstep feature on the following object, both of which result from the irrealis marking of the verb. As briefly mentioned above, we posit a polar tone tonal morpheme preceding the verb stem and another polar tone tonal morpheme following the stem whenever the construction is marked for a basic irrealis tone pattern. The crucial point of the following derivation, however, is that these two tonal morphemes are not specified until after the normal tone rules have applied. This late ordering of the irrealis morpho-tonological insertion rule is what contrasts it with its realis counterpart. The ordering of the insertion of an identical polar tone tonal morpheme thus results in quite different surface realizations.

Our H tone verb root with irrealis mode therefore appears as below after the initial tone mapping rule has operated (with a capital "A" to
indicate the L tone noun class prefix of the following object):

(109)  
\[
\begin{array}{c|c|c|c}
# & V & # & A + \\
\hline
# & H & # & L +
\end{array}
\]

The preceding pattern meets none of the requirements for our set of tonal rules. After these rules have had their chance to operate, a late morpho-tonological rule (see (580) below) will insert our two tonal morphemes, leaving us with a pattern which now looks like the following:

(110)  
\[
\begin{array}{c|c|c|c}
# & + & V & + \\
\hline
# & \emptyset & + & H & + & \emptyset & # & L & +
\end{array}
\]

\[\begin{array}{c}
-\alpha_T \\
L
\end{array}
\quad \begin{array}{c}
-\alpha_T \\
H
\end{array}\]

The two polar tone tonal morphemes are realized differently, a L tone before the H tone of the verb root and a H tone before the L tone of the typical object prefix (syllable A above). Crucially, since our regular tone rules have already operated by the time these polar tone tonal morphemes are inserted, no further change takes place except the register-lowering effect of our downstep rule, which operates twice in this pattern, as below:
According to our downstep rule, an associated H tone preceded by a floating L tone is realized as a downstepped (lowered) H tone (pitch level 2 above). Likewise, an associated L tone preceded by a floating H tone is realized as a downstepped L tone (pitch level 5 above because the register-lowering effect of downstep is cumulative). The result is that the L tone of the object prefix is actually realized two pitch levels lower than in isolation.

It should be pointed out here that the preceding representation does not correspond exactly to the example cited. The reason for this is that our example uses the noun /màb/ "meat" as the object, a noun that has two syllables when pronounced in isolation or after a slight pause. The homorganic nasal noun class prefix (symbolized by the L tone "m" on our noun) actually loses its syllabicity in the middle of normal constructions. In the case in focus, the desyllabified nasal prefix of the noun actually drops out, thus transferring the downstep feature caused by the polar tone to the following noun root. The actual tones realized on objects in different environments are discussed in detail in section 2.4.2. below.
If we find a H tone verb stem which includes the toneless /-te/ suffix, we have a tone pattern as below:

(112) à gê lûmté mbâb "he will bite the meat"

3 3 2 2 5 (later today)

As can be seen, the underlined disyllabic verb stem is here realized on the same pitch level (2). The first association line to be drawn on this pattern results from our general tone mapping rule which operates as below:

(113) # V + S # A +

# H + # L +

When we come to our regular tone rules we find that only our WFR rule operates, associating the toneless S syllable to the first tone on its left, which in this case is the H tone of the verb root, as below:

(114) # V + S # A +

# H + # L +

After our tone rules have operated, a morpho-tonological rule inserts the two polar tone tonal morphemes before and after the verb stem. It is crucial here that the toneless suffix "S" is considered to be part of the verb stem, so that the tonal morphemes are inserted as below:
The only remaining tone rule which applies is our late downstep rule which lowers the tone register in two places, as below:

We are now ready to look at typical L tone verb stems marked for irrealis aspect, as with the monosyllabic verb root shown below:

In this example, the (underlined) verb root and the object are both realized on downstepped L tones. Our derivation starts with just the simple tones of the verb root and object prefix which are associated by the general tone mapping
rule as below:

\[(118)\]

\[
\begin{array}{c}
\# \\
\# \\
\# \\
\# \\
\end{array}
\begin{array}{c}
V \\
A + \\
L \\
L + \\
\end{array}
\]

Once again, the preceding pattern meets none of the requirements for our set of tonal rules. After these rules have had their chance to operate, a late morpho-tonological rule will again insert our two polar tone tonal morphemes, leaving us with the following pattern:

\[(119)\]

\[
\begin{array}{c}
\# \\
\# \\
\# \\
\# \\
\end{array}
\begin{array}{c}
+ \\
V + \\
A + \\
\emptyset + \\
\emptyset + \\
\end{array}
\]

\[
\begin{array}{c}
\# \\
\# \\
\# \\
\# \\
\end{array}
\begin{array}{c}
\emptyset \\
L + \\
\emptyset \\
L + \\
\end{array}
\]

\[
\begin{array}{c}
\alpha T \\
\alpha T \\
\downarrow \\
\downarrow \\
H \\
H \\
\end{array}
\]

The polar tone tonal morpheme which precedes the verb stem is this time realized as a H tone because of the L tone on the following verb root. No further rules operate here except the register-lowering downstep rule, which results in two downstepped L tones, as below:

\[(120)\]

\[
\begin{array}{c}
\# \\
\# \\
\# \\
\# \\
\end{array}
\begin{array}{c}
+ \\
V + \\
A + \\
H + \\
L + \\
\end{array}
\]

\[
\begin{array}{c}
\# \\
\# \\
\# \\
\# \\
\end{array}
\begin{array}{c}
H \\
L \\
H \\
L + \\
\end{array}
\]

\[
\begin{array}{c}
4 \\
5 \\
\end{array}
\]
The L tone verb stems may also include the toneless /-te/ suffix, as in the following example:

(121) à gè lìmtè mbâb "he will reheat the meat"

3 3 4 4 5 (later today)

Once again, the underlined disyllabic verb stem is realized on the same pitch level, though this time it is a lowered L tone on level (4). Our tone mapping rule associates the lexical tones as in the following representation:

(122)

\[
\begin{array}{c}
# & V & + & S & # & A & + \\
\hline
# & L & + & \# & L & + \\
\end{array}
\]

In the presence of the toneless S suffix, we find that our WFR rule is the only tone rule triggered, operating as below:

(123)

\[
\begin{array}{c}
# & V & + & S & # & A & + \\
\hline
# & L & + & \# & L & + \\
\end{array}
\]

After this rule has associated the S syllable to the first tone on its left, our irrealis morpho-tonological rule inserts two polar tone tonal morphemes as below:
Our late register-lowering downstep rule is now the only rule still in a position to operate, and it results in the following surface realization:

This concludes our section on the normal tonal patterns found on realis and irrealis constructions that also have the unmarked perfective aspect. We can now go on to examine their more complicated imperfective counterparts.
2.3.2. *With imperfective aspect*

We have seen examples of the various perfective possibilities in the previous section. We will now examine the changes that come to the verb when the imperfective suffix which is underlyingly a L tone echo vowel is added. In the following autosegmental representations, we shall refer to this morpheme by an "I" for imperfective on the segmental tier and a single L tone on the tonal tier. The first tone pattern that we will examine is that which occurs when H tone monosyllabic verb roots are realized on the regular realis tones, as in the following example from the present realis construction (which is used to signal habitual meaning):

(126)  à nzá?à mbàb  "he cuts meat"

3 1 3 3

The preceding (underlined) verb has the addition of both the homorganic nasal prefix (/n-/ above) signalling realis mode and the echo vowel suffix (/a/ above) signalling imperfective aspect on the segmental tier. According to our proposed analysis, this realis construction can be represented as below after the tone mapping rule has operated (with the symbol "I" to indicate the echo vowel syllable of the imperfective marker on the syllabic tier):
The only tone rule that applies to this pattern is the leftward-docking L tone morpheme rule which associates the floating L tone to the first adjacent syllable ($) on its left. Since the downstep rule does not apply to this pattern, it is realized quite straightforwardly, as below:

\[
\begin{array}{ccc}
S & # & + V + I \\
# L & H & L
\end{array}
\]

The same imperfective pattern can be realized on underlying disyllabic verb stems, as in the following example with the toneless /-te/ suffix:

\[
\begin{array}{ccc}
\text{à ndîmtè mbàb} & "he bites meat"
\end{array}
\]

It should be noticed that the toneless /-te/ suffix at the end of the underlined verb in the preceding example does not have a long vowel (symbolized by doubling the vowel in the Ngyemboon orthography). The echo vowel is thus absent in the presence of the toneless /-te/ suffix, a fact handled by our morphophonological spelling rule for imperfective aspect (see (547) below). We are thus left with a L tone tonal morpheme indicating imperfective aspect, a morpheme
that is ordered after the specification of the toneless suffix "S" as /-te/. Our pattern therefore appears as below after the operation of our tone mapping rule:

\[
\text{(130) } \quad \quad \quad \quad \# + V + S + \# \\
\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \# L + H + + L \# \\
\]

The first rule to operate on this pattern is the leftward-docking L tone morpheme rule which operates first on the \textit{first} L tone tonal morpheme as below:

\[
\text{(131) } \quad \quad \quad \quad S \# + V + S + \# \\
\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \# L + H + + L \# \\
\]

The next rule to operate is our WFR which associates the toneless S syllable to the H tone of the verb root. This results in the following:

\[
\text{(132) } \quad \quad \quad \quad S \# + V + S + \# \\
\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad 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Since all the tones in our pattern are associated to some syllable or other, the downstep tone rule does not apply and we are left with the following surface realization:

Switching now to verbs with underlying L lexical tones, we have examples like the following:

The preceding (underlined) verb consists of the realis /n-/ prefix, the verb root and the imperfective echo vowel suffix (/\-\-\-\-/ above because of the vowel quality of the root vowel). In addition, we have our posited polar tone tonal morpheme which is a H tone before the L tone of the following verb root, as in our representation below:
With this floating H tone at the beginning of our pattern, the rightward-docking H tone morpheme rule applies, changing our pattern to the following:

Since the verb is almost always preceded by a syllable ("$") associated to a L tone, our present pattern feeds the metathesis rule and metathesizes the associated H tone and newly floating L tone of the verb root syllable, resulting in the following pattern:

This floating L tone which now precedes an associated H tone is affected by our late downstep rule which lowers the tone register one notch (to 2), resulting in the following surface realization:
An identical tone pattern can be found on verb stems which are lexically disyllabic, as in the following example:

(140) à ndîmtè mbàb "he reheats meat"

3 2 4 4

The present pattern differs from the preceding in that the verb stem is disyllabic and the imperfective suffix is therefore just a L tone tonal morpheme instead of a L tone echo vowel. Our pattern therefore appears as below (with the L tone tonal morpheme following the toneless S syllable) after the tone mapping rule has operated:

(141) # + V + S + #

# H + L + + L #

Once again, the floating H tone at the beginning of our pattern triggers the rightward-docking H tone morpheme rule, which operates as below:

(142) # + V + S + #

# H + L + + L #

Due to the typical presence of a L tone associated to the preceding syllable (“$”), the newly disassociated L tone is now fronted by our metathesis rule, as in the following representation:
The next rule to operate on this pattern is our WFR rule which associates the toneless S syllable to the first tone on its left (which is a H tone at this point in the derivation), as below:

Since the L tone tonal morpheme is still unassociated at this moment in the derivation, the leftward-docking L tone tonal morpheme rule operates. It associates the final L tone of our pattern to the left and disassociates the S syllable from the preceding H tone, as in our representation below:

The final tone rule to operate is our late downstep rule which again lowers the tone register one notch (to 2) at the beginning of our pattern. This lowered register remains in place throughout, resulting in a lowered (to 4) pitch level for the L tone of the final syllable, as below:
This concludes our analysis of monosyllabic and disyllabic verb stems with both realis mode and imperfective aspect. We will now examine their parallel constructions with irrealis mode.

Turning our attention from realis to irrealis imperfectives, we come across several derivations where the ordering of morpho-tonological rules is crucial. The first of our derivations will concern H tone monosyllabic verb roots found in typical irrealis imperfective constructions, as in the following example:

(147) à gè zā?ā mbāb "he will be a meat-cutter"

3 3 2 5 5 (later today)

The preceding example is from the F₁ (today future) tense. Our English gloss attempts to convey the future habitual meaning that has come to be associated with these irrealis imperfective constructions. The (underlined) verb does not have the realis nasal prefix as did the realis constructions described earlier in this section. The verb does have the echo vowel suffix, and the verb root is both preceded and followed by
downstepped tones. According to our analysis, this construction can be represented as below after our tone mapping rule has operated:

\[(148) \quad \# \quad V \quad + \quad I \quad \# \]
\[(\# \quad H \quad + \quad L \quad \#)\]

Since none of the tone rules apply to this pattern, the next rule to operate is our morpho-tonological rule (see (580) below) for irrealis mode which occurs after the normal tone rules. This rule inserts two polar tone tonal morphemes, a L tone before the H tone of the verb stem and a H tone before the L tone of the imperfective suffix, as represented below:

\[(149) \quad \# \quad + \quad V \quad + \quad I \quad \# \]
\[(\# \quad \emptyset \quad + \quad H \quad + \quad \emptyset \quad + \quad L \quad \#)\]

The only rule which applies after this late morpho-tonological insertion rule is the late downstep rule, which in this case lowers the tonal register twice, first lowering the H tone one notch to pitch level (2), then lowering the L tone two notches to pitch level (5), because register-
lowering is cumulative. The surface result is thus the following:

\[(150) \quad \# + V + + I \# \]
\[
\# L + H + H + L \#
\]
\[2 - 5\]

This same tone pattern can be found on disyllabic verb stems such as the one with the toneless /-te/ suffix in the following example:

\[(151) \quad \text{à gè lûmtè mbàb} \quad "\text{he will be a meat-biter}"\]
\[
3 \quad 3 \quad 2 \quad 5 \quad 5 \quad \text{(later today)}
\]

This pattern differs from the preceding in that it starts the derivation with a toneless suffix after the verb root. The imperfective suffix is lacking syllabic content in the presence of this S syllable instead having the normal L tone echo vowel seen above. Together, these differences are represented on our autosegmental tiers as below:

\[(152) \quad \# V + S + \# \]
\[
\# H + + L \#
\]

After the tone mapping rule has produced the preceding pattern, the next rule to operate is the WFR which associates the toneless S syllable to
the H tone of the verb. The result is the following:

(153) \[ \begin{array}{c}
# V + S + # \\
\hline
# H + + L #
\end{array} \]

The next rule to operate is our leftward-docking L tone tonal morpheme rule which associates the L tone of the imperfective suffix to the S syllable while disassociating that syllable from the H tone already associated there, as below:

(154) \[ \begin{array}{c}
# V + S + # \\
\hline
# H + + L #
\end{array} \]

It is crucial that it is only now, at this time in the derivation, that our late morpho-tonological rule (see (580) below) inserts two polar tone irrealis morphemes, one before and one after the verb stem (which consists of syllables V and S together), as below:

(155) \[ \begin{array}{c}
# + V + S + + # \\
\hline
# \emptyset + H + + \emptyset + L #
\end{array} \]

\[ \begin{array}{c}
\downarrow -\alpha T \\
L
\end{array} \] \[ \begin{array}{c}
\downarrow -\alpha T \\
H
\end{array} \]
Since all the other tonal rules have already operated, the only rule which affects this pattern is the downstep rule which lowers the tonal register twice, as in the following representation:

\[(156) \quad \# \quad + \quad V \quad + \quad S \quad + \quad + \quad \# \]

\[
\begin{array}{c}
\# \\
L + \\
H + \\
+ \\
H + \\
L \\
\end{array}
\]

\[
\begin{array}{c}
2 \\
- \\
5 \\
\end{array}
\]

We will now switch to examining the regular tone patterns which occur when L tone verb stems are marked for irrealis mode and imperfective aspect, as in the example with a lexical monosyllabic root below:

\[(157) \quad \text{à gè gwò?ò mbàb} \quad "\text{he will be a meat-pounder}" \]

\[
\begin{array}{cccccc}
3 & 3 & 4 & 5 & 5 \\
\end{array}
\quad \text{(later today)}
\]

The preceding example looks like the following representation once the initial tone mapping rule has operated:

\[(158) \quad \# \quad V \quad + \quad I \quad \# \]

\[
\begin{array}{c}
\# \\
L + \\
L \\
\end{array}
\]

Since none of the tone rules apply to this pattern, the next rule to operate is the late morpho-tonological rule which inserts two polar tone tonal morphemes, a H tone before the L tone of the verb root and another
H tone before the L tone of the imperfective suffix, as below:

(159) 

The only remaining rule which may apply to this pattern is our late downstep rule which lowers the tonal register twice. Since this lowering of the tonal register is cumulative, the L tone is first lowered to pitch level (4) and a second time to pitch level (5), as below:

(160) 

This same tone pattern can also be seen with L tone verb roots which have disyllabic stems as the result of the addition of the toneless verb suffix, as in the following example:

(161) à gè lîmtè mbâb "he will be a meat-reheater"

3 3 4 5 5 (later today)
Since this verb stem has the lexically toneless /-te/ syllable, it appears as below after the initial tone mapping rule has operated:

(162)  
```
  # V + S + #
    # L + + L #
```

The next rule to apply to this pattern is the WFR which associates the toneless S syllable to the L tone of the verb root. The result is the following:

(163)  
```
  # V + S + #
    # L + + L #
```

The next rule to operate is our leftward-docking L tone tonal morpheme rule which associates the L tone of the imperfective suffix to the S syllable while disassociating that syllable from the L tone previously associated there, as below:

(164)  
```
  # V + S + #
    # L + + L #
```

Once again, it is crucial that our late morpho-tonological rule inserts the two polar tone tonal morphemes indicating a normal irrealis tonal pattern only at this late point in the derivation, as shown below:
The first polar tone tonal morpheme is here realized as a H tone preceding the L tone of the verb root. The second polar tone tonal morpheme is inserted immediately following the toneless S syllable of the verb stem but preceding the L tone of the imperfective suffix. Since all the other tonal rules have already operated, the only rule which may still affect our pattern is the late downstep rule which once again lowers the tonal register twice, as seen in the following representation:

The preceding two sections have shown the underlying derivations of what shall be referred to as the "regular" or "expected" tones for realis and irrealis constructions (labeled "R" for realis and "I" for irrealis in our tone pattern chart at the beginning of section 2.3.2. above). Any
deviations from these R and I patterns are considered more marked. These unusual tonal patterns are always the result of some specific morpho-tononlogical rule, and they are each discussed in detail in their turn in the following section.
2.3.3. With tense markers

The following chart (see (82) above) is repeated below to enable the reader to remember which verbal constructions take normal realis (R) or irrealis (I) tone patterns and which take their own idiosyncratic tone patterns (labelled "x" in the chart):

(167) Revised Realis/Irrealis Tone Distribution

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<th>P_2</th>
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The preceding two sections of this dissertation have examined in detail the tonal derivations of all the normal realis and irrealis tone patterns. It is now the task of the present section to examine as well the various idiosyncratic tone patterns (symbolized by x’s in the preceding chart). The reader is referred to Appendix B for more detailed charts which show the actual surface tones realized on H and L tone verb roots for all these constructions, whether they come from regular realis or irrealis tone patterns or are the result of the idiosyncratic rules discussed in this section. Each of the unique tone patterns indicated in the chart are generated by separate morpho-tonological rules, all of which are formalized in chapter 4 below. Our present interest will be to take the results of these morpho-tonological rules and follow their progress throughout their derivations until their respective phonetic realizations are achieved.

We will begin our examination of these rules by looking at those associated with perfective aspect. The preceding chart clearly shows that Ngyenboun always realizes a non-future indicative sentence on something other than the regular realis tones whenever that sentence is both perfective and positive. Thus we always have the small x’s to the left of the slash mark above for the positive perfective sentences, even though the parallel negative sentences to the right of the slash mark
always have the normal realis tone pattern (R).

Since these non-future positive perfective indicative sentences are among the most frequently used in the course of everyday verbal interaction, it is apparent that Nygembɔɔn speakers are able to remember and reproduce the unique tonal patterns that are special to the positive perfective construction of each tense. These unusual tonal patterns are not only more highly marked than the regular realis patterns, they are most likely also of older historical vintage. These older patterns are therefore maintained today only in highly restricted grammatical environments.

The first perfective positive non-future tone pattern that we shall examine is that of the P₂ tense, as in the following example:

(168) à kà zà? mbàb "he cut the meat"

  3 3 3 3 3 (yesterday)

The abnormal tonal characteristic of the preceding example is that the verb root which has an underlying lexical H tone is realized phonetically on a L tone (pitch level 3). The only tone rule to eliminate H tones completely (it cannot just be disassociated as then it would downstep the following L tone) is our rise-deletion rule. We have therefore posited a morpheme containing both a L and a polar tone preceding the verb stem
with the L tone being associated to both the verb root syllable and the preceding syllable. Since we posit this morpho-tonological rule (see (563) below) to operate before our tone rules, our present H tone verb root would look as below after operation of the mapping rule and the $P_2$ positive perfective indicative morpho-tonological rule (with "$\$" to indicate the immediately preceding syllable):

(169) $\$ \# + V \#$

$\# \emptyset L + H \#$

$L$

It is crucial that the morpho-tonological rule which inserts this additional L tone in the realis tone morpheme before the verb stem also draws the two new association lines shown above. The second tone of the morpheme is actually the realis polar tone but it is realized as a L tone above in order to be opposite of the following H tone (of the verb root). It is now crucial that the preceding pattern feeds our rise-deletion rule, which it can do if we slightly revise the rule (first stated in (51) above), as below:
(170) Rule 6': Rise-Deletion

The preceding rule differs from its previous version by the addition of an optional floating tone (T) and the fact that the rule now applies whenever the next tone is a L tone. The addition of the floating tone (T) is a revision that is similar to the revision of our metathesis rule (see (62) above) which allowed for an additional floating H tone. Adding the syllable A for the L tone noun class prefix of the following object which triggers the revised rise-deletion rule, our pattern is changed into the following:

(171)

Since the downstep rule does not apply to this pattern in its present form, our surface realization is quite straightforward, as below:
Such a L tone realization of an underlying H tone verb root can also occur if the verb stem is disyllabic, as in the following example:

(173) à kà lùmtè mbàb "he bit the meat"

3 3 3 3 (yesterday)

Adding the syllable S to indicate our toneless /-te/ verb suffix, our pattern appears as below after application of both the tone mapping rule and our P₂ positive perfective morpho-tonological rule:

Once again, we show the L tone prefix of the following object which triggers the revised rise-deletion rule, deleting the H tone in the pattern in the following manner:
The next rule to operate is our WFR rule which associates the toneless S syllable to the first tone on its left. The result is the following:

With each syllable now associated to one L tone, the phonetic realization is quite straightforward, as below:

Switching now to verb roots with lexical L tones, we find monosyllabic examples like the following:

The preceding example shows that underlying L tone verb roots are
realized phonetically on a low-downstepped-low tone (glide from pitch level 3 to 4 on the underlined verb root above). Adding the same complex L and polar tone tonal morpheme that we did with the H tone verb roots above results in the following after both the tone mapping rule and the morpho-tonological insertion rule have operated:

Since the verb root tone is L here, the immediately preceding polar tone is realized as a H tone. Since there are no single-tone tonal morphemes to feed our leftward- and rightward-docking rules, the next rule to operate is our late downstep rule which lowers the tone register one notch (from 3 to 4) because of the floating H tone preceding the associated L tone, as below:

Since the verb stem is monosyllabic, both the tone levels 3 and 4 are realized on the same syllable above.
These same two levels are realized on separate syllables whenever the verb stem is disyllabic, as in the following example:

(181) à kà limtè mbàb "he reheated the meat"

3 3 3 4 4  (yesterday)

In the preceding example, the downstep (to level 4) occurs between the first syllable of the underlined verb and the lexically toneless syllable /-te/. The derivation of this tone pattern is similar to the last with the addition of the S syllable found below:

At this point, our WFR rule operates, associating the toneless syllable S to the L tone of the verb root. Crucially, however, this same WFR rule also disassociates the verb root syllable (V) from that same L tone as in the following representation:

It must be pointed out that our preliminary version of the WFR rule
(see (94) above) would associate the toneless $S$ syllable to the $L$ tone on its left, but it would not disassociate that $L$ tone from syllable $V$, as we have indicated must take place. We must therefore revise our WFR rule to disassociate the tone chosen by a formerly toneless syllable from other syllables provided that those other syllables are already associated to yet another tone. The rule obviously does not want to create other toneless syllables in the process of associating existing toneless syllables. The result of our modified WFR rule must be that whenever a toneless syllable "bumps into" a syllable with a complex (i.e. more than one) tone, the complex tone is broken down into its constituent parts, each part being left with its respective associated syllable. We therefore revise our WFR (first stated in (94) above), as below:

(184) **Rule 8': Well-formedness Rule (WFR)**

\[ \begin{array}{c} \text{(S)} + \text{S} + \\ \text{(T)} \text{T} + + \end{array} \]

Condition: When a toneless syllable associates to the first tone on its left, it only disassociates that tone from another syllable if that syllable is already associated to yet another tone.

This rule says that whenever a toneless syllable is found (in the left-to-right application of the tone rules), it is associated to the first tone found on its left, disassociating as well that same tone from any other
syllables with which it might already be associated if those syllables would retain yet another tone.

Once the revised WFR rule has operated, the only other rule to affect our pattern is the late downstep rule which lowers the tone register one notch between the two syllables, as below:

(185) \[
\begin{array}{c}
# \\
L \\
3
\end{array} \quad \begin{array}{c}
S + V + S # \\
H + L + # \\
- 4
\end{array}
\]

The second perfective P₃ positive non-future tone pattern that we shall examine is that of the tense, as in the following example:

(186) à là zâ? mbàb "he cut the meat"

3 3 13 3

The preceding example has a H-L falling tone on its underlined verb root. This kind of a surface realization is accomplished by inserting an associated L tone after the verb stem, a tone not inserted until after the operation of our normal tone mapping rule which results in the following:
It is only after the mapping rule has operated, but before the bulk of our tone rules operate, that our unique morpho-tonological rule inserts a L tone immediately after the verb stem if the sentence is positive perfective $P_3$ (see (562) below). The result of this rule is the following:

(188)  

It is crucial that the additional L tone is added after the verb stem and is associated by the same rule to the last syllable of the same verb stem.

When it comes time for our normal tone rules to operate, the leftward-docking L tone morpheme rule associates the realis polar tone (L tone before the H tone of the verb root) to the first syllable ($) preceding the verb, as below:

(189)  

Since our late downstep rule does not apply to this particular pattern (all the tones being associated), the surface realization is quite straightforward, as

115
below:

(190) $\begin{array}{c}
\frac{s \# + v + \#}{\# l + h + l \#} \\
\quad 1 \quad 3
\end{array}$

The same kind of pattern can be realized on disyllabic verb stems, as in the following example:

(191) à là lúmtè mbàb "he bit the meat"

$\begin{array}{c}
3 \quad 3 \quad 1 \quad 3 \quad 3
\end{array}$

Adding the syllable S to indicate our toneless /-te/ verb suffix, our pattern appears as below after application of the tone mapping rule:

(192) $\begin{array}{c}
\frac{\# + v + s \#}{\# l + h + \#}
\end{array}$

Once again, after the mapping rule but before the other tone rules, the $P_3$ positive perfective morpho-tonological rule inserts a L tone after the verb stem and associates that L tone to the last syllable of the verb stem (in this case, the S syllable), as below:
We now come to our normal tone rules. The only rule to apply to this particular derivation is the leftward-docking L tone morpheme rule which once again operates as below:

Until now, we have seen that our WFR rule has always applied to the toneless S syllable whenever it has been present. However, in the present derivation, the S syllable has already been associated with a tone by our P₃ rule, and the WFR does not apply. Since the late downstep rule does not apply either, the final surface result is the following:

We will now examine parallel P₃ positive perfective examples where the verb root has a lexical L tone, as in the following example:
à là gwɔɔ mbàb  "he ground the meat"

The preceding example shows that underlying L tone verb roots are realized phonetically on a downstepped-high-low tone glide (from pitch level 2 to 4 on the underlined verb above). Starting with the same realis polar tone (realized as a H tone before the L tone of the verb root), the pattern appears as below after our tone mapping rule has operated:

(197)  

Once again, after our mapping rule but before the other tone rules, the P₃ morpho-tonological rule operates producing the following:

(198)  

When it comes time for our normal tone rules to operate, the first rule to operate as we go from left to right is the rightward-docking H tone morpheme rule which associates the realis polar tone (H) to the verb root syllable while also disassociating the first L tone to its right, as below:
The fact that the preceding rule disassociated the L tone of the verb root feeds our metathesis rule before the usual associated L tone, which metathesizes the H and L tones as below:

The final tone rule to operate on the present derivation is our late downstep rule which lowers the tone register one notch (to 2) at the beginning of the verb root, as below:

The same kind of pattern can be realized on disyllabic verb stems, as in the following example:

(202) à là límtè mbàb "he reheated the meat"
Adding the syllable S to indicate our toneless /-te/ verb suffix, our pattern appears as below after application of the tone mapping rule:

(203) \[ \begin{array}{c}
# & + & V & + & S & # \\
\hline
# & H & + & L & + & #
\end{array} \]

Once again, the next rule to apply is the P₃ positive perfective morpho-tonological rule which again inserts a L tone after the verb stem and associates that L tone to the last syllable of that stem, as below:

(204) \[ \begin{array}{c}
# & + & V & + & S & + & # \\
\hline
# & H & + & L & + & + & \emptyset & # \\
\downarrow
\end{array} \]

Once we come to our normal tone rules, the first rule to apply is the rightward-docking H tone morpheme rule which both associates the H tone to the verb root and disassociates the L tone already associated there, as below:

(205) \[ \begin{array}{c}
# & + & V & + & S & + & # \\
\hline
# & H & + & L & + & + & L & #
\end{array} \]

The result of this rule again feeds our metathesis rule which metathesizes the L tone formerly associated with the verb root and the H
tone from the realis polar tone, all of this before the normal L tone associated to the preceding syllable ($), as below:

\[ (206) \]

\[
\begin{array}{c}
S \# + V + S + # \\
\hline
L \# H + L + + L \# \\
\end{array}
\]

Once again, the WFR rule that has usually applied to syllable S does not apply since the S syllable is already associated to a tone. The late downstep rule is the only other tone rule to apply to this pattern and it lowers the tone register one notch (the H tone going to level 2) on the verb root, with its continuing effect being noticed by the lowering of the formerly toneless verb suffix also one notch (L tone going to level 4), as below:

\[ (207) \]

\[
\begin{array}{c}
# + V + S + # \\
\hline
# L H + + + L \# \\
\end{array}
\]

\[
\begin{array}{c}
2 - 4 \\
\end{array}
\]

We now turn to several other unusual tone patterns. The first of these patterns is unusual for three separate reasons. First, the normal tone contrast between H and L tone verb roots is neutralized. Second, the $P_0$ construction (zero tense with perfective aspect used to indicate immediate past time meaning) is the only construction where a verb root is realized
on a rising tone glide. Third, the object is downstepped like an irrealis construction even though the P₀ is definitely realis. The following examples include monosyllabic H and L tone verb roots respectively:

(208) à zǎn mbàb "he (just) cut the meat"

3 31 4

à gwɔ̀ mbàb "he (just) pounded the meat"

3 31 4

The key to the derivation of P₀ constructions is that the verb is always immediately preceded by a L tone subject marker clitic which associates to the right to the verb root syllable. While the process is described in detail in section 2.4.1. below, we will show an abbreviated version of the derivation here to justify the tonal neutralization of these constructions.

The normal pattern for a realis verb root would appear as below (with "P" symbolizing the floating realis polar tone and the "T" symbolizing either a H or L tone) after the floating subject marker tone is associated by a special morpho-tonological rule (see (565) below) to the verb root (V), as below:

(209) + # + V #

+ L # P + T #

The crucial moment has now arrived. The polar tone is trapped between two
association lines so it **must** associate to the verb root syllable on its right
because the WFC prohibits new association lines from crossing old lines. The
rule which operates is thus either the leftward- (see (38) above) or rightward-
docking (see (56) above) tone rules. The difference between the two tone rules
will be evident **only** by the association lines which the respective rules delete,
one on the left and the other on the right, as shown below:

\[
\begin{align*}
(210) & & + & & \# & & + & & V & & \# \\
& & + & & L & & \# & & L/H & & + & & H/L & & \#
\end{align*}
\]

The resulting structures for both H and L tone verbs yield the same LH
rising tone, though the tones involved in the rise have different morphological
origins. The following representation shows both the underlying H tone verb
root pattern (in solid lines, reflected in the first row of numbers below) and the
underlying L tone verb root pattern (in dashed lines, reflected in the second row
of numbers even further below):

\[
\begin{align*}
(211) & & + & & \# & & + & & V & & \# \\
& & + & & L & & \# & & L/H & & + & & H/L & & \#
- & & 3 & & 1 & & - \\
- & & 3 & & 1 & & -
\end{align*}
\]

The preceding pattern and its accompanying derivation become somewhat
more unusual when the verb stem is disyllabic, as in the following two
examples:

(212) à lùmìmbì "he (just) bit the meat"
     3 3 31 4
     à lùmìmbì "he (just) reheated the meat"
     3 3 31 4

The derivation starts out as the preceding one did with the addition of a
toneless verb suffix (S) on the syllabic tier, as below:

(213)   +  #  +  V  +  S  #

Once the subject marker tone has been associated to the verb root syllable
by special morpho-tonological rule (see (565) below), as above, the polar tone is
forced to associate with the verb root, disassociating lines to its left and right in
the case of L and H tones respectively, as below:

(214)   +  #  +  V  +  S  #

The next rule to operate is our revised WFR (see (184) above) which
associates the toneless S syllable to the H tone on its right, also disassociating
these H tones from the syllables that they were associated to, as below:

(215) + # + V + S #

+ L # L/H + H/L + #

Now that the two syllables of the verb stem are associated to a L and H tone respectively, they feed the rise-formation rule which operates as below, resulting in the correct surface realizations. Our final surface realization is therefore as below, with the underlying H tone verbs using solid lines (and the first row of numbers) while underlying L tone verbs use dashed lines (and the second row of numbers):

(216) + # + V + S #

+ L # L/H + H/L + #

- 3 -31 -

- 3 -3 1 -

Another environment where the normal tonal contrast between H and L tone verbs is neutralized is for P₂ and P₃ non-progressive imperfective constructions. We select the P₂ positive examples as characteristic of this group, and examine first the monosyllabic verb roots, as found in the following examples:
(217) à kàa nzà? mbàb  "he was a meat-cutter"
3 3 4 4  (yesterday)

à kàa ngwò? mbàb  "he was a meat-pounder"
3 3 4 4  (yesterday)

The preceding examples are unusual in many ways. Based on what we have seen of realis mode and imperfective aspect, it appears that a transformation has operated on the preceding examples. While the imperfective realis nasal prefix (symbolized by "n") is in its usual position at the beginning of the (underlined) verb, the typical L tone echo vowel verb suffix that indicates imperfective aspect is not attached to the end of the verb. Instead, this suffix seems to have been transferred from the verb stem to the tense marker (usually a short /kà/ for P₂). This kind of a transformation would explain both the absence of the echo vowel after the verb root, and its presence after the tense marker. A further modification, however, is that the tones on the verb are not the normal realis tones that are usual in such environments, but a neutralized downstepped L tone. To handle these changes, we need two separate morpheme rules. The first rule would operate very early in the derivation and would attach the normal L tone imperfective suffix to the tense marker instead of the verb stem. A much later rule would perform the tonal replacement function on the verb stem. Assuming that the imperfective suffix has been transferred to the tense marker, our pattern
would appear as below after the mapping rule had operated:

\[
(218) \quad \# \quad + \quad V \quad \# \\
\quad \# \quad P \quad + \quad T \quad \#
\]

Since the symbols "P" and "T" actually stand for two combinations of H and L tones, these tones would undergo different changes as the normal tone rules operated. We signify the resulting tone pattern after the normal tone rules by having an optional floating tone and omitting the morpheme boundaries (since they are no longer significant at this point in the derivation), as below:

\[
(219) \quad \# \quad V \quad \# \\
\quad \# \quad (T) \quad T \quad \#
\]

It is at this point in the derivation that our late P₂ and P₃ morpho-tonological rule (see (577) below) applies to both positive and negative non-progressive imperfective constructions. It changes the floating tone to a H tone and the associated tone to a L tone, as in the following representation:

\[
(220) \quad \# \quad V \quad \# \\
\quad \# \quad (T) \quad T \quad \#
\quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
\quad H \quad L
\]
The resulting pattern has an associated L tone preceded by an unassociated H tone which feeds our late downstep rule, lowering the tonal register by one notch (to 4), as below:

\[
\begin{array}{cccc}
\# & V & \# \\
\# & H & L & \#
\end{array}
\]

It should be stressed that the preceding derivation had identical results for both H and L tone monosyllabic verb roots.

The same downstepped L tones can be spread over two syllables, as in the disyllabic verb stems shown below:

(222) à kàa ndïmtè mbàb "he was a meat-biter"

\[
\begin{array}{cccc}
3 & 3 & 4 & 4
\end{array}
\]

(yesterday)

à kàa ndïmtè mbàb "he was a meat-reheater"

\[
\begin{array}{cccc}
3 & 3 & 4 & 4
\end{array}
\]

(yesterday)

Once again, the echo vowel imperfective suffix has been transferred to the tense marker from the verb stem and the entire verb is realized on a downstepped L tone. Our tonal derivation again starts with a floating polar tone preceding the associated verb tone after the tone mapping rule has operated, as below:
The preceding pattern differs from the corresponding pattern of the preceding derivation only in the presence of the toneless S syllable. This toneless S syllable associates with the same tone associated to the verb root in the course of the tone rules by our revised WFR rule, leaving a pattern like the following after the tone rules have operated:

Once again, after the majority of tone rules have operated, the special $P_2$ and $P_3$ morpho-tonological rule applies to our pattern yielding the following:

Since the resulting L tone is connected to both syllables of the verb, the same lowered pitch level is realized on both, with both of them being one notch lower than a normal L tone because of the downstep rule, which results in the following:
The next three patterns which we will examine are realized on the surface with the normal irrealis tones on the verb stems though there are several reasons to posit that they are marked underlyingly for realis mode. The three constructions in focus here are the following:

\[(227) \quad \text{Realis} \rightarrow \text{Irrealis Tones}\]

- positive perfective P₄.
- positive non-progressive imperfective P₄.
- positive realis progressive imperfective zero.

The major trait that these three constructions share with each other is that they are all positive, and all three have corresponding negative constructions which exhibit the normal realis tones on the verb stem. The following positive and negative realis progressive imperfective examples from the zero tense show the unusual change of realis to irrealis tone patterns on the (underlined) verbs:
(228) à nè nzákà mbab ḟ “he is cutting the meat”

3 3 2 5 5

à tê nè nzákà mbab wó ḟ “he isn’t cutting the meat”

3 31 3 1 3 3 1

The rising tone on the NEG marker /tê/ is discussed in section 2.3.5. below. Leaving this feature aside, it is plain that the normal H tone for realis mode is realized only on the negative sentence while the normal H tone with downsteps before and after is realized on the verb root of the positive sentence. We propose to handle the three constructions which behave in this manner by means of an early morpho-tonological rule which changes the [+real] feature to [-real] (see (549) below). This rule would have to follow other morphological rules like the specification of the realis imperfective homorganic nasal consonant verb prefix, yet precede the specification of the realis polar tone. The tonal derivation would then proceed in an identical manner to patterns which had an underlying [-real] feature, as shown in the previous two sections.

The next idiosyncratic tone pattern which we will examine is the positive non-progressive irrealis present (zero) construction, the only time that an underlying irrealis construction is ever realized on anything but the normal irrealis surface tones. Beginning with a H tone monosyllabic
verb root, we find examples like the following:

(229) à zà?à mbàb "he is cutting the meat"

Though the patterns we will be examining appear highly unusual in that the underlying H tone verb stems are always realized phonetically on a lower pitch level than underlying L tone verb stems, the patterns are easily handled with our existing tone rules. We simply posit a separate morpho-phonological rule which inserts a L tone tonal morpheme immediately after the verb root. This rule (see (566) below) operates after the tone mapping rule, resulting in the following:

(230)

The next rule which operates is our leftward-docking L tone tonal morpheme rule which associates our floating L tone to the V syllable while disassociating the H tone already associated there, as below:
The only remaining rule to apply to this derivation is our late
downstep rule which lowers associated L tones one notch (to 4) because
of the floating H tone, as below:

The same kind of surface pattern can also be found on disyllabic verb
stems whose underlying root tone is H, as in the following example:

(233) à lùmtè mbàb "he is biting the meat"

Undergoing the same morpho-tonological rule which inserts a L tone
tonal morpheme between the V and toneless S syllables of the verb stem,
we have the following result after operation of the tone mapping rule
(remembering that the imperfective (I) syllable drops out in the presence
of the toneless S syllable):
It is crucial for the present derivation both that the L tone tonal morpheme is inserted between the two syllables of the verb stem (V and S) and that the WFR tone rule acts as a normal tone rule with right-to-left application on the tonal tier. It is only because of these two factors that the L tone tonal morpheme remains unassociated at the time of the leftward-docking L tone tonal morpheme rule, which once again operates as below:

It is only after the L tone has associated to the left and disassociated the H tone formerly associated to the V syllable that our WFR rule is allowed to operate. It then associates the S syllable to the first tone on its left, as below:

This takes care of our pattern except for the final L tone tonal morpheme which is associated leftward by the second application of the
leftward-docking L tone tonal morpheme rule, also disassociating the S syllable from the other L tone already associated there, as below:

(237) 

\[
\text{\# V + + S + \#} \\
\text{\# H + L + + L \#} \\
\text{4 - 4}
\]

The only remaining rule to operate is our late downstep rule which once again lowers the tonal level one notch because of the floating H tone, as in the following representation:

(238) 

\[
\text{\# V + + S + \#} \\
\text{\# H + L + + L \#} \\
\text{4 - 4}
\]

The preceding derivations show that the tone rules developed for previous noun and verb phrase constructions correctly derive the surface realization of H tone verbs given a L tone tonal morpheme immediately following the V syllable. Such straightforward results are also possible with the underlying L tone verb roots, as with the monosyllabic root in the following example:

(239) à gwòò mbàb "he is pounding the meat"

3 3 3 3
The typical L tone verb is here realized on a normal L tone pitch level (of 3) though the H tone verbs seen above had been lowered one notch (to 4). This is the result of the same morpho-tonological rule which inserts a L tone tonal morpheme after the V syllable. This results in the following after the operation of the tone mapping rule:

\[(240)\]
\[\# \quad V \quad + \quad + \quad I \quad \#
\]
\[\# \quad L \quad + \quad \emptyset \quad + \quad L \quad \#
\]
\[\downarrow
\]
\[L
\]

The only tone rule to operate on the present pattern is the leftward-docking L tone tonal morpheme rule which associates the floating L tone to the V syllable while disassociating the L tone already associated there. The resulting pattern does not trigger our downstep rule and is therefore realized quite straightforwardly as below:

\[(241)\]
\[\# \quad V \quad + \quad + \quad I \quad \#
\]
\[\# \quad L \quad + \quad L \quad + \quad L \quad \#
\]
\[3 \quad - \quad 3
\]

The disyllabic L tone verb stems also end up with the same pattern, as the following example illustrates:
(242) à lìmtè mbàb "he is reheating the meat"

Adding the S syllable to represent our toneless /-te/ suffix, our pattern appears as below after the tone mapping rule and morpho-tonolgocial rule have applied:

(243)  

Once again, our leftward-docking L tone morpheme rule is the first to operate, associating the first floating L tone of our pattern to the V syllable while disassociating the tone already there, as below:

(244)  

The next rule to operate (going from left to right) is our WFR rule which associates the toneless S syllable to the left, as below:

(245)  

The final tone rule to operate on this particular pattern is once again our leftward-docking L tone tonal morpheme rule which associates the final L tone
of our pattern to the S syllable while erasing the associating line already attached to that syllable, as below:

\[(246)\]

\[
\begin{array}{c}
# & V & + & + & S & + & # \\
\downarrow & & & & \downarrow & & \\
# & L & + & L & + & + & L & # \\
3 & - & 3
\end{array}
\]

Since the downstep rule does not apply to this pattern, our phonetic realization is once again on pitch level 3 which is normal for L tones, as below:

\[(247)\]

\[
\begin{array}{c}
# & V & + & + & S & + & # \\
\downarrow & & & & \downarrow & & \\
# & L & + & L & + & + & L & # \\
\end{array}
\]

The final idiosyncratic pattern which we saved until last refers to the unusual P₁ tense. The tone changes for this tense are such that we must handle even the regular patterns in two stages: first, positing a marker which consists of a series of L-H-L tones and is inserted before the normal tone rules operate; second, positing a morpho-tonological rule which deletes any word internal floating tones for the marker and changes the final L tone to a floating polar tone after the normal tone rules have operated.

Such a two-stage solution is needed because of the nature of tonal
realizations in the various P₁ constructions, like the negative perfective examples given below:

(248) à né tè zá? mbàb wó "he didn't cut the meat"
   \[3314242\] (earlier today)
à né tè gwò? mbàb wó "he didn't grind the meat"
\[3314353\] (earlier today)

Remembering that the NEG marker /tè/ has just an underlying L tone, it is obvious from the preceding examples that the P₁ tense marker [nɛ'] is always realized as a LH rising tone followed by a downstep. Because of the nature of the tone rules already developed, we must develop this complex marker in two stages. The first stage is that the following marker with LHL tones is inserted before the tone rules along with the other tense markers (where "M" is used to symbolize the P₁ past tense marker on the segmental tier):

(249) Today Past Tense Marker

\[
\begin{array}{c}
# & M & # \\
\# & L & H & L & # \\
\end{array}
\]

This P₁ marker has all of its association lines specified in the lexicon. If we insert this marker before the NEG marker of the preceding examples, our
autosegmental representation would appear as below once the normal tone mapping rule had operated (the NEG marker is indicated by "N" on the syllabic tier):

(250)

Now, after the normal tone rules have operated, a late morpho-tonological rule (see (581) below) changes the last associated L tone of the P₁ marker (M) to a polar tone (which is specified as a H tone before the following L tone) and deletes the association line which connects this tone to the marker (M), as below:

(251)

The only remaining rule to affect this particular derivation is our late downstep rule which lowers the tonal register one notch at the floating H tone, resulting in a lowered pitch level (4) on the NEG marker (N), as in the following representation:
Now that we have seen a straightforward derivation involving the P₁

tense, we are in a position to examine the more interesting examples

where the P₁ marker directly precedes a verb root marked for realis mode,
as in the following positive non-progressive imperfective examples:

(253) à né zä?à mbàb "he didn’t cut the meat"

3 31 2 4 4  (earlier today)

à né gwò?ò mbàb "he didn’t pound the meat"

3 31 3 5 5  (earlier today)

The tones in focus in the next two derivations are the downstepped H
tone on the (underlined) H tone verb root and the double-downstepped
H tone on the (underlined) L tone verb root. Though the double-
downstepped tone is quite rare, we shall examine the first sentence of the
preceding example to get a feeling of the factors involved. The
autosegmental structure for the first sentence would appear as below after
the realis polar tone has been inserted and the tone mapping rule has
applied:
The first tone rule to apply to this pattern is our leftward-docking L tone morpheme rule, which associates the floating L tone to the first syllable on its left and disassociates the first of the the adjacent associated tones already found there, as below:

It is only now, after the tone rules have operated, that our late morphological rule (see (581) below) deletes any floating tones internal to the marker, changes the final L tone into a polar tone (which happens to stay L in this pattern because of the following H tone), and disassociates that polar tone from its syllable (M), as below:
The only rule which still applies to our pattern is our late downstep rule, which lowers the tonal register one notch where the one floating L tone remains, as below:

\[
\begin{array}{cccccc}
\# & M & \# & + & V & + & I & \# \\
\# & L & H & \# & L & + & H & + & L & \#
\end{array}
\]

\[\text{(257)}\]

We can now examine the parallel P₁ construction where underlying L tone verb roots are realized on the surface as double-downstepped H tones. These cases of double-downstepped H tones derive from L tone verb roots which are the result of our rightward associating H tone tonal morpheme rule. This rule associates the floating H tone to the first syllable on its right and disassociates the L tone found there, as in the following representation:

\[
\begin{array}{cccccc}
\# & M & \# & + & V & + & I & \# \\
\# & L & H & \# & H & + & L & + & L & \#
\end{array}
\]

\[\text{(258)}\]

At this point in our derivation, it is crucial that the now disassociated L tone be fronted by the metathesis rule. It is precisely because our underlying P₁ tense marker (M) ends in an associated L tone that the metathesis rule is able to operate, resulting in the following:
Now that the metathesis rule has operated, our late morpho-tonological rule changes that preceding conditioning associated L tone to a polar tone (-αT) and disassociates this tone from the tense marker (M). It is crucial at this point that polar tones in Ngyembɔn are always determined to be the opposite of the immediately following associated tone, not of any intermediate floating tones. In the pattern under examination, the polar tone thus becomes a floating L tone because the verb root is associated to a H tone at this point in the derivation, as in the following representation:

We now have two floating L tones preceding the associated H tone of the verb root. According to our analysis, it is precisely this multiplicity of floating tones that is the cause of the parallel multiplicity of downstep. In order to
capture this relationship between the number of floating polar tones and the
number of pitch levels the tonal register is lowered, we must revise our
downstep rule (stated first in preliminary form in (18) above), as below:

(261) **Rule 2': Downstep**

```
  $                         +$ pitch
  (-\alpha T)_\beta \alpha T
```

This rule says that the tone register is lowered the same number ($\beta$) of
steps (add one pitch level for each step lowered) as the number ($\beta$) of
floating polar tones (-\alpha T) which precede a given associated tone (\alpha T).
This rule lowers the tonal register two notches in the present derivation, a
lowering that is verified by observing that the pitch level of the final L
tone is (5) in the surface realization shown below:

(262)

```
   #          M    #     +  V     +  I    #
   #       / L  H  L     / L  H     /  +  L  #
   3  1     -     3     -     5     -
```

Now that we have examined the "regular" behavior of the P_1 tense
marker, we are ready to examine the special tonal properties of the P_1
positive perfective construction. The P_1 positive perfective
sentences, in contrast to other P₁ constructions, contain both the tonal properties and intervening nasal prefix that is characteristic of parallel P₀ consecutive sentences. Our P₁ positive perfective sentences are the following:

(263) à nē nzã? mbâb "he cut the meat"
    3 31 2 5 (earlier today)

à nē ngwɔ? mbâb "he ground the meat"
    3 31 4 5 (earlier today)

Hyman (1971) discusses the consecutive verb construction common to Grassfields Bantu languages and the intervening nasal consonant which occurs between the two verbs in realis consecutive constructions. The P₀ consecutive verb constructions which are parallel to the P₁ constructions seen above also neutralize the tonal contrast between the (underlined) first verbs in a consecutive verb construction, as below (using the H tone verb /cwɔŋ/ "to come down" and the L tone verb /pyù/ "to go up"):

(264) à cwɔŋ nzã? mbâb "he came down and cut the meat"
    3 31 2 5

à pyù ngwɔ? mbâb "he went up and ground the meat"
    3 31 4 5
One way of deriving our special $P_1$ sentences is just to have an early rule which converts the $P_1$ marker into a $P_0$ verb in a consecutive verb construction. Since the verb and the marker would not have the same lexical tones, however, we will choose a simpler method. We will posit a rule which moves the floating realis polar tone ($P$) from before the verb to after the verb only in the case of $P_1$ positive perfective sentences. This rule (see (564) below) would operate as below (with a $L$ tone verb root as an example) after the normal tone mapping rule had operated:

\[(265)\]

\[
\begin{array}{c}
\# \quad M \quad \# \quad \emptyset \quad + \quad V \quad \# \quad A \quad + \\
\# \quad L \quad H \quad L \quad \# \quad H \quad + \quad L \quad \emptyset \quad \# \quad L \quad + \\
\end{array}
\]

The same morpho-tonological rule which moves the polar tone after the verb root tone also inserts a nasal consonant prefix (symbolized by a lower case "n" because it cannot associate to a tone) as sort of a resumptive marker, marking the position in the phrase from which the polar tone was moved. Once the polar tone has been moved, it can be specified as being of opposite quality of the immediately following tone, in this case a $H$ tone before the $L$ tone of the object prefix ($A$), as below:
After the tone rules have operated, a late morpho-tonological rule (see (581) below) changes the last associated L tone of the P₁ tense marker (M) to a polar tone (-αT) which becomes a H tone before the following L tone associated to the verb root (V), and it disassociates that tone from its syllable, as below:

The final rule to operate in this derivation is our late downstep rule which operates twice. First, it lowers the tonal register one notch preceding the verb root syllable (V), then a second notch preceding the object prefix syllable (A), as in the surface representation below:
The special rule which moved the realis polar tone after the verb root in this construction was thereby responsible for the downstep before and after a L tone on the verb root instead of the more "regular" double-downstepped H tones for L tone verb roots in P₁ constructions.

This concludes our section on special morpho-tonological rules which modify the tones on verb stems away from the expected realis and irrealis tone patterns described in the previous two sections. The rules discussed informally in this section are formally stated in section 4.0. below.
2.3.4. With progressive aspect markers

Two separate progressive markers occur in Ngyemboon: the normal /nè/ and the realis /ssé'/. These two markers occasionally undergo tonal perturbations. We will revise below our familiar tense-mode tonal chart to focus on the tonal realization of progressive markers. Since only those constructions marked for [+prog] are eligible for a progressive marker, our chart for the marker /nè/ contains only two rows, one for realis and one for irrealis, as below:

(269) **Progressive /nè/ Tone Distribution**

<table>
<thead>
<tr>
<th>Features</th>
<th>P₄</th>
<th>P₃</th>
<th>P₂</th>
<th>P₁</th>
<th>Ø</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>-perf</td>
<td>L/L</td>
<td>HL/L</td>
<td>HL/L</td>
<td>HL/L</td>
<td>L/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+real</td>
<td>L/L</td>
<td>HL/L</td>
<td>HL/L</td>
<td>HL/L</td>
<td>L/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+prog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L/’L</td>
<td>L/L</td>
<td>L/L</td>
<td>L/L</td>
</tr>
</tbody>
</table>

Assuming that a single L tone is the underlying lexical tone of /nè/, we can factor out the regular L tone realizations, leaving only the occurrences of special perturbed tones, as in the following revised chart:
Progressive /nè/ Perturbed Tone Distribution

<table>
<thead>
<tr>
<th>Features</th>
<th>-perf</th>
<th>+real</th>
<th>+prog</th>
<th>-perf</th>
<th>-real</th>
<th>+prog</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P₄</td>
<td>P₃</td>
<td>P₂</td>
<td>P₁</td>
<td>Ø</td>
<td>F₁</td>
</tr>
<tr>
<td>HL/</td>
<td>HL/</td>
<td>HL/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/'L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explaining the presence of the HL downglides on the /nè/ marker is not quite as simple as it might seem from examining the preceding chart. The reason that it is more complicated than just positing the addition of an associated H tone in the case of past progressive positive sentences is that a similar associated H tone occurs in the parallel negative sentences except this time it is associated to the end of the NEG marker (underlined in the following P₃ examples):

(271) à là nè nzá?à mbàb "he was cutting the meat"

3 3 13 1 3 3

à là tè nè nzá?à mbàb wó "he wasn’t cutting the meat"

3 3 31 3 1 3 3 1

Since the NEG marker /tè/ immediately precedes the progressive marker /nè/, it seems that in non-future sentences with imperfective aspect, a H tone morpheme is added between the NEG /tè/ and the
progressive /nè/. Since this position is the same as the realis progressive /ssé'/ described below, and this realis progressive marker can cooccur with the NEG /tè/ and/or the progressive /nè/ but it never has this additional H tone morpheme in the same sentence, this H tone morpheme must be located in the same position as the realis progressive /ssé'/, and only one of the "morphemes" in that position can occur in any one sentence.

In addition to a morpho-tonological rule which will insert a H tone word between /tè/ and /nè/ in the absence of /ssé'/ (and in the absence of a future marker like the /lá?/ used to signal P₄ tense), separate morpho-tonological rules will have to be posited to associate this tone with the /nè/ in positive sentences and with the /tè/ in negative sentences. Since the progressive /nè/ is in focus in this section, we posit the following representation of a positive past tense with imperfective aspect (with the symbol "P" used to signal the general progressive marker /nè/ on the syllabic tier):

\[(272) \quad \# \quad P \quad \# \quad + \quad V \quad + \quad I \quad \# \]

\[
\# \quad L \quad \# \quad L \quad + \quad H \quad + \quad L \quad \#
\]

The first morpho-tonological rule (see (560) below) to operate relative to progressive marking would add our H tone tonal word before the progressive marker, as shown below:
A separate morpho-tonological rule (see (567) below) would then come along and associate the H tone tonal word (in the absence of the NEG /tè/) to the progressive marker (P), as below:

Finally, the normal tone rules will come into play and the polar tone realis prefix on the verb root, which is a L tone before the H tone of the lexical verb, will associate to the left by our leftward associating tonal morpheme rule while also disassociating the L tone already associated to the same syllable (P), as below:

Since the floating L tone before the associated L tone does not trigger our register-lowering downstep rule, no other rule operates on our pattern and the surface realization is correct, as below:
This concludes our look at the positive past sentences where our posited H tone tonal word associated to the right. Parallel negative sentences where the same H tone tonal word associates to the left are described in detail in the following section.

The one remaining unusual tonal pattern on the general progressive marker /nè/ is when it is realized on a downstepped L tone in negative present irrealis progressive sentences. Actually, the process is slightly more complicated than just the insertion of an unexpected downstep feature, as the following positive and respective negative examples show:

(277) à nè zã?ã mbãb "he is probably cutting meat"

3 1 3 2 5 5

à tè nè zã?ã mbãb wó "he probably isn’t cutting meat"

3 3 4 3 6 6 4

Several things should be noticed in the preceding examples. First, the positive sentence is unusual in that it contains a LH rising tone on the (underlined) subject pronoun. The negative sentence is unusual in that it
contains an unexpected downstep on the progressive /nè/. What is especially interesting is that both these cases need to have an additional H tone tonal word posited between the NEG /tè/ and the progressive /nè/, exactly like the unusual realis sentences examined above. However, though the tonal word may be the same and in the same position, the tone reacts quite differently in these irrealis sentences than in the irregular realis sentences examined above.

Beginning with the positive example (and using the symbol "S" to indicate the subject pronoun on the syllabic tier), our representation would appear as below after the lexical entries and the tone mapping rule:

```
(278)    # S # P # V + I #
        # L # L # H + L #
```

If we now insert the same H tone tonal word immediately preceding the progressive marker /nè/, our pattern becomes the following:

```
(279)    # S # # P # V + I #
        # L # Ø # L # H + L #
```

It must now be stressed that we need a morpho-tonological rule which associates this H tone tonal word to the left in this irrealis sentence, precisely
the opposite direction that we saw it associated in positive realis sentences above. This association to the left also takes place without disassociating the tone already associated on the syllable found, as below:

\[(280) \quad \# \quad S \quad \# \quad \# \quad P \quad \# \quad V \quad + \quad I \quad \# \]
\[
\quad \# \quad L \quad \# \quad H \quad \# \quad L \quad \# \quad H \quad + \quad L \quad \#
\]

At this point, our normal tonal rules find nothing to operate on and a late morpho-tonological rule (see (580) below) inserts two floating polar tone tonal morphemes, one before and another after the verb root, as below:

\[(281) \quad \# \quad S \quad \# \quad \# \quad P \quad \# \quad + \quad V \quad + \quad + \quad I \quad \# \]
\[
\quad \# \quad L \quad \# \quad H \quad \# \quad L \quad \# \quad 0 \quad + \quad H \quad + \quad 0 \quad + \quad L \quad \#
\]

\[
\downarrow \quad \downarrow
\]
\[
-\alpha T \quad -\alpha T
\]
\[
\downarrow \quad \downarrow
\]
\[
L \quad H
\]

Since we now have two places where floating tones precede their opposite associated tones, our late downstep rule is triggered twice, lowering the tonal register one notch each time. This lowering results in the correct surface realization, as shown below:
The parallel negative examples are slightly more complicated. Our basic construction including lexical entries appears as below after our left-to-right tone mapping rule has operated:

Once again, our H tone tonal word is inserted between the negative marker (N) and the progressive marker (P), as below:

Now in parallel realis constructions, such a H tone tonal word was associated by morpho-tonological rule to the NEG marker on its left. In these parallel irrealis constructions, however, the floating H tone is left unassociated. In addition, the rightward-docking H tone tonal morpheme rule which might be expected to apply to this floating H tone most
definitely does not apply. It appears that our rightward-docking H tone tonal morpheme rule will only operate across morpheme boundaries and not across the stronger word boundary that we have posited here.

The next rule to operate on the derivation in focus is our late irrealis morpho-tonological rule which inserts two floating polar tone tonal morphemes, one before and another after the verb root, as below:

```
(285)  S  N  P  +  V  +  I

# L # L # H # L # 0 + H + 0 + L
```

Our pattern now contains three floating tones, each of them preceding an associated tone of opposite quality. These floating tones therefore trigger our register-lowering downstep rule three separate times, lowering the register one notch each time which yields the correct surface realization shown below:

```
(286)  S  N  P  +  V  +  I

# L # L # H # L # L # H + H + L

3 - 3 - 4 - 3 - 6
```
This concludes our analysis of those constructions which modify the normal lexical L tone found on the general progressive marker /nè/. Now we can examine the alternative progressive marker in realis constructions, /ssé'/, which can either replace or occur with the regular progressive marker /nè/. However, since /ssé'/ is realis, it can only occur in realis constructions, and we therefore have only a single realis row in the following chart:

\[(287)\]

<table>
<thead>
<tr>
<th>Features</th>
<th>P₄</th>
<th>P₃</th>
<th>P₂</th>
<th>P₁</th>
<th>Ø</th>
<th>Futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>-perf</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H/H'</td>
</tr>
<tr>
<td>+real</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H/H'</td>
</tr>
<tr>
<td>+prog</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H'</td>
<td>H/H'</td>
</tr>
</tbody>
</table>

Assuming that the regular unperturbed tonal pattern of [ssé'] is a H tone followed by a downstep feature, we can factor out those patterns leaving only one exceptional pattern (the positive present progressive) in which the tone has been perturbed (downstep before the H tone), as in the following chart:
(288) **Realis Progressive /ssé'/ Perturbed Tone Distribution**

<table>
<thead>
<tr>
<th>Features</th>
<th>P₄</th>
<th>P₃</th>
<th>P₂</th>
<th>P₁</th>
<th>Ø</th>
<th>Futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>-perf</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>'H/</td>
</tr>
<tr>
<td>+real</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+prog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the preceding section, during our discussion of the unusual P₁ tense marker which also is realized with a H tone followed by a downstepped tone, we saw that a complex analysis was necessary, positing both an underlying marker and a late morpho-tonological rule which modifies that marker. The lexical entry for the realis progressive marker will therefore be the following (with the symbol "R" indicating the marker on the syllabic tier):

(289) **Realis Progressive Marker**

```
# R #
```

Once again, the tones of this complex marker are associated with the syllable in the lexical entry since our tone mapping rule would not associate both tones with the same syllable on the syllabic tier. By means of similar derivations, the preceding marker along with its associated morpho-tonological rule result in the following surface realizations,
including the rare (underlined) double-downstepped H tone on the verb root:

(290) à là ssé nzâ?à mbàb "he isn’t cutting the meat"

\[
\begin{array}{cccc}
3 & 3 & 1 & 244 \\
\end{array}
\]

à là ssé ngwô?ò mbàb "he isn’t pounding the meat"

\[
\begin{array}{cccc}
3 & 3 & 1 & 355 \\
\end{array}
\]

The first example above shows the downstep after the realis progressive marker being realized on the verb root. The second example shows the same lexical downstep doubling up with a derived downstep on an (underlined) L tone verb root to produce a double-downstepped H tone. The reality that it is in fact a double-downstepped H tone and not a normal L tone is shown by the phonetic level (5) of the following L tone verb suffix. Our realis progressive marker and its following (underlined) verb root above would begin their derivation as below:

(291)

\[
\begin{array}{cccc}
# & R & # & + & V & + & I & # \\
# & H & L & # & H & + & L & + & L & # \\
\end{array}
\]

At this time, proceeding from left to right for our normal tone rules, the H tone tonal morpheme would dock to the right while disassociating the L tone already associated to the verb root, as below:
Since our realis progressive marker (R) ends with an associated L tone at this point in the derivation, the now disassociated L tone from the verb root syllable (V) is fronted by the metathesis rule, as below:

It is at this point that our late morpho-tonological rule operates on the realis progressive syllable (S), changing the final associated L tone to a polar tone and disassociating this polar tone from the realis progressive syllable. Once again, the polar tone (-αT) becomes a L tone since it is specified as being opposite of the first associated tone on its right. This morpho-tonological rule thus accomplishes the following:
Once again, we have two floating L tones preceding an associated H tone. This is changed by our revised downstep rule into a double-downstep (one for each floating polar tone) which lowers the tonal register two notches immediately before the H tone associated to the verb root. The surface realization is therefore the following:

\[
\begin{array}{cccccc}
\# & R & \# & + & V & + & I & \# \\
\# & H & L & \# & L & H & + & + & L & \#
\end{array}
\]

\[
\begin{array}{c}
1 \quad - \quad 3 \quad - \quad 5
\end{array}
\]

It should be noticed that both the syllables realized on pitch level (1) and (3) above are high tones, an observation confirmed by the following L tone being realized on pitch level (5). The second of the H tones is thus double-downstepped, a phenomenon achieved in Niryemboon only by the rare co-occurrence of two floating similar tones preceding an associated tone of opposite quality. Floating tones of such quality only come together immediately following either of two grammatical markers: the P₁ tense marker or the realis progressive marker. These are precisely the two markers which undergo the late morpho-tonological rule which changes a final associated L tone into a floating polar tone.

Now that we have seen the unusual character of "normal" realis progressive constructions, we are prepared to examine the one case where the expected tones are further changed, namely in the positive present
progressive construction, shown together with its tonally "regular" negative counterpart below:

(296) á ssë nzá?à mbàb  "he is cutting the meat"

à tè ssé nzá?à mbàb wó "he isn’t cutting the meat"

The preceding examples can also receive an additional progressive /nè/ without changing the meaning of the sentences. In this case, the unusual tones on the subject and realis progressive marker remain perturbed, even though the marker is followed by a L tone, as below:

(297) á ssë nè nzá?à mbàb  (same glosses as above)

à tè ssé nè nzá?à mbàb wó

The unusual tonal perturbation in the preceding examples is that the subject of the positive sentence becomes a H tone and the downstep normally associated with the realis progressive marker precedes that marker instead of following it. It would appear that this idiosyncratic feature of the Ngyemboon verbal phrase can best be handled
synchronously by positing an additional morpho-phonological rule. The input to such a rule would be sentences with the following kind of underlying structure:

\[ (298) \]

\[
\begin{array}{cccccc}
\# & S & \# & R & \# & + \\
\# & L & \# & H & L & \# & L & + & H & + & L & \#
\end{array}
\]

The only tone rule to apply to this structure is the leftward-docking L tone tonal morpheme rule, which associates the floating L tone to the first syllable (R) on its left while disassociating the (L) tone already associated there, as below:

\[ (299) \]

\[
\begin{array}{cccccc}
\# & S & \# & R & \# & + \\
\# & L & \# & H & L & \# & L & + & H & + & L & \#
\end{array}
\]

Next, after the tone rules have operated, we would posit a late morpho-phonological rule (see (568) below) which would delete completely the subject pronoun’s tone (L), reassociate the H tone of the realis progressive marker (R) to the now toneless subject pronoun (S), and convert the final associated tone of the realis progressive marker (R) to a H tone, as in the following representation:
The pattern in question is now realized with the unusual surface pattern of this particular construction, with the downstep feature preceding instead of following the tone on the realis progressive syllable (S), as below:

This concludes our section on the idiosyncratic tonal perturbations that occasionally show up with either of our two progressive markers.
2.3.5. With negative markers

Two separate negative markers occur in Ngyemboon: the normal /tè/ marker and the unusual positive realis perfective zero (P₀) negative marker /kà/. Since the P₀ /kà/ only occurs in one construction in which its surface tone is always L, we assume this L tone to be its underlying lexical tone and do not need to examine any tonal perturbations. The /tè/ negative, on the other hand, occasionally undergoes a change of its tone before it is realized on the surface. The actual surface tones of the /tè/ (and /kà/ in parentheses) markers are shown in the following chart:
Negative /tè/ (/kà/) Tone Distribution

<table>
<thead>
<tr>
<th>Features</th>
<th>P4</th>
<th>P3</th>
<th>P2</th>
<th>P1</th>
<th>Ø</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
</tr>
</thead>
<tbody>
<tr>
<td>+perf +real</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>(L)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real -prog</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>LH</td>
<td>LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real +prog</td>
<td>L</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+perf -real</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LH</td>
<td>L</td>
<td>L</td>
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</tr>
<tr>
<td>-perf -real -prog</td>
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<td></td>
<td></td>
<td>LH</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>-perf -real +prog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LH</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>
Assuming that a single L tone is the underlying lexical tone of /tè/, we can factor out the regular L tone realizations leaving only the occurrences of special perturbed tones on this marker, as in the following revised chart:

![Negative /tè/ Perturbed Tone Distribution](chart)

<table>
<thead>
<tr>
<th>Features</th>
<th>P4</th>
<th>P3</th>
<th>P2</th>
<th>P1</th>
<th>Ø</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
</tr>
</thead>
<tbody>
<tr>
<td>-perf</td>
<td>LH</td>
<td>LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+real</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-prog</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+perf</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-real</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td>LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

169
Several of the perturbed tones on NEG markers are the result of the H tone tonal word discussed in the previous section. The basis for positing such a tonal word are positive/negative pairs like the following:

(304) à là nè ndúmtè mbàb "he bit the meat"
3 3 13 1 3 3 (yesterday)

à là tě nè ndúmtè mbàb wó "he didn't bite the meat"
3 3 31 3 1 3 3 1 (yesterday)

Since we can show from many other examples that the underlying lexical tones on both the NEG /tè/ and progressive /nè/ markers are definitely L, the preceding examples seem to contain a floating H tone between the NEG and progressive markers which docks onto the end of the NEG /tè/ when it is present but onto the progressive /nè/ when the NEG is absent. Thus, both the underlined HL falling tone in the positive sentence, and the underlined LH rising tone in its negative counterpart result from the same underlying tone. Since the HL falling tone was discussed in detail in the previous section, we will examine here only the LH rising tone which is realized on the NEG marker.

Before examining in detail the derivation of such a perturbed rising tone, its distribution should be mentioned. As seen from the preceding chart, most of the LH rising tones could be predicted by positing a H tone tonal word following the NEG marker for a11 realis imperfective
sentences *except* those which have an (irrealis) future marker (i.e. \( P_4 \)) or a rule which modifies the verb tones (i.e. \( P_2 \) and \( P_3 \) non-progressive imperfectives, described in section 2.3.3. above). Such a rule would take care of all the LH rising tones in realis constructions in our chart.

We can now examine the derivation of the negative sentence in the preceding example. Its underlying lexical structure would appear as below:

\[
\text{(305)} \quad \# \begin{array}{c} \text{N} \\ \text{L} \end{array} \text{ \# \# \begin{array}{c} \text{P} \\ \text{L} \end{array} \# \# \begin{array}{c} \text{V} \\ \text{L} \end{array} \# \begin{array}{c} \text{S} \\ \text{L} \end{array} \# \# \# \end{array}
\]

Since the derivation of the tones on the verb has already been discussed in detail in section 2.3.2. above, we focus here upon the derivation of the tones of the NEG marker (N) and the progressive marker (P). The first step is the insertion by morpho-tonological rule of a H tone tonal word between these two markers, as discussed in the preceding section and as shown below:

\[
\text{(306)} \quad \# \begin{array}{c} \text{N} \\ \text{L} \end{array} \# \# \begin{array}{c} \text{P} \\ \text{L} \end{array} \text{ \# \# \begin{array}{c} \text{V} \\ \text{L} \end{array} \# \begin{array}{c} \text{S} \\ \text{L} \end{array} \# \# \# \end{array}
\]

Since the NEG marker /tè/ is present in this sentence, a separate morpho-tonological rule associates the H tone of the tonal word to the NEG syllable (N) on its left, as below:
The next two rules to operate are the leftward-docking L tone morpheme rule which associates the realis polar tone preceding the verb root (V), which is a L tone before the H tone of this root, to the progressive marker on its left, while disassociating the L tone already associated there, and the WFR which associates the toneless syllable (S) to the first tone on its left, as below:

The final rule to operate on this derivation is our leftward-docking L tone morpheme rule which associates the final floating L tone to the S syllable while disassociating the H tone already associated there. This final change results in the correct surface realization, as below:
The preceding derivation is characteristic of all the LH rising tones which occur on the NEG marker in realis constructions. The chart at the beginning of this section also showed that unusual LH rising tones also occurred in irr realis constructions, to be specific, in F₁ future constructions. The following pair of F₁ sentences shows that the rising tone is not caused by the same H tone tonal morpheme because the positive sentence does not have a HL falling tone on the progressive /nè/:

(310) à ãè nè zã?ã mbãb  "he will be cutting the meat"
3 3 3 2 5 5   (later today)
'à ãè ngè nè zã?ã mbãb wò  "he won't be cutting the meat"
3 31 3 3 2 5 5 3   (later today)

The preceding examples show the presence of an (underlined) LH rising tone on the NEG marker and an immediately following nasal prefix affixed to the today future marker /gè/ only in negative constructions. What is unusual about both the rising tone and the nasal prefix is that they always occur together and they only occur in F₁ negative constructions, albeit in all F₁ negative constructions. We therefore posit a single morpho-tonological rule which inserts both a nasal prefix (labelled lower case "n" on the syllabic tier since it is not a full tone-bearing syllable) and a H tone which is associated to the next syllable on its left (always the
NEG marker /tè/ since it is only in negative F₁ constructions that this rule is triggered. Our lexical construction appears as below (with "F" marking the future marker on the syllabic tier) before the rule has operated:

(311)  
\[
\begin{array}{cccccc}
\# & \text{N} & \# & \text{F} & \# & \text{P} \\
\# & \text{L} & \# & \text{L} & \# & \text{L} \\
\end{array}
\]

Our morpho-tonological rule (see (569) below) now applies and inserts a nasal prefix (symbolized with a lower case "n" on the syllabic tier since it never carries a tone) on the future marker while associating the H tone of that prefix back to the preceding NEG marker on its left, as below:

(312)  
\[
\begin{array}{cccccc}
\# & \text{N} & \# & \emptyset & + & \text{F} & \# & \text{P} & \# \\
\# & \text{L} & \# & \emptyset & + & \text{L} & \# & \text{L} & \# \\
\end{array}
\]

Since our downstep rule is not triggered in this part of the construction, the surface realization is straightforward, as below:
This concludes our section on negative markers and the morphophonological rules which occasionally perturb their tones.
2.4. Between Phrases

We have just concluded our two main sections on tonal rules and tonal derivations, concentrating first on nouns in section 2.2. and then on verbs in section 2.3. We will now examine the tonal phenomena characteristic of phrase junctures, specifically between subject and verb (immediately below) and between verb and object (section 2.4.2. further below).

2.4.1. Between subject and verb

Many Narrow Bantu languages have a full concord prefix as a "subject marker" (SM) at the juncture of subject noun phrase and the following verb phrase. Subject markers have not yet been reported in Bamileke languages, probably owing to the lack of any segmental marking. But, subject markers do exist, at least in Ngyemboon. The subject markers in Ngyemboon are controlled by the kind of verbal construction which follows. If the sentence is past indicative, the subject marker is a simple concord tone which occurs at the end of the subject noun phrase. If the sentence is future indicative, the subject marker is still a simple concord tone determined by the noun class of the preceding noun, but whenever this tone is a H tone, a morpho-tonological rule changes it in various ways. Finally, if the sentence is in the zero tense, the subject marker (discussed further below) varies according to the
aspect and mode of the verb.

We will begin by examining in detail the concord tone which functions as a subject marker in past indicative sentences. Like the concord tone which functions as the associative marker in noun-noun constructions (described in detail in section 2.2.2. above), the concord tone that is the subject marker is a L tone tonal morpheme for noun classes 1 and 9 and a H tone tonal morpheme for the other eight noun classes (see (543) below for class prefixes of all ten noun classes). The major underlying difference between the associative concord tone and the subject marker concord tone is that the associative tone functions as a prefix on the second noun while the subject marker tone functions as a suffix on the end of the noun phrase. Thus the associative tone has a stronger grammatical boundary to its left while the subject marker tone has a stronger grammatical boundary to its right.

Before positing underlying structures and examining various derivations, we will look at the two characteristic examples shown below:

(314) àmbù? kà zà? mbàb "the deaf-man-(1) cut the meat"

3 3 3 3 3 (yesterday)

mèpù? kà zà? mbàb "the deaf-men-(2) cut the meat"

3 31 13 3 3 (yesterday)
The underlined words in the two preceding examples have the same root, /pú?/ "deaf-man." The first example uses the root with the noun class 1 prefix /àN-/ , which signifies "singular." The homorganic nasal consonant (N) in the prefix assimilates to the point of articulation of the following consonant, and the consonant variant (p) changes to its voiced variant (b) whenever immediately preceded by a nasal consonant in the same word. The second example shows our same noun root with the noun class 2 prefix /mè-/ , which signifies "plural." The noun class number of the noun will be added to the gloss to the examples in this and the following section.

The reason for citing the preceding two examples is not the phonological alternations in consonants, but the tonal perturbations which take place, specifically, that the rising tone of [pū?] has been lost in the case of a subject from noun class 1, and the tone on the following tense marker /kà/ has been perturbed into a HL falling tone in the case of a subject from noun class 2. As be shall see below, both of these tone changes are straightforward results of the subject marker concord tone which we posit here between the subject noun phrase and the following verb phrase.

Examining first our "singular" example, where the normal rising tone on the noun root [pū?] becomes a level L tone, we posit an underlying lexical structure like the following (syllable "A" being the subject noun
prefix, syllable "B" the noun root, the tonal morpheme the subject marker concord tone and syllable "T" the tense marker):

\[(315) \quad \text{// A + B + ¶ T #} \]

\[\text{// L + H + L ¶ L #} \]

The preceding representation uses the symbol "¶" to refer to a phrase boundary. As we shall see in this section and the next, the positing of a phrase boundary which is stronger than a word boundary will prove crucial in the revision of our two tone rules for associating tonal morphemes. This stronger boundary is posited after a subject marker and before an object marker, suggesting that both these markers are part of their respective noun phrases and not part of the intervening verbal material.

The first tone rule to operate is our general left-to-right mapping rule which associates each of the three syllables ("A" for noun class prefix, "B" for noun root and "T" for tense marker) to the leftmost tone in the same morpheme, as below:

\[(316) \quad \text{// A + B + ¶ T #} \]

\[\text{// L + H + L ¶ L #} \]

The first regular tone rule to operate on this construction is the rise-
formation rule (see (29) above) which associates the L tone already associated to syllable A also to syllable B, creating a rising tone on syllable B, as below:

(317) // A + B + ¶ T #

// L + H + L ¶ L #

The output of the preceding rule feeds our rise-deletion tone rule (see (51) above) since the rise is followed by a L tone tonal morpheme. The rise-deletion rule deletes completely the H tone associated with syllable B, as below:

(318) // A + B + ¶ T #

// L + H + L ¶ L #

The next rule to operate is our leftward-docking L tone tonal morpheme rule (see (38) above) which not only docks the L tone of the tonal morpheme to syllable B, but also disassociates the same syllable from the other L tone already associated there, as below:

(319) // A + B + ¶ T #

// L + + L ¶ L #

Since no floating tones remain at this stage of our derivation, neither of the downstep rules is triggered, and the surface realization is the following:
The preceding derivation has been very similar to that for associative noun patterns 13 through 16 described in section 2.2.2. above, where the H tone of a LH rising tone was also deleted before a L tone tonal morpheme. We now move on to the parallel case where a subject noun with the same underlying L+H tonal structure is followed by a H concord tone subject marker. Such a derivation would appear as below after the operation of our left-to-right tonal mapping rule:

Once again, the first regular tonal rule to operate is the rise-formation rule which associates the L tone of syllable A also to syllable B, as below:

At this point, our rise-deletion rule does not operate, since the LH rising tone is followed by a H tone tonal morpheme instead of a L tone.
The next rule to operate is our rightward-docking H tone tonal morpheme rule which must be slightly modified to not disassociate the next syllable (T above) from any tones it is associated with. This is done by limiting the disassociation to cases where the intervening boundary is no stronger than a word boundary, as in our revised rule (first formulated in (56) above), as restated below:

(323) **Rule 7': Rightward-docking H-tone Morphemes**

\[ + \quad + \quad S \]

\[ + \quad H \quad + \quad T \]

Condition: association line deleted only if boundary between H and T tones is weaker than a phrase boundary (¶).

It should be noted at this point that alternate means are possible to accomplish the same effect as the condition that we have added to the preceding rule. Anderson (1981:84) proposed that certain rules would operate if the syllable was [+NCP], a noun class prefix. Stewart (1981:115) proposed to limit some rules by distinguishing between "solid" and "fluid" syllables. Both of these alternatives attempt to capture the observation that some tone rules tend to apply only to root syllables and never to affixes. While such a solution might also be the best for
Ngeymboon, we have chosen to limit our rules to being restricted by boundary phenomena as much as possible in order to avoid the use of grammatical information in otherwise phonological rules.

Our revised rightward-docking H tone tonal morpheme rule applies to our present derivation by associating the H tone to the left but not deleting the association line already attached to syllable T since the phrase boundary (¶) separates the two tones. The tone rule thus operates as below:

\[(324) \quad \begin{array}{c}
\quad A \quad + \quad B \quad + \quad \text{¶} \quad T \quad \# \\
\quad L \quad + \quad H \quad + \quad H \quad \text{¶} \quad L \quad \#
\end{array}\]

Once again, neither of our late downstep rules applies to this particular pattern, and the surface realization is the following:

\[(325) \quad \begin{array}{c}
\quad A \quad + \quad B \quad + \quad \text{¶} \quad T \quad \# \\
\quad L \quad + \quad H \quad + \quad H \quad \text{¶} \quad L \quad \#
\end{array}\]

We have shown above that nouns with underlying L+H tonal patterns lose their usual LH rising tones when the noun is a subject from either noun class 1 or 9, but they create a HL falling tone on the next syllable if the nouns comes from any other of the ten noun classes. We showed how positing a concord tone tonal morpheme suffixed to the subject noun
phrase produces the correct surface derivations.

Readers acquainted with the prevalence of spreading tone rules in African languages might think that this last process was just a general tone rule spreading the H tone from the noun onto the next word. The following examples, where the subject nouns have an underlying L+L tonal pattern, prove that this is not the case:

(326) èncùm kà zà? mbàb "the heron-(9) cut the meat"

3 3 3 3 3 (yesterday)

mèncùm kà zà? mbàb "the herons-(4) cut the meat"

3 3 13 3 3 (yesterday)

The subject in the preceding sentences is a noun built on the root for the bird which is called a "heron" /çùm/. This noun root belongs to noun gender 9/4, which is to say that it forms its singular by prefixing the class 9 prefix /(è)N-/ (where the vowel "e" is only pronounced at the beginning of sentences), and it forms its plural by prefixing the class 4 prefix /mèN-/.

The reason we have selected this particular noun is that noun class 9 has L tone concord while noun class 4 has H tone concord. Thus, with the same noun root, we can examine both concord possibilities. Indeed, as our examples show, when the case of the class 4 noun is subject, the following (underlined) tense marker /kà/ has its tone perturbed from the normal L tone to a HL falling tone. This perturbation
is the result of the H concord tone that we posited as a subject marker on the end of the subject noun phrase. The underlying structure of this construction appears as below after the left-to-right mapping rule has operated:

\[(327) \quad // \quad A + B + \quad \underline{\mid} \quad T \quad \# \quad // \quad L + L + H \quad \underline{\mid} \quad L \quad \# \]

The only tone rule to operate here is our revised rule which docks H tone tonal morphemes to the left, but does not disassociate the next tone to the left when the intervening boundary is a phrase boundary, as below:

\[(328) \quad // \quad A + B + \quad \underline{\mid} \quad T \quad \# \quad // \quad L + L + H \quad \underline{\mid} \quad L \quad \# \]

Since neither of the late downstep rules applies to this pattern, our derivation is realized straightforwardly as below:

\[(329) \quad // \quad A + B + \quad \underline{\mid} \quad T \quad \# \quad // \quad L + L + H \quad \underline{\mid} \quad L \quad \# \]

\[
\begin{array}{c}
3 - 3 - 1 \\
3 - 
\end{array}
\]
We have examined above various derivations which motivate positing a concord tone as the subject marker for past tense sentences with full nouns as subjects. We will now take a look at sentences with pronouns as subjects. The Ngeymbɔɔn pronouns for animate objects from noun classes 1 and 2 in subject position are the following:

(330) **Subject Pronouns**

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Long forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>/\Ny/ &quot;I&quot;</td>
<td>/pég/ &quot;we(exclusive)&quot;</td>
<td>/mëŋ/ &quot;I&quot;</td>
</tr>
<tr>
<td></td>
<td>/pógo/ &quot;we(inclusive dual)&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>/pëge/ &quot;we(inclusive plural)&quot;</td>
<td></td>
</tr>
<tr>
<td>/\O/ &quot;you(sg.)&quot;</td>
<td>/pî/ &quot;you(pl.)&quot;</td>
<td>/gû/ &quot;you(sg.)&quot;</td>
</tr>
<tr>
<td></td>
<td>/pô/ &quot;they&quot;</td>
<td>/pôb/ &quot;they&quot;</td>
</tr>
</tbody>
</table>

Various observations should be made about the preceding subject pronouns in light of parallels they have with noun classes 1 and 2. In most Bantu languages, noun classes 1 and 2 most often indicate singular and plural human nouns respectively. In addition, the concord tone for class 1 is L tone while for class 2 it is H tone. The consonant concord for Ngeymbɔɔn nouns is /w/ for class 1 and /p/ for class 2. The parallels between these typical noun class elements and their respective subject
pronouns would seem to argue strongly for the pronouns being at least partially derived from noun class prefixes. First, all the singular subject pronouns are L tone. In addition, all the plural subject pronouns are H tone and begin with the consonant /p/. Even the "long form" subject pronouns, whose exact conditioning factor and derived semantic force has yet to be discovered, also follow these same parallels with noun class phenomena.

The reason we have brought up the topic of subject pronouns and their noun class parallels is that the subject pronouns take a concord tone as subject marker just like full nouns. However, what is unusual is that all the subject pronouns act like singular class 1 nouns (in taking a L tone concord tone as subject marker) except the third person plural pronouns /pó/ and /pób/ which act like plural class 2 nouns (in taking a H concord tone as subject marker), as exemplified by the following sentences:

(331) póɡò kà zà? mbàb "you-and-I-(1) cut the meat"
    1 3 3 3 3 (yesterday)

pó kâ zà? mbàb "they-(2) cut the meat"
    1 13 3 3 (yesterday)

As seen for nouns above, the L tone subject marker following /póɡɔ/ docks to the left and modifies the (underlined) echo vowel of the subject pronoun, while the H tone subject marker following /pó/ docks to the right and changes the L tone tense marker /kà/ into a HL falling tone. Thus, though all the frozen
plural pronouns seem to harken back to their class 2 origins by starting with [p] and having a H tone, only the third person plural pronouns actually behave like class 2 nouns in past tense sentences. The fact that the pronouns also have need of a following concord tone independently motivates our positing such a tone on the basis of subject noun behavior.

Having examined the concord tone subject marker needed in past tense sentences, we now move on to examine the more complicated subject marker needed in future tense sentences. The examples that we will examine are the following:

(332) àmbù? tō zā? mbâb "the deaf-man-(1) will cut the meat"

3 2 3 6 (tomorrow)

àmbù? lù zā? mbâb "the deaf-man-(1) will cut the meat"

3 3 4 3 6

mèpū? tō zā? mbâb "the deaf-men-(2) will cut the meat"

3 312 2 3 6 (tomorrow)

mèpū? lù zā? mbâb "the deaf-men-(2) will cut the meat"

3 312 4 3 6

mèncùm tō zā? mbâb "the herons-(4) will cut the meat"

3 2 3 6 (tomorrow)

mèncùm lù zā? mbâb "the herons-(4) will cut the meat"

3 3 4 3 6
The preceding sentences show three different nouns with H and L tone future auxiliary verbs. The fact that the normal LH rising tone created on the noun "deaf-man-(1)" is not realized argues for the presence of the same L concord tone as subject marker with L concord tone classes (1 and 9). We will also posit the parallel H concord tone as subject marker with the other classes, though this tone does unusual things. First, when it follows nouns which end on an associated L tone, like the "herons-(4)" above, the H tone drops out completely.

Much more difficult to derive are the unusual (underlined) rising-downstepped-high tones which only occur when a rising tone is created before an auxiliary verb in a future construction. The derivation of these unusual tones would begin with a structure like the following after the left-to-right tone mapping rule has operated (with "F" representing the auxiliary verb used to indicate future time):

\[
\begin{array}{c|c|c|c|c|c|c}
\text{(333)} & A & + & B & + & \text{¶} & F & \# \\
\text{//} & L & + & H & + & H & \text{¶} & T & \#
\end{array}
\]

Now, before the normal tone rules operate, we need a special (rather ad hoc) idiosyncratic morpho-tonological rule (see (570) below) which takes the H tone subject marker and inserts the H tone immediately before
the auxiliary verb tone **inside** the auxiliary marker, associating this H tone back to the last syllable of the subject noun phrase, and all this **only** when the preceding noun phrase has a final associated H tone. This idiosyncratic morpho-tonological rule produces the following effect:

\[(334) \quad // \quad A + B + \quad \parallel \quad F \quad # \]

\[(335) \quad // \quad L + H + H \quad \parallel \quad T \quad # \]

When the regular tone rules operate, our rise-formation rule associates the L tone of syllable A also to syllable B, as below:

\[(334) \quad // \quad A + B + \quad \parallel \quad F \quad # \]

\[(335) \quad // \quad L + H + H \quad \parallel \quad H \quad T \quad # \]

The crucial part of our derivation now arrives when our normal late morpho-tonological rule inserts an irrealis **polar** tone immediately before the auxiliary verb marking future tense. Since, by this time, the auxiliary verb has the perturbed H subject marker tone as its rightmost tone, the polar tone which is inserted is always a L tone, as below:
Since the only rules left to operate are our late downstep rules, the only remaining change is that the floating L tone lowers the tone register one notch before the following associated H tone. The following H tone is however associated back to the last syllable of the noun phrase, producing sentences with the normal "irrealis" downstep feature not realized on the auxiliary verb, but on the preceding noun root, as below (where the first row of numbers is for a future auxiliary verb (F) with underlying H tone and the second row for a similar verb with underlying L tone):

Our unusual morpho-tonological rule thus gives rise to the only occurrences of the unusual rising-downstepped-high tone, where fully
three tones are associated to a single syllable (B). To the author’s present knowledge, this unusual rule is the only means of having any three-toned syllable in the Ngyemboon language.

Now that we have examined the behavior of the concord tone subject markers in past and future constructions, we are ready to look at zero tense constructions where each construction has its own kind of subject marking. The only one of the zero tense constructions to use a concord tone as a subject marker is the non-progressive irrealis construction shown below:

(338) ìmbù? zaìà mbàb "the deaf-man-1) is cutting meat"

\[
\begin{array}{cccc}
3 & 3 & 4 & 4 \\
\end{array}
\]

ìmbù? gwò?ò mbàb "the deaf-man-1) is pounding meat"

\[
\begin{array}{cccc}
3 & 3 & 3 & 3 \\
\end{array}
\]

mèpù? zaìà mbàb "the deaf-men-2) are cutting meat"

\[
\begin{array}{cccc}
3 & 31 & 1 & 4 \\
\end{array}
\]

mèpù? gwò?ò mbàb "the deaf-men-2) are pounding meat"

\[
\begin{array}{cccc}
3 & 31 & 1 & 3 \\
\end{array}
\]

The preceding examples show that the posited L concord tone subject marker for class 1 (and 9) nouns docks to the left after rise-deletion has eliminated the H tone from the normal LH rising tone normally found on the noun root /pù?/ "blind-man." The last two examples show that the posited H concord tone subject marker also docks to the right as with the past tense
examples discussed earlier above. With the zero tense however, this H tone subject marker not only associates directly onto the verb root, it reassociates the tone of the verb root to the imperfective suffix of the verb. The underlying pattern for the verbs in these constructions contains an additional L tone tonal morpheme immediately following the verb root, as discussed in section 2.3.3. above. We add to the verb construction a noun with underlying L + H pattern and the posited H concord tone subject marker, as seen below after the left-to-right tone mapping rule has operated:

\[(339) \quad \text{//} \quad A + B + \quad \downarrow \quad V + \quad + \quad I \quad \# \]

\[(340) \quad \text{//} \quad L + H + H \quad \downarrow \quad T + L + L \quad \# \]

Before the regular tone rules operate, an idiosyncratic morpho-tonological rule (see (573) below) associates the H concord tone subject marker to the verb root (V) and reassociates the verb root tone (T) to the next syllable on its right (I), as below:

\[(340) \quad \text{//} \quad A + B + \quad \downarrow \quad V + \quad + \quad I \quad \# \]

\[(340) \quad \text{//} \quad L + H + H \quad \downarrow \quad T + L + L \quad \# \]

The first of the normal tone rules to operate is the rise-formation tone rule which associates the L tone of the noun class prefix (A) to the noun root (B), as below:
The next rule to operate is the **leftward-docking** L tone tonal morpheme rule which actually in this case associates to the **right**, since it is confined by the association line of the verb tone (T) on its left and the association line of the imperfective suffix syllable (I) on its right. Since our WFC says that association lines cannot cross, the new line must go to the syllable on the right, though the leftward-docking rule does delete the association line on its left as in more normal applications. So, the L tone of the tonal morpheme associates to the imperfective suffix (I) while disassociating the verb tone (T) already associated there, as below:

The realization of the surface tone on syllable I now depends upon the nature of the verb root tone, whether this tone reaches the end of the derivation as a floating H or a floating L tone. If the tone is a floating H tone before the associated L tone, it causes our downstep rule to lower the tone register one notch, as shown in the first row of surface tone numbers below. If the tone (T) is a L tone, the downstep rule is not triggered, and
the final syllable is not downstepped, as shown in the second row of surface tone numbers below:

\[
\begin{array}{ccccccc}
(343) & / & A & + & B & + & \uparrow & V & + & + & I & \# \\
/ & L & + & H & + & H & \uparrow & T & + & L & + & L & \# \\
3 & -3 & 1 & - & 1 & 4 & - \\
3 & -3 & 1 & - & 1 & 3 & - \\
\end{array}
\]

The unusual LH rising tone on the verb root in the positive perfective construction of the zero tense (P₀) was shown in section 2.3.3. above. There we mentioned how the unusual rightward association of a low tone subject marker was crucial to the derivation. We will now give additional examples with full nouns in the subject position and then show how the unusual rightward associating L tone subject marker results in neutralization of the tonal contrast between H and L tone verb roots. Our characteristic sentences are the following:

\[
(344) \text{àmbũ? zǎ? mbâb } "\text{the deaf-man just cut the meat}"
\]

\[
3 \ 31 \ 31 \ 4
\]

\[
\text{mèpũ? gwọ? mbâb } "\text{the deaf-men just pounded the meat}"
\]

\[
3 \ 31 \ 31 \ 4
\]

We will show the derivation of each sentence in turn since, though they have remarkably similar underlying structures, their derivations are quite
divergent. The first P₀ sentence above would appear as below after the left-to-right tone mapping rule had operated:

\[
(345) \quad // \quad A \ + \ B \ + \ + \ V \ # \\
// \quad L \ + \ H \ + \ L \ + \ H \ #
\]

Before any normal tone rule can operate, a morpho-tonological rule (see (571) below) adds a L tone tonal morpheme and associates it all the way to the verb root syllable (V), as below:

\[
(346) \quad // \quad A \ + \ B \ + \ + \ V \ # \\
// \quad L \ + \ H \ + \ L \ + \ H \ #
\]

The first tone rule to operate is our rise-formation rule which associates the L tone of syllable A to syllable B as well, as below:

\[
(347) \quad // \quad A \ + \ B \ + \ + \ V \ # \\
// \quad L \ + \ H \ + \ L \ + \ H \ #
\]

The next tone rule to operate is our normal leftward-docking L tone tonal morpheme rule which associates the L polar tone in this case to the right while disassociating the L tone already associated to syllable (V), as below:
The only rule which remains to operate is a late morpho-tonological rule (see (576) below) which inserts a floating polar tone (an \(-\alpha T\)) which becomes a H tone before a L tone) after the verb in \(P_0\) constructions, as below (where syllable "C" stands for the L tone object noun class prefix):

Our late downstep rule lowers the tonal register one notch immediately before the L tone of the object prefix (C), resulting in the proper surface realization, as below:

The parallel \(P_0\) construction with a L tone verb root begins its
derivation with the left-to-right association rule, as below:

(351)  //  A  +  B  ¶  +  V  #

//  L  +  H  ¶  H  +  L  #

Once again, before the normal tone rules can operate, our special $P_0$ morpho-tonological rule (see (571) below) inserts a L tone tonal morpheme and associates it all the way to the verb root syllable (V) on its right, as below:

(352)  //  A  +  B  +  ¶  +  V  #

//  L  +  H  +  Ø  ¶  H  +  L  #

The first regular tone rule to apply is our rise-formation rule which associates the L tone of syllable A also to syllable B, as below:

(353)  //  A  +  B  +  ¶  +  V  #

//  L  +  H  +  L  ¶  H  +  L  #

The next rule to operate is our rightward-docking H tone tonal morpheme rule which docks the H tone realis morpheme to the verb root on its right while disassociating the L tone already associated there, as below:
It can now be seen by comparing this derivation with the preceding one that the neutralization of the verb root to a LH rising tone is brought about by the L tone subject marker "trapping" the polar tone between itself and the verb root tone. When the leftward- or rightward-docking tone rules apply, the polar tone must dock to the verb root syllable on its right since to do otherwise would necessitate crossing association lines. It is the leftward- and rightward-docking tone rules: task in this environment to disassociate a tone on the left or right respectively. It is this disassociation first one way and then the other that results in the neutralization of H and L tone verb roots in P₀ constructions.

Continuing on to finish the present derivation, a floating polar tone (-αT) is inserted after the verb in P₀ constructions (see (576) below), as in the following representation:
Once again our late downstep rule lowers the tonal register one notch only when it gets to the object prefix. The resulting surface realization is exactly the same as the preceding derivation, even though the L and H tones associated with the same V syllable are from different underlying morphemes than the last construction. The final step in this derivation results in the following surface realization:

Another zero tense construction which utilizes a L tone tonal morpheme as subject marker is the realis non-progressive imperfective which is used to convey habitual meaning, as in the examples below:
(357) pò ngwó?ò mbàb "they-(2) pound meat"

13 2 4 4

mèncùm nzá?à mbàb "the herons-(4) cut meat"

3 3 1 3 3

The difference with the constructions above is that a L tone subject marker is inserted by a morpho-tonological rule (see (572) below) and associated to the left instead of to the right as with the P₀ constructions discussed immediately above. We will examine the derivation of the example with the third person plural pronoun /pó/ "they," which appears as below after the left-to-right tone mapping rule has operated (with the symbol "P" to indicate the pronoun on the syllabic tier):

(358) // P ¶ + V + I #

// H ¶ H + L + L #

Once again, before the normal tone rules operate, a morpho-tonological rule (see (572) below) inserts a L tone subject marker in this construction and associates it to the first syllable on its left, without disassociating that syllable from any other tones, as below:
The first tone rule to operate is our H tone tonal morpheme rule which takes the H tone of the realis polar tone and associates it to the right while disassociating the tone already associated there, as below:

This in turn feeds our metathesis rule which fronts the now disassociated L tone which came from the verb root morpheme, as in the following representation:

The final rule to operate is our late downstep rule which lowers the tonal register one notch before the H tone associate with the verb root (V), yielding the correct surface realization, as below:
We just saw what happens to a normal H tone when a L tone subject marker is associated to it by a morpho-tonological rule. One unusual tone pattern created by this rule occurs when underlying L+H nouns (which usually are realized with a LH rising tone on their roots) occur as subjects before such a L concord tone, as below:

(363) àmbû? nzá?à mbàb "the deaf-man-(1) cuts meat"

3 13 1 3 3

mèpù? ngwõ?ò mbèb "the deaf-men-(2) cut meat"

3 13 2 4 4

We will examine the derivation of the L tone verb root sentence to see how the ordering of this particular morpho-tonological rule before the normal tone rules bleeds the rise-formation rule. Our underlying structure would appear as below after the left-to-right tone mapping rule has operated:
Once again, a morpho-tonological rule (see (572) below) for non-progressive realis imperfective constructions in the zero tense inserts a L tone subject marker and associates it to the first syllable on its left while not deleting association lines already attached to that syllable (B). This rule must operate before the normal tone rules, and produces the following result:

\[(365) \quad \begin{array}{|c|c|c|c|c|c|c|}
\hline
A & B & \# & V & I & \# \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|c|c|c|c|c|}
\hline
L & H & L & H & L & L & \# \\
\hline
\end{array}
\]

It is crucial that now, when the normal tone rules scan the structure from left to right, the rise-formation rule cannot operate because syllable B is already associated to two different tones. The first tone rule to operate is thus the H tone tonal morpheme rule which associates the H tone of the polar realis marker to the verb root syllable on its right disassociating at the same time the verb root syllable from the tone already associated there, as below:

\[(366) \quad \begin{array}{|c|c|c|c|c|c|c|}
\hline
A & B & \# & V & I & \# \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|c|c|c|c|c|}
\hline
L & H & L & H & L & L & \# \\
\hline
\end{array}
\]

This in turn feeds our metathesis rule which fronts the L tone that has just been disassociated, as in the following representation:
The late downstep rule is once again triggered by this now fronted floating L tone, resulting in a lowering of the tone register one notch on the verb root syllable, as shown in the following representation:

This bleeding of the rise-formation rule keeps the Ngyemboon language from acquiring a three-toned (313) tone glide on the surface.

The preceding derivations were the last of the zero tense constructions which take a L tone subject marker. The only zero tense construction which still requires examination is the progressive irrealis imperfective which takes a H tone subject marker which associates to the left, as can be seen in the following examples:
(369)  ámbá zã?á mbàb "he-(1) is probably cutting meat"

3 3 2 5 5

mépû? nè zã?á mbàb "the blind-men-(2) are probably cutting meat"

3 3 3 2 5 5

ènçûm nè gwò?ò mbàb "the heron-(9) is probably pounding meat"

3 3 3 4 5 5

Examining briefly the last example cited above, its underlying structure would appear as below after the left-to-right tone mapping rule has operated (with the symbol "P" representing the progressive marker /nè/ on the syllablic tier):

(370)  // A + B ¶ P #

// L + L ¶ L #

The only morpho-tonological rule (see (579) below) to affect this construction is one which inserts a H tone tonal morpheme as subject marker and associates it to the first syllable on its left without disassociating any tones already associated there, and this only for progressive irrealis imperfective constructions in the zero tense. The resulting changes are shown below:
Since neither of our late downstep rules is triggered by this portion of our construction, the surface realization is quite straightforward, as below:

This ends our section on the variations of the subject marker with the various tenses, aspects and modes of the indicative mood. The following section will examine similar interaction with the verbal construction, though it will be between the verb and its following objects.
2.4.2. Between object and verb

Just as a subject marker occurs at the juncture of a subject with the following verb phrase, so too an object marker occurs at the juncture of a verb with its following object. Like the majority of subject markers which varied according to the noun class of the subject, our one unique object marker also varies according to the noun class of the object. While the subject marker was often just the concord tone morpheme, the object marker has a different variation, though it too is governed by the noun class of the head noun. The object marker in Ngeymbôc has two basic shapes, as summarized in the following chart:

(373)  

<table>
<thead>
<tr>
<th>Form</th>
<th>Classes</th>
<th>Prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>/’-/</td>
<td>2, 4, 5, 6</td>
<td>lè-/mè-/mèN-</td>
</tr>
<tr>
<td>/Ø/</td>
<td>3, 8, 9, 10</td>
<td>(è-)/(è)N-</td>
</tr>
<tr>
<td></td>
<td>1 and 7</td>
<td>(à-)/(à)N-</td>
</tr>
</tbody>
</table>

The preceding chart lists the two different forms of the object marker along with three different groups of noun classes and their respective noun class prefixes (the forms in parentheses only being optionally possible at the beginning of sentences). It can be seen that each variant form of the object marker is associated with a different type of noun
class prefix. It is only objects with full CV(N) prefixes that take the floating H tone object marker prefix. The second form is a zero morpheme (or the absence of a marker) which is present (or absent) for all the other noun classes, those that at least optionally can start with a vowel. We have divided this last group of noun classes up into two subgroups because of their extremely divergent behavior. The first subgroup contains the four noun classes whose prefix at least optionally begins with the vowel "e." These prefixes lose their syllabic identity in object position, a process that carries with it certain tonal perturbations. The other subgroup includes the two noun classes whose prefixes at least optionally begin with the vowel "a." These prefixes do not lose their syllabic identity in object position, but instead they are attached to the preceding word by a rule of vowel assimilation, a rule which results in certain rather uncommon tonal perturbations. The reader who is interested in the various concord properties of the Ngyemboon noun class system can find additional information in Anderson (1980a).

We will begin our examination of the variant object marker forms with the zero marker characteristic of noun classes 3, 8, 9 and 10. The only object from these classes that has been used in the present dissertation outside of this section is the noun /mâb/ "meat." This particular noun is from noun class 9 in the singular and was picked as the paradigm object precisely because it does not further complicate the
already complicated tonal derivations by adding extra tones and syllables. We give the following four sentences as a base paradigm, because each of the four object nouns (all from noun class 9) is realized on the same tone that it has when it occurs in isolation:

(374) à kà zà? mbāg "he cut the kolanut"
   3 3 3 34 (yesterday)
à kà zà? mbāb "he cut the meat"
   3 3 3 3 (yesterday)
à kà zà? mbīm "he cut the forest"
   3 3 3 2 (yesterday)
à kà zà? nzsō "he cut the cloth"
   3 3 3 31 (yesterday)

Though all of the preceding examples are quite straightforward, we will examine the derivation of the last example to see the timing and effect of the desyllabification of the homorganic nasal prefix /N-/ on the object noun. The underlying structure of that example includes a tense marker (T), a realis polar tone morpheme (L before a H tone root), a verb root (V) and an object (prefix "A" and root "B") which appear as below after the left-to-right tone mapping rule has operated:
Once again, we have posited the existence of a phrase boundary marker (¶) between the verbal constituents and the following object noun phrase. This phrase marker will be significant in revising another of our tonal morpheme docking rules, examined further below.

The first rule to operate is our morpho-tonological desyllabification rule (see (573) below) which omits the syllabic status of the noun class prefix for nouns from classes 3, 8, 9 and 10 when the noun is an object. This rule deletes syllable A while leaving behind a floating L tone, as below:

(376)

An alternative morpho-tonological rule (described in detail in section 2.3.3. above) operates only on positive P₂ perfective sentences like the one in focus here. It (see (563) below) inserts a special L tone inside the polar realis tone morpheme and associates this L tone both to the left and to the right, as below:
Once our regular tone rules begin to operate, the rising tone which was created on the verb root (V) feeds our rise-deletion rule which operates as below:

The next tone rule to operate is our leftward-docking L tone tonal morpheme rule which associates the now floating L tone from the object prefix to the verb root syllable (V) while disassociating the same syllable from the L tone already associated there, as below:

This in turn feeds our rise-formation rule since both the L and H tone of the object remain in the same word and are associated to two separate syllables
(even if one of those syllables is in a preceding phrase). This rise-formation rule yields the correct surface structure since neither of the downstep rules applies to this structure, resulting in the following:

\[ (380) \]
\[
\begin{array}{ccccccc}
\# & T & \# & + & V & \& & + & B \\
\# & L & \# & L & L & + & \& & L & + & H \\
- & 3 & - & & & & & & & & 3 & -3 & 1
\end{array}
\]

The preceding paradigm and derivation are characteristic of objects without an overt object marker which follow verbs which end on a L tone (including the L tone suffix of imperfective aspect). Both the paradigm and derivation change significantly when the object is preceded by a verb which ends on a H tone. The following paradigm of the same objects in a negative P₂ perfective construction is especially revealing:

\[ (381) \]
\[
\begin{array}{ccccccc}
\text{à kà tè zá? mbàng wó } & \text{"he didn’t cut the kolanut"} \\
3 & 3 & 3 & 1 & 3 & 1 & \text{(yesterday)}
\end{array}
\]

\[
\begin{array}{ccccccc}
\text{à kà tè zá? mbàb wó } & \text{"he didn’t cut the meat"} \\
3 & 3 & 3 & 1 & 3 & 1 & \text{(yesterday)}
\end{array}
\]

\[
\begin{array}{ccccccc}
\text{à kà tè zá? mbím wó } & \text{"he didn’t cut the forest"} \\
3 & 3 & 3 & 1 & 2 & 3 & \text{(yesterday)}
\end{array}
\]

\[
\begin{array}{ccccccc}
\text{à kà tè zá? nzsö wó } & \text{"he didn’t cut the cloth"} \\
3 & 3 & 3 & 1 & 2 & 2 & \text{(yesterday)}
\end{array}
\]
The tone perturbations that we shall examine in detail are the two derivations which give rise to two underlined words above, a final negative clitic /w5/ which is realized with a downstep feature and our L+H noun whose root is usually realized on a LH rising tone but is realized here on a downstepped H tone. We will examine the derivation of the L+H object noun first, its pattern appearing as below after the operation of the left-to-right tone mapping rule (with the common bipartite NEG morpheme /tè...w5/ being symbolized by "N" and "W" on the syllabic tier):

\[
(382) \quad \# \ N \ # \ + \ V \ \downarrow \ A \ + \ B \ # \ W \ // \\
\# \ L \ # \ L \ + \ H \ \downarrow \ L \ + \ H \ # \ H \ //
\]

The first rule to affect this structure is the noun desyllabification rule which once again leaves behind a floating L tone while deleting the noun class prefix on the syllabic tier (A), as below:

\[
(383) \quad \emptyset
\]

\[
(382) \quad \# \ N \ # \ + \ V \ \downarrow \ A \ + \ B \ # \ W \ // \\
\# \ L \ # \ L \ + \ H \ \downarrow \ L \ + \ H \ # \ H \ //
\]

The next tone rule to operate is the leftward-docking L tone tonal morpheme rule which seems to have two separate environments in which to do its work, associating both the realis polar L tone and the object prefix L tone to the
adjacent syllables on their left. In fact, the rule only operates on the L realis polar tone. We therefore need some limiting condition on the operation of this rule which will block its application whenever it would cross a phrase boundary (¶) to associate with a syllable already associated to an immediately preceding H tone. We therefore modify our leftward-docking tone rule (the preliminary formulation was presented in (38) above), as below:

(384) **Rule 5'**: Leftward-docking L-tone Morphemes

\[
\begin{align*}
\$ & + + \\
T & + L + \\
\end{align*}
\]

Condition: This rule shall not operate if it would associate the floating L tone across a phrase boundary to a syllable already associated with an immediately preceding H tone.

This rule as now modified applies only to the realis L tone polar tone of the current pattern under examination. When it applies, it has the following result:

(385)

\[
\begin{align*}
\# & N \# + V \parallel + B \# W // \\
\# & L \# L + H \parallel L + H \# H // \\
\end{align*}
\]
Since the leftward-docking rule is blocked from applying in this construction, the L tone left floating before the H tone of the object noun root triggers our downstep rule which lowers the tonal register one notch at that point. The resulting surface realization is:

(386)  

\[ \# \, N \, \# \, + \, V \, \downarrow \, + \, B \, \# \, W \, // \]

\[ \# \, L \, \# \, L \, + \, H \, \downarrow \, L \, + \, H \, \# \, H \, // \]

\[- \, 3 \, - \, 1 \, - \, 2 \, - \, 2 \]

While the preceding derivation ended with sentence final object and NEG clitic realized on downstepped H (2) followed by a H (also realized on the now lower tone level), the following derivation will examine objects with underlying L + HL tone patterns which result in a sentence that ends in two downstepped H tones, realized on tone levels (2) and (3) respectively. This derivation starts with an underlying structure which appears as below after the initial left-to-right tone mapping rule has operated:

(387)  

\[ \# \, N \, \# \, + \, V \, \downarrow \, A \, + \, B \, \# \, W \, // \]

\[ \# \, L \, \# \, L \, + \, H \, \downarrow \, L \, + \, H \, L \, \# \, H \, // \]

The first rule to modify this structure is the morpho-tonological desyllabification rule which keeps the L tone of the object prefix but deletes the syllabic standing of the nasal consonant (A), as below:
Next, our modified leftward-docking L tone tonal morpheme rule applies 
only to the L tone of the realis polar tone morpheme and not to the stranded L 
tone of the object noun prefix since that would mean crossing a phrase boundary 
to a syllable already associated with an immediately preceding H tone. The 
result is therefore the following:

Now, crucially, the metathesis rule does not apply to syllable B because that 
rule only applies when the preceding syllable is associated to a L tone. Since the 
metathesis rule does not apply, our downstep rule is allowed to apply twice, 
lowering the tonal register one notch on syllable B and a second notch on 
syllable W, resulting in the following:
This concludes our examination of nouns which take a zero object marker in reals constructions.

The derivation of these same objects when they occur immediately following an irrealis perfective verb root is slightly different, as the following F₃ paradigm suggests:

(391) à lù zá? mbåg "he will cut the kolanut"
    3 4 3 67

à lù zá? mbåb "he will cut the meat"
    3 4 3 6

à lù zá? mbìm "he will cut the forest"
    3 4 3 4

à lù zá? nzsö "he will cut the cloth"
    3 4 3 4

The objects in the preceding examples uniformly begin with downstep. Even the object with underlying L-L tone whose root is usually realized on a low-downstep-low tone before pause is preceded by yet a second downstep on one individual syllable. We saw in section 2.3.4. above that H tone syllables can be double-downstepped on a single syllable, but the two notch drop in tonal register was made in one step. Here, with two downsteps on the same syllable with L tones, the two notch drop is kept separate resulting in a tone glide (67 above).
Because the underlying L-H tone object (underlined above) is again realized on a downstepped H tone, we will select that particular sentence as characteristic of the group, and examine its derivation with special attention to the effect of the insertion of the irrealis polar tone. This particular sentence has an underlying structure like the following after the left-to-right tone mapping rule has operated:

\[(392) \quad \# \text{F} \quad \# \text{V} \quad \text{¶} \quad \text{A} + \text{B} \quad // \quad \# \text{L} \quad \# \text{H} \quad \text{¶} \quad \text{L} + \text{H} \quad //\]

As usual, the first morpho-tonological rule to operate is the desyllabification rule (see (573) below) which deletes the syllabicity of the object nasal prefix (A), resulting in the following:

\[(393) \quad \emptyset \quad // \quad \# \text{F} \quad \# \text{V} \quad \text{¶} \quad \text{A} + \text{B} \quad // \quad \# \text{L} \quad \# \text{H} \quad \text{¶} \quad \text{L} + \text{H} \quad //\]

Since the stranded L tone from the object prefix is preceded by a phrase boundary (¶) and a syllable associated to an immediately preceding H tone, the leftward-docking L tone morpheme rule does not apply to this construction. After the tone rules have had their chance to apply, a late morpho-tonological rule inserts three separate polar tones (labelled "-αT" in the representation
below just to show their position before and after each "verb" including the auxiliary verb (labelled "F") which is used to mark future time). The same rule deletes any floating tone before the object noun root, as below:

\[(394) \quad \# + F \# + V + \| + B /// \]
\[\# \emptyset + L \# \emptyset + H + \emptyset \| L + H /// \]
\[\downarrow -\alpha T \downarrow -\alpha T \downarrow -\alpha T \emptyset \]

The morpho-tonological rule which inserts these polar tones as a mark of irrealis mode must define the nature of each polar tone to be the opposite of the first associated tone which immediately follows. Since the object prefix tone is deleted in this environment if it is floating, each of the polar (-\alpha T) tones can now easily be specified, as below:

\[(395) \quad \# + F \# + V + \| + B /// \]
\[\# -\alpha T + L \# -\alpha T + H + -\alpha T \| + H /// \]
\[\downarrow \downarrow \downarrow \]
\[H \quad L \quad L \]

This leaves a polar floating tone immediately preceding three associated tones, which triggers our downstep rule three separate times, lowering the tonal register one notch each time, as below:
Because of the three separate register lowerings, the H tone at the end of the preceding sentence is realized phonetically on pitch level (4) instead of pitch level (1).

An even greater number of downsteps occur when the preceding paradigm is made negative, as the following examples illustrate:

(397) à tè lù zâ? mbàg wó "he won't cut the kolanut"
    3 3 4 3 6 4

à tè lù zâ? mbàb wó "he won’t cut the meat"
    3 3 4 3 6 4

à tè lù zâ? mbîm wó "he won’t cut the forest"
    3 3 4 3 4 5

à tè lù zâ? nzsô wó "he won’t cut the cloth"
    3 3 4 3 4 4

Once again, the object noun roots are all realized on downstepped tones, a fact which points to the influence of an adjacent floating polar tone. For this paradigm, we shall only examine the derivation of the sentence containing the (underlined) downstepped H tone on the negative clitic /wó/. This particular
sentence appears as below after the left-to-right tone mapping rule has operated:

\[(398)\]
\[
\begin{array}{cccccccc}
\# & F & \# & V & \| & A & + & B & \# & W & // \\
\# & L & \# & H & \| & L & + & H & L & \# & H & // \\
\end{array}
\]

The first rule to modify this structure is our desyllabification rule which once again deletes the syllabic status of the object noun class prefix, as below:

\[(399)\]

At this point, the regular tone rules are allowed to operate, but none are applicable. The stranded L tone from the object prefix is not associated to its left by the leftward-docking L tone tonal morpheme rule because it is preceded by a phrase boundary (¶) and a syllable associated to an immediately preceding H tone. Likewise, the metathesis rule fails to front the L tone of the object root (B) because the immediately preceding associated tone is a H tone. The next rule to operate is thus the late morpho-tonological rule which inserts polar tones (-αT) immediately before and after all "verbs" in irrealis constructions, deleting at the same time the stranded L tone of the object prefix, as below:
The polar tones are now determined to be opposite in nature to their following adjacent tones on the tonal tier. These polar tones thus trigger the register-lowering downstep rule three times. The same rule is triggered one additional time by the floating L tone of syllable B which was not metathesized in this environment. The phonetic realization of the sentence-final H tone is thus four notches lower (pitch level 5 instead of 1), as below:

It should be mentioned here that the downstepped H tone realized on the sentence-final negative clitic /w3/ above occurs in just the environment where we have come to believe that the normal metathesis rule is blocked from operating on the preceding noun root and this is strong independent motivation for the presence of the final floating L tone in the underlying lexical structure of
such nouns. It also lends additional independent motivation to the present
structure of our metathesis rule which does not operate in just those
environments where it is not needed.

Two additional constructions which by morpho-tonological rule end up with
a polar tone tonal morpheme just before the object (like the irrealis
constructions shown above), are the \( P_0 \) and \( P_1 \) realis positive perfective
sentences. We saw in section 2.3.3. above that the \( P_1 \) positive perfective
construction was probably modeled on the \( P_0 \) consecutive construction, so this
similarity of object marking is not surprising. A typical \( P_0 \) construction would
appear as below:

\[(402) \ à zà? \ mbàg \ "he just cut the kolanut"\]
\[
3 \ 31 \ 45
\]
\[
à zà? \ mbàb \ "he just cut the meat"
\]
\[
3 \ 31 \ 4
\]
\[
à zà? \ mbím \ "he just cut the forest"
\]
\[
3 \ 31 \ 2
\]
\[
à zà? \ nzsò \ "he just cut the cloth"
\]
\[
3 \ 31 \ 2
\]

Once the morpho-tonological rule (see (576) below) inserts the \( P_0 \) polar tone
after the verb root, its derivation proceeds much like the irrealis constructions
we just examined, resulting in downstepped surface tones for all of our underlying noun tonal patterns.

We now leave behind the homorganic nasal noun class prefixes and turn to those classes which take a full CV(N) prefix. We will chose the nouns of class 5 whose prefix is /lè-/ as representative of this group. A representative paradigm with nouns from the four tone patterns would be the following:

(403) à kà tè záʔ lépfôm wó "he didn’t cut the stomach"
3 3 3 1 1 3 1 (yesterday)

à kà tè záʔ lépfô wó "he didn’t cut the kolanut"
3 3 3 1 1 3 1 (yesterday)

à kà tè záʔ lépfê wô "he didn’t cut the garbage"
3 3 3 1 1 2 3 (yesterday)

à kà tè záʔ lékwê wó "he didn’t cut the bamboo"
3 3 3 1 1 2 2 (yesterday)

The most noticeable tone perturbation in the preceding paradigm is that all of the objects whose L tone noun class prefix /lè-/ is normally realized on a L tone in isolation and in subject position is here realized on a perturbed H tone. It is precisely this perturbation for all nouns whose prefixes have similar syllable structure that has motivated our positing a
H tone object marker prefix which precedes the object noun class prefix in all such constructions.

Once again, we will examine in detail the derivation of the sentence where we find the (underlined) downstepped H tone on the sentence-final negative clitic /wɔ/. Since the object in this sentence has an underlying L + HL tone pattern, our underlying structure would appear as below after the left-to-right tone mapping rule has operated:

(404) # N # + V ¶ + A + B # W //
     # L # L + H ¶ H + L + H L # H //

Since the noun class prefix in this case is a full CV(C) syllable (A), it does not undergo our desyllabification rule as did the syllabic nasal consonants which marked the noun classes discussed above. Therefore, the first tone rule to apply to this structure is our leftward-docking L tone tonal morpheme rule which associates the L tone of the realis polar tone morpheme to the NEG marker syllable (N) while disassociating the L tone already associated there, as below:

(405) # N # + V ¶ + A + B # W //
     # L # L + H ¶ H + L + H L # H //

The next tone rule to operate is the rightward-docking H tone tonal morpheme rule which associates the H tone object marker morpheme to
the following noun class prefix (A) while disassociating the L tone already associated there, as below:

No further tone rules operate on this pattern. The metathesis rule is blocked at two places. It cannot operate on either syllable A or B because in each case that syllable is preceded by a syllable associated to a H tone. Both the floating L tones are left where they originated and each one triggers the downstep rule which lowers the tonal register one notch, resulting in the correct surface realization shown below:

It should be noticed that the floating H tone object marker described above must have the phrase boundary on its left because if it was on its right, the leftward-docking L tone tonal morpheme rule would associate the H tone to the object prefix but would not disassociate the tone already associated there, a tone that is crucial for our downstep rules. Thus, the floating H tone object marker is definitely a pre-prefix on the object.
The final variation of the object marker is not at all clear at the present moment. We will posit, based on the data at hand, that noun classes 1 and 7 do not have an object marker present. We posit, for the moment that the unusual features of the following paradigm of class 7 nouns in the object position is just the result of the nature and timing of our vowel assimilation rule. The unusual character of the following examples is only plain when one remembers that these sentences are perfective, and thus do not have any verb suffix on the underlying level. Our unusual paradigm:

(408) à kà tè gwo¿ó twì? wó "he didn’t pound the cane"
3 3 3 2 2 4 2 (yesterday)
à kà tè gwo¿ó ffò wó "he didn’t pound the leaf"
3 3 3 2 2 4 2 (yesterday)
à kà tè gwo¿ó kàŋ wò "he didn’t pound the plate"
3 3 3 2 2 3 4 (yesterday)
à kà tè gwo¿ó tyò wó "he didn’t pound the tree"
3 3 3 2 2 42 2 (yesterday)

The unusual nature of the preceding examples can be summarized under the following main points:
(409) A) presence of an echo vowel suffix on the verb in a perfective construction.

B) a H tone on that suffix.

C) the negative clitic /wó/ is downstepped after nouns with underlying L+HL tones.

D) nouns with underlying L+H tones are realized on LH rising tones which they only have when the L tone of the prefix is associated to some syllable.

We propose that all of these characteristics are the result of the late ordering of a vowel assimilation rule (see (586) below) which takes any vowel that begins a word, attaches it to the end of the preceding word, assimilates it to the vowel quality of the preceding vowel, and reassociates it to the preceding tone. We will examine in detail the derivation of the last example shown above in order to see why such a rule ordered after the normal tone rules can have such an unusual effect. Our underlying structure would appear as below after the left-to-right tone mapping rule has operated (we will label the object noun class prefix lower case "a" in this derivation since it represents a vowel which will undergo a segmental assimilation):

(410) | # N | # | + V | a | + B | # | W | //
    |    |    |     |    |    |    |    |    |
    |    |    |    |    |    |    |    |    |
    |    |    |     |    |    |    |    |    |
    | # | L | # | H | + L | # | L | + | H | # | H | //
Since the desyllabification rule does not apply to these object prefixes, the first rule to operate is our rightward-docking H tone tonal morpheme rule which associates the floating H realis polar tone to the verb root syllable on its right while disassociating the L tone already associated there, as below:

(411)   #   N   #   +   V    \   a   +   B   #   W   //
        #   L   #   H   +   L    \   L   +   H   #   H   //

This in turn feeds our metathesis rule which fronts the now stranded L tone which came from the verb root, as below:

(412)   #   N   #   +   V    \   a   +   B   #   W   //
        #   L   #   H   +   L    \   L   +   H   #   H   //

The next tone rule to operate is our rise-formation rule which forms a LH rising tone on syllable B by associating that syllable to the preceding L tone noun class prefix, as below:

(413)   #   N   #   +   V    \   a   +   B   #   W   //
        #   L   #   L   H   +   \   L   +   H   #   H   //

Now, after all the regular tone rules have operated, we come to the crucial moment in the derivation. Though our data on vowel assimilation is not
overwhelming, nothing there shows our following rule to be false. We therefore tentatively propose that a single morpho-tonological rule (see (576) below) operate on all word-initial vowels which are not also sentence-initial and attach them to the preceding word (as a suffix). The rule would also assimilate the vowel to the vowel quality found in the preceding syllable. And, crucially, this late rule would also disassociate the vowel from its previously associated tones and reassociate it to the last tone of the preceding word. All this is shown in the following representation:

\[(414)\]

\[\begin{align*}
\# & N & + & V & \vdash & a & + & B & \# & W & // \\
\# & L & & L H & \vdash & L & + & H & \# & H & // \\
-3 & - & 2-2 & & -4 & 2 & - & 2 & \\
\end{align*}\]

The only remaining rule to affect this structure is our downstep rule which lowers the tone register one notch immediately preceding the verb root, resulting in the correct surface realization found below:

\[(415)\]

\[\begin{align*}
\# & N & + & V & \vdash & & \vdash & B & \# & W & // \\
\# & L & & L H & + & \vdash & L & + & H & \# & H & // \\
\end{align*}\]

This concludes our examination of tone changes due to the presence or absence of an object marker between verb and object.
2.5. Overall Rule Ordering

The various tone rules needed in Ngyemb̄on have been developed over the course of the preceding three sections: 2.2. on rules needed in order to handle noun phrases, 2.3. on additional rules needed to handle verb phrases, and finally 2.4. on two restrictions on our tonal morpheme docking rules when subjects, verbs and objects come in contact. The present section will collect all these rules into one place so the reader can get an overall idea of the entire tonal system. The reader is referred to Appendix A for a restatement of the final tone rules with just their formalized statements. This section will discuss in prose the various tone rules which have been developed.

The first step to seeing the whole system is to see a list of all the tone rules along with a discussion of their ordering. The tone rules in Ngyemb̄on have been divided into three separate groups. Crucially, all of the tone rules are unordered within their respective group, each group operating on a left-to-right principle. The early group contains just our left-to-right tone mapping rule, which various writers have posited to be a universal. The second and major group contains our "regular" tone rules which operate whenever their conditions are met moving through the structure on the tonal tier from left to right. The late group contains just our late downstep rule which is responsible only for yielding
the correct phonetic realization from the rest of the derivation. We now give an updated chart (from (71) above), which lists the various rules in each of their groups, separated from each other by various morpho-tonological "grammatical" rules, as below:

(416)  

**Rule Ordering**

(Morpheme Spelling Rules)

**Left-to-Right Mapping Rule** (universal)

(Early Morpho-tonological Rules)

- Rule 1: Final Downglide
- Rule 3': Metathesis
- Rule 4: Rise-Formation
- Rule 5': Leftward-docking L-tone Morphemes
- Rule 6': Rise-Deletion
- Rule 7': Rightward-docking H-tone Morphemes
- Rule 8': Well-formedness Rule (WFR)

(Late Morpho-tonological Rules)

- Rule 2': Downstep (late adjustment rule)
It should be stressed that apart from the fact that the mapping rule is very early and the downstep rule very late, the rest of the tone rules are completely unordered with respect to each other. They are ordered in each derivation simply by the local principle of proceeding from left to right on the tonal tier and allowing each rule to apply whenever its conditions are met.

We will now restate each of the formalized versions of the tone rules in the order that they were discussed in the text (and with a reference back to its original place in the text). We will follow each rule with a brief summary of what the rule accomplishes. Starting with the rules we developed for the noun phrase, our first rule was:

(417) **Rule 1: Final Downglide**  (see (16) above)

![Diagram]

The preceding rule adds both a H and L tone after any single associated L tone which immediately precedes pause, and associates the last L tone back to the same syllable. We next offered a preliminary version of our downstep rule, as below:
(418) **Rule 2: Downstep** (see (18) above)

\[
\begin{align*}
S &\rightarrow +1\text{ pitch} \\
-\alpha T &\rightarrow \alpha T
\end{align*}
\]

The preceding rule is a late adjustment rule which lowers the tone register one notch (an increase numerically means a lower pitch level) whenever an associated tone is immediately preceded by a floating tone of opposite character. It should be noted that this rule is both cumulative and perseverative. Once a downstep rule is triggered, it lowers all following tones one pitch level until it reaches the next pause. When more than one downstep occurs between two pauses, they keep lowering the pitch register additional notches. Theoretically speaking, there is no limit to the number of downsteps which might take place between two pauses. Practically speaking, when the pitch register gets too low, after seven to ten lowerings, the Ngyemboon speaker will pause (and reset his pitch level) at the next major grammatical boundary. A rule which always feeds this downstep rule is the following:
(419) **Rule 3: Metathesis** (see (24) above)

![Diagram of Rule 3]

The preceding rule was a preliminary formulation of our metathesis rule. This rule reversed the order of an associated H tone and a following L tone whenever the preceding syllable was associated to a L tone. This rule was crucial in feeding our downstep rule at the right place in our tonal patterns. Our next rule was:

(420) **Rule 4: Rise-Formation** (see (29) above)

![Diagram of Rule 4]

The preceding rule creates a LH rising tone by associating any already associated L tone to the next syllable if that syllable is already associated to a single H tone providing that both tones are adjacent and contained in the same word. Our next rule was:
(421) **Rule 5: Leftward-docking L-tone Morphemes**  
(see (38) above)

The preceding rule was an early version of our rule which associated (docked) any (floating) L tone in a morpheme without syllabic content to the immediately preceding syllable while disassociating that syllable from the tone it was associated to, if that tone was adjacent to the newly associated L tone. Our next rule was:

(422) **Rule 6: Rise-Deletion**  
(see (51) above)

The preceding rule was an early version of our rule which deleted the H tone of any syllable which had a LH tone rise associated with it provided that the L tone of that rise was already associated to the
preceding syllable and that the syllable with the rise was immediately followed by a morpheme containing nothing but a single L tone. Our next rule was:

(423) **Rule 7: Rightward-docking H-tone Morphemes** (see (56) above)

```
+ + $______________________________
+ H + T
```

The preceding rule was an early version of our rule which associated (docked) any (floating) H tone which made up an entire morpheme to the immediately following syllable and deleted the association line from that syllable to any tone which immediately followed the newly associated H tone. Our next rule was:

(424) **Rule 3’: Metathesis** (see (62) above)

```
$ $______________________________
L (H) H L
```

The preceding rule was our revised metathesis rule which added the possibility of a floating H tone before the syllable undergoing the change. The rule now changed the order of an associated H tone and a following floating L tone provided that the previous syllable is associated to a L
tone and allowing for the presence of a single floating H tone between the
two adjacent syllables. The revision of this rule was the last step in our
development of tone rules needed to handle the tone changes for
disyllabic nouns in noun phrases.

One of the main aims of this dissertation was to see if the tone rules
needed in Ngyemboon noun phrases were sufficient in and of themselves
to handle all of the tone changes found in verb phrases. While we found
that the noun phrase tone rules handled the vast majority of verbal tone
perturbations, we did need to develop one new tone rule. This tone rule,
the WFR, was one part of the WFC which needed to be restated and given
the status of an unordered tone rule. Stated first in its preliminary form:

\[(425) \textbf{Rule 8: Well-formedness Rule (WFR)} \text{(see (94) above)}\]

This rule says that whenever a toneless syllable is found (in the left-
to-right application of the tone rules), it is associated to the first tone
found to its left. Next, it was found that we needed to revise the rise-
deletion rule, which was restated as below:

(426) **Rule 6’: Rise-Deletion**  (see (170) above)

\[
\begin{array}{c}
\text{S} \\
\text{L (T) H} \\
\text{Ø}
\end{array}
\]

The preceding revised rule allows for the presence of a floating tone between our two syllables where rise-deletion takes place and allows that the rise must only be followed by a following L tone instead of a L tone tonal morpheme. The rule now deletes the H tone of any syllable with a LH rising tone whenever the L tone is associated to a preceding syllable and the rising tone is immediately followed by a L tone even if a floating tone occurs between the L and H tone of the rise. Next, we discovered reason to further complicate our WFR, and we restated it in its final form as below:
(427) **Rule 8': Well-formedness Rule (WFR)** (see (184) above)

Condition: When a toneless syllable associates to the first tone on its left, it only disassociates that tone from another syllable if that syllable is already associated to yet another tone.

This rule associates any toneless syllable to the first tone found on its left while disassociating as well that same tone from any other syllables with which it might already be associated so long as those syllables would retain yet another tone. Our next step was to revise our downstep rule in order to allow for double downstepping of the tonal register, as below:

(428) **Rule 2': Downstep** (see (261) above)
This rule says that the tone register is lowered the same number of steps (add one pitch level for each step lowered) as the number (β) of floating polar (-α) tones (T) which precede a given associated tone (αT).

This was the last of the tone rules and revisions of tone rules which was needed to handle all of our data on verb phrases (presented in the following chapter). Before leaving aside the question of additional tone rules and their exact form, the interaction of noun phrases with verb phrases and verbs with objects was examined with special attention to tonal phenomena. It was found that no new tone rules were needed, but that each of our rules which docks tonal morphemes had to have added restrictions which in each case referred to the presence of an intervening phrase boundary. The first of these rules to be revised was our rightward-docking H tone tonal morpheme rule, which was finally formalized as below:
(429) **Rule 7'**: Rightward-docking H-tone Morphemes (see (323) above)

\[
\begin{array}{c}
+ \\
+ \ \ + \ \ + \ $ \\
\end{array}
\]

Condition: association line deleted only if boundary between H and T tones is weaker than a phrase boundary (¶).

The preceding rule associates the H tone of a morpheme consisting of nothing else to the first syllable on its right, but will not disassociate that syllable from the tone already associated there if the newly associated H tone had to cross a phrase boundary to find the syllable. Our final revision of a tone rule for the parallel leftward-docking L tone tonal morpheme rule was formalized as below:
Rule 5': Leftward-docking L-tone Morphemes (see (384) above)

\[
\begin{array}{c}
S + + \\
T + L + 
\end{array}
\]

Condition: This rule shall not operate if it would associate the floating L tone across a phrase boundary to a syllable already associated with an immediately preceding H tone.

The preceding rule continues to associate a L tone which makes up an entire morpheme to the first syllable on its left while dissassociating the tone already associated there, except if the newly associated tone must cross a phrase boundary to find a syllable and the immediately previous tone associated to that syllable is a H tone.

This concludes our summary of the development of our tone rules and the part of the grammar (noun phrase, verb phrase, subject or object marker) which necessitated their formulation or revision. It should be mentioned that not all of the additional verb data could have been handled without positing several morpho-tonological rules which take grammatical information into account when deciding whether to apply. These morpho-tonological rules are formalized in chapter 4 below. The eight purely tonal rules just elaborated do not need any grammatical
information in their formulation. They operate whenever their conditions are met on the tonal and syllabic tiers alone.
CHAPTER 3

3.0 Verb Paradigms

The present chapter presents the various paradigms of tense, aspect, mode and polarity in the Ngyemboon indicative main clause. It is this data which has been the center of our investigation into tonal phenomena in the verb phrase.

The various verb paradigms presented in this chapter will be organized according to our chart (first presented in (82) above) which shows whether each construction’s tones on the verb stem are those of the regular realis (R), or regular irrealis (I) or some unusual idiosyncratic (x) realization, as below:
### Revised Realis/Irrealis Tone Distribution

<table>
<thead>
<tr>
<th>Features</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
<th>P₄</th>
<th>Ø</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>+perf +real</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td>x/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real</td>
<td>x/R</td>
<td>x/x</td>
<td>x/x</td>
<td>x/R</td>
<td>R/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real</td>
<td>R/R</td>
<td>R/R</td>
<td>R/R</td>
<td>R/R</td>
<td>x/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+perf -real</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
</tr>
<tr>
<td>-perf -real</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
</tr>
<tr>
<td>-perf -real</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +prog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
<td>I/I</td>
</tr>
</tbody>
</table>
We will present the individual paradigms for each of the nine tenses in the chart from left to right, and examining each of the constructions possible in each tense from top to bottom in each column. As in a previous reference to this same chart, "R" refers to regular realis tone patterns, "I" to regular irrealis tone patterns, and "x" to idiosyncratic tone patterns on the verb. The letter to the left of each slash indicates the tone pattern of the positive construction while the letter to the right of each slash indicates its negative counterpart.

Due to the extremely frequent occurrence of two tone patterns, and due to the contrast between these two patterns correlating with a semantic contrast between realis and irrealis mode, these two patterns have been determined to be more basic than various idiosyncratic patterns and they have therefore been labeled "regular." The following chart gives the surface realizations of the regular realis and irrealis tone patterns on the verb stem:

(432)  

<table>
<thead>
<tr>
<th>Lexical tones</th>
<th>Realis</th>
<th>Irrealis</th>
</tr>
</thead>
<tbody>
<tr>
<td>H tone verb root</td>
<td>H</td>
<td>'H'</td>
</tr>
<tr>
<td>L tone verb root</td>
<td>'H'</td>
<td>'L'</td>
</tr>
</tbody>
</table>

The preceding chart shows that regular tonal patterns for verb stems in realis constructions are H tone from an underlying H tone verb root and
downstepped H tone from an underlying L tone verb root. In regular irreals tone patterns however, the underlying tone on the verb root is modified by the addition of two downstep features ('), one preceding and one following the verb stem. The various derivations that produce these surface structures are described in detail in sections 2.3.1. and 2.3.2. above. Constructions which contain idiosyncratic tone patterns on the verbs are discussed in detail in section 2.3.3. above. During the rest of this chapter, the various verb paradigms will be presented with only a word as to their regular or idiosyncratic tonal behavior. The reader interested in the in-depth derivation of each pattern is referred to the appropriate sections above.

In Ngyemboon, the basic indication of the various tenses is done by means of different "markers." The zero tense is indicated by the absence of any overt tense morpheme. Most of the future tenses are marked by the presence of various auxiliary verbs (see section 3.7. below), two of the future tenses actually having a choice between two different auxiliary verbs to indicate the same semantic features. Three of the past tenses make use of ordinary tense markers while the unusual P₄ tense is indicated by combining markers for P₃ and F₄. The nine tenses of our previous chart are marked by the following morphemes:
Tense Markers

$P_4 : /là/ + /làʔ/ $ 

$P_3 : /là/ $ 

$P_2 : /kà/ $ 

$P_1 : /né'/ $ 

Zero : /Ø/ 

$F_1 : /gè/ $ 

$F_2 : /tô/ or /gyô/ $ 

$F_3 : /lù/ $ 

$F_4 : /láʔ/ or /fô/ $ 

The four verb stems which will form the basis for each verb paradigm are the following:

Verb Stems

(434)

<table>
<thead>
<tr>
<th></th>
<th>Monosyllabic</th>
<th>Disyllabic</th>
</tr>
</thead>
<tbody>
<tr>
<td>H tone verb root</td>
<td>zaʔ &quot;cut&quot;</td>
<td>lumte &quot;bite&quot;</td>
</tr>
<tr>
<td>L tone verb root</td>
<td>gwoʔ &quot;grind&quot;</td>
<td>limte &quot;reheat&quot;</td>
</tr>
</tbody>
</table>

The other words found in the following paradigms include the following subject, object and grammatical markers:
(435) **Other Words**

/à/ "he" (subject)

/mbâb/ "meat" (object)

/nè/ "progressive aspect"

/ssê'/ "realis progressive"

/kà...wɔ/ "present perfective negative"

/tè...wɔ/ "other negative"

For constructions marked for realis mode, progressive aspect may be marked by **either** /nè/ alone, /ssê'/ alone, or both of them together.

These three constructions will be presented in the order shown above, though the differences between constructions makes no difference in their meaning.

The main marker of negation in the indicative mood is the bipartite morpheme /tè...wɔ/ with the /tè/ positioned after the past tense markers and before the PROG marker while the /wɔ/ is a clitic that occurs at the end of the clause. The P₀ (immediate past perfective) is the only exception to the general negative marking when it takes its own bipartite NEG marker /kà...wɔ/.

The various indicative verb paradigms are now presented beginning with the remote past and progressing to the remote future.
3.1. Remote Past \( P_4 \): /là/ + /lá?/

The remote past tense is formed by combining the past tense marker /là/ of \( P_3 \) with an auxiliary verb /lá?/ which is also one of the alternative forms used to indicate the \( F_4 \) tense (the other alternative, /fó/ cannot be used with /là/ to indicate \( P_4 \) time). The following positive perfective constuctions are interesting in that (though all \( P_4 \) sentences are underlyingly realis) they have the regular irrealis tone patterns on the main verbs. The \( P_4 \) perfectives, both positive and negative, are also unusual in that they have a nasal prefix on the main verb root. This nasal prefix appears to be the prefix which marks consecutive verbs in realis consecutive verb constructions. The reason one finds it with \( P_4 \) is because the \( F_4 \)/lá?/ continues to function as an auxiliary verb. What is unusual is that, though the /lá?/ occurs with realis tones and is followed by the realis consecutive nasal prefix, the main verb roots in positive constructions have \_\_\_realis tones. The derivation of the following positive sentences is discussed in section 2.3.3. above. We now show the positive perfective paradigm:
(436) \(P_4\) positive perfective:

à là lá? nzā? mbè mbè "he cut the meat" (a long time ago)

à là lá? ngwō? mbè mbè "he pounded the meat"

à là lá? ndümté mbè mbè "he bit the meat"

à là lá? ndîmtè mbè mbè "he reheated the meat"

Though the negative counterparts also have the consecutive nasal prefix on the main verb, they have regular realis tone patterns instead of the unusual patterns seen above. Remembering that the NEG marker /tè/ comes after past tense markers like /là/ but before auxiliary verbs like /lā?/, the negative paradigm is as below:

(437) \(P_4\) negative perfective:

à là tè lá? nzà? mbè wò "he didn’t cut the meat"

à là tè lá? ngwō? mbè wò "he didn’t pound the meat"

à là tè lá? ndümté mbè wò "he didn’t bite the meat"

à là tè lá? ndîmtè mbè wò "he didn’t reheat the meat"

The various imperfective alternatives are formed by adding a L tone vowel suffix to the verb root. This imperfective vowel takes on the vowel quality of the root vowel with monosyllabic verb stems and drops out completely with disyllabic verb stems. Thus for disyllabic verbs, it is only the tone on the second syllable (usually a /-te/ suffix as in our examples)
which indicates the presence of the imperfective aspect. The non-
progressive imperfective aspect is used with past tenses to indicate that
the actor used to be involved in a certain habitual action which (implied)
he no longer does.

The positive non-progressive paradigm listed below undergoes the
same idiosyncratic tone changes as the positive perfective paradigm
further above:

(438) P₄ positive non-progressive imperfective:
à là lâ? nzâ?à mbâb "he was a meat-cutter" (a long time ago)
à là lâ? ngwô?ô mbâb "he was a meat-pounder"
à là lâ? ndûmtë mbâb "he was a meat-biter"
à là lâ? ndîmtë mbâb "he was a meat-reheater"

The negative counterparts of the preceding examples once again
return to the regular realis tone patterns on the verbs, as we saw with the
perfective negatives above. The negative paradigm:

(439) P₄ negative non-progressive imperfective:
à là tê lâ? nzâ?à mbâb wô  "he wasn’t a meat-cutter"
à là tê lâ? ngwô?ô mbâb wô  "he wasn’t a meat-pounder"
à là tê lâ? ndûmtë mbâb wô  "he wasn’t a meat-biter"
à là tê lâ? ndîmtë mbâb wô  "he wasn’t a meat-reheater"
The P₄ progressive imperfectives are completely regular, both segmentally and tonally. They do not take irrealis tone patterns on their verb roots as in the parallel positive non-progressive counterparts of the preceding section. Instead, they have their expected realis tones. The only unusual factor is that the realis progressive marker /ssé/ is not possible with the P₄ tense as with other past tenses. This is most likely due to the presence of the irrealis F₄ marker /lâ/? in the middle of a realis construction. Instead of three parallel grammatical constructions, we therefore find only the construction with the general progressive /nè/, as below:

(440) P₄ positive progressive imperfective:

à là là? nè nza?à mbàb  "he was cutting meat"
   (a long time ago)
à là là? nè ngwó?ò mbàb  "he was pounding meat"
à là là? nè ndúmtè mbàb  "he was biting meat"
à là là? nè ndímtè mbàb  "he was reheating meat"

The negative counterparts are also realized on the regular realis tones, as in the following paradigm:
(441) **P₄ negative progressive imperfective:**

à là tè lá? nè nzá?à mbàb wó  "he wasn’t cutting meat"

à là tè lá? nè ngwó?ò mbàb wó  "he wasn’t pounding meat"

à là tè lá? nè ndúmtè mbàb wó  "he wasn’t biting meat"

à là tè lá? nè ndámìtè mbàb wó  "he wasn’t reheating meat"

This concludes our section on the possible P₄ constructions, four of six of which have been realized on regular realis tones.
3.2. Distant Past $P_3$ : /là/

Like many Bantu languages, N’gymbɔɔn uses the common Bantu past tense morpheme /là/. Like all past perfective positive constructions, the $P_3$ has an idiosyncratic tone pattern whose derivation has been described in detail in section 2.3.3. above. The resulting surface paradigm is the following:

(442) $P_3$ positive perfective:

à là zâ? mbàɓ  "he cut the meat" (some time ago)
à là gwɔ? mbàɓ  "he pounded the meat"
à là lúmtè mbàɓ  "he bit the meat"
à là lîmtè mbàɓ  "he reheated the meat"

The negative counterparts of the $P_3$ perfective are completely regular, always taking the regular realsi tones on the verb root, as below:

(443) $P_3$ negative perfective:

à là tè zâ? mbàɓ wó  "he didn’t cut the meat"
à là tè gwɔ? mbàɓ wó  "he didn’t pound the meat"
à là tè lúmtè mbàɓ wó "he didn’t bite the meat"
à là tè lîmtè mbàɓ wó "he didn’t reheat the meat"
The $P_3$ (and $P_2$) tenses with non-progressive imperfective aspect are unusual in that both positive and negative paradigms undergo an identical modification. In section 2.3.3. above, we posited that all of these constructions undergo a transformation which takes the L tone echo vowel imperfective suffix from the verb root and affixes it instead to the tense marker (see (559) below). A later morpho-tonological rule would apply to the tones of the verb stems, resulting in tonal neutralization between H and L tone verbs, as in the positive $P_3$ examples below:

(444) $P_3$ positive non-progressive imperfective:

à làa nzâ? mbàb "he was a meat-cutter" (some time ago)
à làa ngwã? mbàb "he was a meat-pounder"
à làa ndûmtê mbàb "he was a meat-biter"
à làa ndûmtê mbàb "he was a meat-reheater"

The negative counterparts to the preceding sentences also undergo the same transfer of the echo vowel to the tense marker and the tonal neutralization to downstepped L tones on the verb stems, as below:
(445) **P₃ negative non-progressive imperfective:**

à làa tè nzá? mbàb wó "he wasn’t a meat-cutter"

à làa tè ngwô? mbàb wó "he wasn’t a meat-pounder"

à làa tè ndûmtè mbàb wó "he wasn’t a meat-biter"

à làa tè ndîmtè mbàb wó "he wasn’t a meat-reheater"

Moving on to the P₃ progressive constructions, they all carry the regular realis tones on the verb stems. There are various modifications and unusual patterns as a result of the tones of the progressive markers themselves, however, and their derivations are described in detail in section 2.3.4. above. When the regular progressive marker /nè/ is present, the marker changes to a rising tone in positive constructions, as in the following paradigm:

The P₃ and P₂ progressive imperfective sentences take the expected realis tone patterns on the verb root, but the PROG marker is realized on a H-L falling tone instead of the basic L tone, as below:

(446) **P₃ positive progressive imperfective:**

à là nè nzá?à mbàb "he was cutting meat"(some time ago)

à là nè ngwô?ò mbàb "he was pounding meat"

à là nè ndûmtè mbàb "he was biting meat"

à là nè ndîmtè mbàb "he was reheating meat"
The negative counterparts to the preceding sentences have the unusual H tone attached to the end of the /tè/ NEG marker instead of at the beginning of the progressive marker. The derivation of these sentences is discussed in detail in section 2.3.5. above. Our paradigm is realized as below:

(447) P₃ negative progressive imperfective:

à là tè nè nzáʔà mbàb wó  "he wasn’t cutting meat"
à là tè nè ngwōʔò mbàb wó  "he wasn’t pounding meat"
à là tè nè ndúmtè mbàb wó  "he wasn’t biting meat"
à là tè nè ndímtè mbàb wó  "he wasn’t reheating meat"

Since all past tenses are realis mode, the realis progressive marker /ssé'/ can optionally take the place of the regular progressive marker seen above. The realis progressive marker is tonally regular with the exception that the downstep following the marker is actually realized on the following verb root, becoming the unusual double downstep in the case of L tone verbs. The derivation of such unusual patterns is described in detail in section 2.3.4. above. The resulting surface realization is as below:
(448) **P₃ positive progressive imperfective:**

à là ssé nzāʔà mbàb "he was cutting meat" (some time ago)

à là ssé ngwōʔò mbàb "he was pounding meat"

à là ssé ndūmtè mbàb "he was biting meat"

à là ssé ndīmtè mbàb "he was reheating meat"

Since the realis progressive marker /ssè'/ follows the NEG marker /tè/, the double downstep is also found on the verb roots in the parallel negative paradigm, as below:

(449) **P₃ negative progressive imperfective:**

à là tè ssé nzāʔà mbàb wó "he wasn’t cutting meat"

à là tè ssé ngwōʔò mbàb wó "he wasn’t pounding meat"

à là tè ssé ndūmtè mbàb wó "he wasn’t biting meat"

à là tè ssé ndīmtè mbàb wó "he wasn’t reheating meat"

Though one can signal past progressive meaning by using either the regular progressive marker /nè/ or the realis progressive marker /ssè'/, one can also combine both markers in the same construction though the basic past progressive meaning remains unchanged. When both progressive markers are present in the same construction, the tones are completely regular realis tones throughout, as in the positive paradigm below:
(450) $P_3$ positive progressive imperfective:

à là ssé nè nzá?à mbàb "he was cutting meat" (some time ago)

à là ssé nè ngwō?ò mbèb "he was pounding meat"

à là ssé nè ndúmtè mbèb "he was biting meat"

à là ssé nè ndǐmtè mbèb "he was reheating meat"

As can be seen above, the /ssé'/ marker precedes the /nè/ marker when both are present. Both of these markers also follow the NEG /tè/ marker whenever all three are present, as in the following paradigm:

(451) $P_3$ negative progressive imperfective:

à là tè ssé nè nzá?à mbèb wó "he wasn’t cutting meat"

à là tè ssé nè ngwō?ò mbèb wó "he wasn’t pounding meat"

à là tè ssé nè ndúmtè mbèb wó "he wasn’t biting meat"

à là tè ssé nè ndǐmtè mbèb wó "he wasn’t reheating meat"

This concludes our examination of the $P_3$ tense, and we can move on to the remarkably similar constructions and changes of the $P_2$ tense.
3.3. Yesterday Past $P_2$: /kà/

As in the $P_3$ tense, the yesterday past tense uses another of the common Bantu past tense markers /kà/. Like all past perfective positive constructions, the $P_2$ also has its own idiosyncratic tone pattern (whose derivation has been described in detail in section 2.3.3. above). The resulting surface paradigm is the following:

(452) $P_2$ positive perfective:

à kà zà? mbàb "he cut the meat" (yesterday)
à kà gwō? mbàb "he pounded the meat"
à kà lùmtè mbàb "he bit the meat"
à kà lìmò mbàb "he reheated the meat"

The negative counterparts of the $P_2$ perfective are completely regular, always being realized on the regular realis tones on the verb roots, as in the following paradigm:

(453) $P_2$ negative perfective:

à kà tè zá? mbàb wó "he didn’t cut the meat"
à kà tè gwō? mbàb wó "he didn’t pound the meat"
à kà tè lùmtè mbàb wó "he didn’t bite the meat"
à kà tè lìmò mbàb wó "he didn’t reheat the meat"
The $P_2$ non-progressive imperfective constructions undergo the same unusual changes referred to for $P_3$ in the preceding section. The positive paradigm is realized as below:

(454) $P_2$ positive non-progressive imperfective:

à kàà nzâ? mbàb  "he was a meat-cutter"  (yesterday)
à kàà ngwô? mbàb  "he was a meat-pounder"
à kàà ndûmtè mbàb  "he was a meat-biter"
à kàà ndîmtè mbàb  "he was a meat-reheater"

The transfer of the imperfective suffix to the tense marker and the neutralizing changes on the verb root tones are also found in the parallel negative examples given below:

(455) $P_2$ negative non-progressive imperfective:

à kàà tè nzâ? mbàb wó  "he wasn't a meat-cutter"
à kàà tè ngwô? mbàb wó  "he wasn't a meat-pounder"
à kàà tè ndûmtè mbàb wó  "he wasn't a meat-biter"
à kàà tè ndîmtè mbàb wó  "he wasn't a meat-reheater"

The $P_2$ progressive also has three different constructions that have the same identical meaning, as with most realis constructions. The positive progressive constructions with /nè/ share with the $P_3$ tense the unusual
realization of that marker on a H-L falling tone, even though the verbs have their regular realis tones, as in the following paradigm:

(456) \(P_2\) positive progressive imperfective:

à kà nè nzá?à mbàb "he was cutting meat" (yesterday)
à kà nè ngwǒ?ò mbàb "he was pounding meat"
à kà nè ndúmtè mbàb "he was biting meat"
à kà nè ndímtè mbàb "he was reheating meat"

The parallel negative examples also share with the \(P_3\) tense the realization of the unusual L-H rising tone on the NEG marker /tè/, as below:

(457) \(P_2\) negative progressive imperfective:

à kà tè nè nzá?à mbàb wó "he wasn’t cutting meat"
à kà tè nè ngwǒ?ò mbàb wó "he wasn’t pounding meat"
à kà tè nè ndúmtè mbàb wó "he wasn’t biting meat"
à kà tè nè ndímtè mbàb wó "he wasn’t reheating meat"

The \(P_2\) progressive sentences also share the property of being able to switch to the realis progressive marker /ssé¹/, while maintaining the same progressive meaning, as in our positive paradigm below:
(458) P\textsubscript{2} positive progressive imperfective:

à kà ssé nzáʔà mbàb "he was cutting meat" (yesterday)
à kà ssé ngwōʔò mbàb "he was pounding meat"
à kà ssé ndūmtè mbàb "he was biting meat"
à kà ssé ndīmtè mbàb "he was reheating meat"

The unusual occurrence of double downtepped H tones on the verb roots is also found in the parallel negative paradigm shown below:

(459) P\textsubscript{2} negative progressive imperfective:

à kà tè ssé nzáʔà mbàb wò "he wasn’t cutting meat"
à kà tè ssé ngwōʔò mbàb wò "he wasn’t pounding meat"
à kà tè ssé ndūmtè mbàb wò "he wasn’t biting meat"
à kà tè ssé ndīmtè mbàb wò "he wasn’t reheating meat"

Once again, the two progressive markers can be combined in a single progressive construction, this time with the downstep following the /ssēˈ/ marker being realized on the following /nè/ marker instead of on the verb root, as below:

(460) P\textsubscript{2} positive progressive imperfective:

à kà ssé nè nzáʔà mbàb "he was cutting meat" (yesterday)
à kà ssé nè ngwōʔò mbàb "he was pounding meat"
à kà ssé nè ndūmtè mbàb "he was biting meat"
à kà ssé nè ndīmtè mbàb "he was reheating meat"
The parallel negative sentences also are realized with the regular realis tone patterns on the verbs, as below:

(461) \( P_2 \) negative progressive imperfective:

à kà tè ssé nè nzá?à mbàw wó "he wasn't cutting meat"
à kà tè ssé nè ngwō?ò mbàw wó "he wasn't pounding meat"
à kà tè ssé nè ndúmtè mbàw wó "he wasn't biting meat"
à kà tè ssé nè ndímtè mbàw wó "he wasn't reheating meat"

This concludes our examination of the \( P_2 \) tense, which has been remarkably parallel to constructions of the \( P_3 \) tense. We now move on to the \( P_1 \) past tense.
3.4. Today Past \( P_1 \): /nẽ'/

The today past tense is marked by the tonally complex tense marker /nẽ'/ in the perfective aspect. Positive perfective constructions are identical to \( P_0 \) consecutive verb constructions with the tense marker functioning as the first verb. The identical \( P_1 \) constructions include the tone pattern on the /ne/ "auxiliary verb" and the presence of the consecutive marker /N-/ on the second "main" verb. However, careful examination of the parallel \( P_1 \) NEG constructions shows that the /nẽ'/ does not always have the consecutive marker which leads one to say that the /nẽ'/ no longer functions as a verb in a consecutive construction but has now become a frozen marker. The \( P_1 \) positive perfectives (whose \( P_0 \) characteristics are derived in section 2.3.3. above) are realized as below:

\begin{align*}
\text{(462) } P_1 \text{ positive perfective:} & \\
\text{à nẽ nzɑ? mbāb } & \text{"he cut the meat" (earlier today)} \\
\text{à nẽ ngwɔ? mbāb } & \text{"he pounded the meat"} \\
\text{à nẽ ndũmté mbāb } & \text{"he bit the meat"} \\
\text{à nẽ ndîmté mbāb } & \text{"he reheated the meat"}
\end{align*}

While the preceding examples have the \( P_0 \) consecutive tones on the verbs and objects as well as the presence of a homorganic nasal prefix (which could be regarded as the consecutive marker marking the second
of two consecutive verbs), none of these characteristics are found with the parallel negative constructions. Instead the "main verb" is realized on regular realis tones and the nasal (consecutive?) prefix is missing. This shows that, although the P₁ tense marker undoubtedly developed historically from a verb in a P₀ consecutive construction, the former verb has now become frozen in form and taken up a fixed position preceding the NEG marker (where true verbs never occur). The crucial negative paradigm is the following:

(463) P₁ negative perfective:

à né tè zá? mbàb wó "he didn’t cut the meat"
à né tè gwɔ? mbàb wó "he didn’t pound the meat"
à né tè lúmté mbàb wó "he didn’t bite the meat"
à né tè lǐmté mbàb wó "he didn’t reheat the meat"

One of the unusual features of the Ngyemboon verbal system occurs in P₁ non-progressive imperfective constructions, where three separate markers may occur in the position of the tense marker. The first of these markers is the normal (perfective) P₁ marker /né/ which is felt to be slightly questionable (symbolized by the question mark) in the following paradigm. The tones on the verb are now the regular realis tones although they are modified by an additional downstep which follows the tense marker. This results in the double downstepped H tones on underlying L
tone verb roots, as in our examples below:

(464) P₁ positive non-progressive imperfective:

? à nē nzā?à mbɔ̀b "he was meat-cutting" (earlier today)
? à nē ngwɔ̀?ɔ̀ mbɔ̀b "he was meat-pounding"
? à nē ndūmtæ mbɔ̀b "he was meat-biting"
? à nē ndîmtæ mbɔ̀b "he was meat-reheating"

The regular realis tones on the verbs is more easily seen in the parallel NEG paradigm where the downstep from the tense marker is realized on the following NEG marker /tè/. The rising tone on the NEG marker is unusual and is derived in section 2.3.5. above. The resulting paradigm is once again considered by Ngyemboon speakers to be of questionable status, as marked by question marks below:

(465) P₁ negative non-progressive imperfective:

? à nē tè nzā?à mbɔ̀b wò "he wasn’t meat-cutting"
? à nē tè ngwɔ̀?ɔ̀ mbɔ̀b wò "he wasn’t meat-pounding"
? à nē tè ndūmtæ mbɔ̀b wò "he wasn’t meat-biting"
? à nē tè ndîmtæ mbɔ̀b wò "he wasn’t meat-reheating"

Because the preceding two paradigms are of questionable grammaticality for reasons that will only be described later below, there exists a rule which allows the tense marker to be changed to either /kɔ́/ or
/kè/, giving fully grammatical constuctions. The verbs in these constructions are always realized on the regular realis tones, as in the following two paradigms (which have identical meaning):

(466) \( P_1 \) positive non-progressive imperfective:

à kò nzá?à mbàb "he was meat-cutting" (earlier today)
à kò ngwó?ò mbàb "he was meat-pounding"
à kò ndúmtè mbàb "he was meat-biting"
à kò ndímtè mbàb "he was meat-reheating"

(467) \( P_1 \) positive non-progressive imperfective:

à kè nzá?à mbàb "he was meat-cutting" (earlier today)
à kè ngwó?ò mbàb "he was meat-pounding"
à kè ndúmtè mbàb "he was meat-biting"
à kè ndímtè mbàb "he was meat-reheating"

Since the downstep feature of these two alternative \( P_1 \) markers precedes the marker, it is easier to notice that the verb tones are regular for realis mode. In the parallel negative paradigm, the unusual rising tone on the NEG marker is once more present, as below:
(468) P₁ negative non-progressive imperfective:

à kọ tɛ nzá?à mbàb wọ "he wasn’t meat-cutting"
à kọ tɛ ngwó?ò mbàb wọ "he wasn’t meat-pounding"
à kọ tɛ ndúmtɛ mbàb wọ "he wasn’t meat-biting"
à kọ tɛ ndímtɛ mbàb wọ "he wasn’t meat-reheating"

(469) P₁ negative non-progressive imperfective:

à kè tɛ nzá?à mbàb wọ "he wasn’t meat-cutting"
à kè tɛ ngwó?ò mbàb wọ "he wasn’t meat-pounding"
à kè tɛ ndúmtɛ mbàb wọ "he wasn’t meat-biting"
à kè tɛ ndímtɛ mbàb wọ "he wasn’t meat-reheating"

We now come to the P₁ progressive constructions. It appears that the identical segmental shape /ne/ of both the PROG marker and the P₁ tense marker has motivated a restriction against both of these markers occurring in the same construction. The following positive and negative paradigms are therefore ungrammatical in the speech of adults (their ungrammaticality being marked by the "+" in front of each sentence):

(470) P₁ positive progressive imperfective:

+ à nɛ nɛ nzá?à mbàb "he was cutting meat" (earlier today)
+ à nɛ nɛ ngwó?ò mbàb "he was pounding meat"
+ à nɛ nɛ ndúmtɛ mbàb "he was biting meat"
+ à nɛ nɛ ndímtɛ mbàb "he was reheating meat"
(471) $P_1$ negative progressive imperfective:

+ à nè tè nè nzá?à mbè wó "he wasn’t cutting meat"
+ à nè tè nè ngwò?ò mbè wó "he wasn’t pounding meat"
+ à nè tè nè ndúmtè mbè wó "he wasn’t biting meat"
+ à nè tè nè ndímtè mbè wó "he wasn’t reheating meat"

Though the preceding examples are ungrammatical in adult speech, children who have not yet mastered the language will utter such sentences. Adults have no trouble understanding the meaning intended, and will correct the child by substituting a construction with either /kõ/ or /kè/ replacing the $P_1$ /nè'/. For these reasons, we posit such a replicative transformation which is obligatory whenever $P_1$ sentences are progressive, and optional whenever they are non-progressive imperfective. The resulting progressive paradigms have regular realis tones on the verbs, as below:

(472) $P_1$ positive progressive imperfective:

à kõ nè nzá?à mbè "he was cutting meat"(earlier today)
à kõ nè ngwò?ò mbè "he was pounding meat"
à kõ nè ndúmtè mbè "he was biting meat"
à kõ nè ndímtè mbè "he was reheating meat"
(473) P₁ positive progressive imperfective:

à kè nè nzá?à mbàb "he was cutting meat" (earlier today)
à kè nè ngwō?ò mbàb "he was pounding meat"
à kè nè ndúmtè mbàb "he was biting meat"
à kè nè ndímtè mbàb "he was reheating meat"

The negative paradigms which are parallel to the preceding examples also take regular realis tone patterns on the verbs, but they have unusual H-L tone glides on the PROG marker /nè/. The derivation of this special falling tone glide is discussed in detail in section 2.3.4. above. Our two grammatical progressive paradigms are therefore as below:

(474) P₁ negative progressive imperfective:

à kò tè nè nzá?à mbàb wò "he wasn't cutting meat"
à kò tè nè ngwō?ò mbàb wò "he wasn't pounding meat"
à kò tè nè ndúmtè mbàb wò "he wasn't biting meat"
à kò tè nè ndímtè mbàb wò "he wasn't reheating meat"

(475) P₁ negative progressive imperfective:

à kè tè nè nzá?à mbàb wò "he wasn't cutting meat"
à kè tè nè ngwō?ò mbàb wò "he wasn't pounding meat"
à kè tè nè ndúmtè mbàb wò "he wasn't biting meat"
à kè tè nè ndímtè mbàb wò "he wasn't reheating meat"
The P₁ tense marker /nè'/ cannot cooccur with the realis progressive (REPR) marker /ssé'/ just as it could not cooccur with the general PROG marker /nè/. We can however find REPR marker with the alternative P₁ markers /kō/ or /kē/, as in the following paradigms:

(476) P₁ positive progressive imperfective:
à kō ssé nzāʔà mbàb "he was cutting meat" (earlier today)
à kō ssé ngwōʔo mbàb "he was pounding meat"
à kō ssé ndūmtè mbàb "he was biting meat"
à kō ssé ndīmtè mbàb "he was reheating meat"

(477) P₁ positive progressive imperfective:
à kō ssé nè nzāʔà mbàb (same glosses as above)
à kō ssé nè ngwōʔo mbàb
à kō ssé nè ndūmtè mbàb
à kō ssé nè ndīmtè mbàb

(478) P₁ positive progressive imperfective:
à kē ssé nzāʔà mbàb (same glosses as above)
à kē ssé ngwōʔo mbàb
à kē ssé ndūmtè mbàb
à kē ssé ndīmtè mbàb
As can be seen above, the REPR marker can signal progressive meaning on its own or in combination with the regular PROG marker. The NEG parallels also carry the realis tones on the verbs, and are realized just like their positive counterparts with the exception of the addition of the bipartite negative morpheme /tè...wó/, with the /tè/ immediately preceding the REPR marker /ssé'/, as in the paradigms below:

(480) P₁ negative progressive imperfective:

à kò tè ssé nè nzá?à mbàb wó "he wasn’t cutting meat"
(earlier today)
à kò tè ssé ngwò?ò mbàb wó "he wasn’t pounding meat"
à kò tè ssé ndŭmtè mbàb wó "he wasn’t biting meat"
à kò tè ssé ndĭmtè mbàb wó "he wasn’t reheating meat"
(482) $P_1$ negative progressive imperfective:

à kè tè ssé nzàfà mbàb wó  
(same glosses as above)

à kè tè ssé ngwô?ò mbàb wó

à kè tè ssé ndúmtè mbàb wó

à kè tè ssé ndîmtè mbàb wó

(483) $P_1$ negative progressive imperfective:

à kè tè ssé nè nzàfà mbàb wó  
(same glosses as above)

à kè tè ssé nè ngwô?ò mbàb wó

à kè tè ssé nè ndúmtè mbàb wó

à kè tè ssé nè ndîmtè mbàb wó

This concludes our section on the $P_1$ past tense, a tense which results in several different surface structures for identical underlying grammatical and semantic features.
3.5. **Zero** $P_0$ and PRES : /Ø/

The zero tense has five different kinds of constructions instead of just three like the other tenses. Using $P_0$ to indicate the zero perfective and PRES to indicate the various zero imperfective ("present") constructions, the following five possibilities are found in the Ngyemboon zero tense:

(484) **Zero Tense**

realis perfective ($P_0$)

realis non-progressive imperfective (PRES)

realis progressive imperfective (PRES)

irrealis non-progressive imperfective (PRES)

irrealis progressive imperfective (PRES)

The first construction which we will examine is the realis perfective variation of the zero tense ($P_0$). This construction is used to indicate actions which took place in the immediate past but are complete at the present moment. As with other "past" tenses, the tone pattern of $P_0$ is idiosyncratic in its positive realizations yet completely regular in its negative counterparts. The various tonal derivations which result in the tonal neutralization of H and L tone verb roots and their realization on an unusual rising tone are described in detail in section 2.3.3. above. The
resulting positive paradigm is the following:

(485) \( P_0 \) positive realis perfective:

\[
\begin{align*}
\text{à zäh? mbàb} & \quad \text{"he has just cut the meat"} \\
\text{à gwö? mbàb} & \quad \text{"he has just pounded the meat"} \\
\text{à lùmté mbàb} & \quad \text{"he has just bitten the meat"} \\
\text{à lìmté mbàb} & \quad \text{"he has just reheated the meat"}
\end{align*}
\]

While the negative counterparts to the preceding paradigm are all realized on the regular realis tones on the verbs, they are quite unusual in that they utilize their own unique bipartite NEG marker /kà...wó/, as below:

(486) \( P_0 \) negative realis perfective:

\[
\begin{align*}
\text{à kà zäh? mbàb wó} & \quad \text{"he hasn't just cut the meat"} \\
\text{à kà gwö? mbàb wó} & \quad \text{"he hasn't just pounded the meat"} \\
\text{à kà lùmté mbàb wó} & \quad \text{"he hasn't just bitten the meat"} \\
\text{à kà lìmté mbàb wó} & \quad \text{"he hasn't just reheated the meat"}
\end{align*}
\]

The \( P_0 \) negative is also unique in that it alone allows the fronting of the object to a position between tense marker and verb. This fronting of the object leaves the verb immediately preceding the final NEG clitic /wó/ and this clitic reduces to a phrase-final vowel in the case of monosyllabic verb roots and it drops out altogether in the case of disyllabic verb roots.
The constructions are tonally regular except for the introduction of the downstep feature before the L tone of the fronted object (a tonal feature that is no doubt introduced by the same rule that fronts the object), as below:

(487) **P$_0$ negative realis perfective with object fronted:**

à kà mbàb záʔá  "he hasn’t just cut the meat"
à kà mbàb gwōʔó  "he hasn’t just pounded the meat"
à kà mbàb lúmté  "he hasn’t just bitten the meat"
à kà mbàb lǐmté  "he hasn’t just reheated the meat"

We can now turn from the perfective P$_0$ constructions to the imperfective PRES constructions of the zero tense. The first construction we will show is the non-progressive realis present tense. It has the usual habitual meaning of non-progressive constructions and the tones on the verbs are the completely regular tones for realis mode with the imperfective suffix described in section 2.3.2. above. The resulting positive paradigm is the following:

(488) **PRES positive realis non-progressive imperfective:**

à nzáʔà mbàb  "he cuts meat"
à ngwōʔò mbàb  "he pounds meat"
à ndúmté mbàb  "he bites meat"
à ndǐmté mbàb  "he reheats meat"
While the negative counterparts to the preceding positive sentences also have the regular realis tones on the verbs, they also have unusual rising tones on the NEG marker /tè/ (whose derivation is described in section 2.3.5. above), as in the following paradigm:

(489) PRES negative realis non-progressive imperfective:

à tè nzáʔà mbàb wó "he isn’t a meat-cutter"
à tè ngwòʔò mbàb wó "he isn’t a meat-pounder"
à tè ndúmtè mbàb wó "he isn’t a meat-biter"
à tè ndímtè mbàb wó "he isn’t a meat-reheater"

The final realis constructions to be detailed here will be the progressive imperfective variants with the zero tense. As with other realis progressive constructions, there exist three alternative surface realizations to indicate the same realis progressive meaning. We will begin by examining the positive paradigm using just the regular /nè/ progressive marker. This construction has an idiosyncratic tone pattern on the verbs which is derived in section 2.3.3. above. The resulting paradigm is the following:
(490) **PRES positive realis progressive imperfective:**

à nè nzáʔà mbàb "he is in the process of cutting meat"

à nè ngwóʔô mbàb "he is in the process of pounding meat"

à nè ndúmtè mbàb "he is in the process of biting meat"

à nè ndímtè mbàb "he is in the process of reheating meat"

While the preceding positive paradigm saw underlying realis mode verbs realized on irrealis verb tone patterns, the following negative paradigm maintains the regular realis verb tones on the surface. Once again, however, the /tè/ NEG marker is realized on a rising tone, as below:

(491) **PRES negative realis progressive imperfective:**

à tè nè nzáʔà mbàb wó "he isn’t cutting meat"

à tè nè ngwóʔô mbàb wó "he isn’t pounding meat"

à tè nè ndúmtè mbàb wó "he isn’t biting meat"

à tè nè ndímtè mbàb wó "he isn’t reheating meat"

The same kind of progressive meaning can be signalled by substituting the realis progressive (REPR) marker /ssé'/ for the regular progressive marker /nè/. When the REPR marker is used with the present tense, the verbs retain their expected realis tone marking but the downstep of the /ssé'/ marker is shifted to the left and the subject pronoun is given
a H replacive tone, as described in detail in section 2.3.4. above. The resulting positive paradigm is the following:

(492) PRES positive realis progressive imperfective:

á ssé nzá?à mbàb  "he is in the process of cutting meat"
á ssé ngwō?ò mbàb  "he is in the process of pounding meat"
á ssé ndúmtè mbàb  "he is in the process of biting meat"
á ssé ndímtè mbàb  "he is in the process of reheating meat"

As can be seen from the parallel negative examples below, the negative construction also has normal realis tones on the verbs though the downstep of the preceding /ssé'/ marker is also added to it. The subject pronoun remains with its normal L tone and the whole construction is therefore completely regular, as below:

(493) PRES negative realis progressive imperfective:

à tè ssé nzá?à mbàb wó  "he isn’t cutting meat"
à tè ssé ngwō?ò mbàb wó  "he isn’t pounding meat"
à tè ssé ndúmtè mbàb wó  "he isn’t biting meat"
à tè ssé ndímtè mbàb wó  "he isn’t reheating meat"

The final way of signalling progressive meaning with the realis zero tense is by combining progressive markers /nè/ and /ssé'/ into a single construction. When this happens in positive sentences, the same unusual
fronting of the downstep feature of the /ssé'/ marker and the subject tone being replaced by a H tone as occurred in the parallel constructions without /nè/ also take place here. The resulting positive paradigm is the following:

(494) PRES positive realis progressive imperfective:

á ssé nè nzá?à mbàb "he is cutting meat"
á ssé nè ngwó?ò mbàb "he is pounding meat"
á ssé nè ndúmtè mbàb "he is biting meat"
á ssé nè ndímtè mbàb "he is reheating meat"

The parallel negative sentences once again show only the regular tones expected of the morphemes involved in a realis construction, as below:

(495) PRES negative realis progressive imperfective:

à tè ssé nè nzá?à mbàb wó "he isn’t cutting meat"
à tè ssé nè ngwó?ò mbàb wó "he isn’t pounding meat"
à tè ssé nè ndúmtè mbàb wó "he isn’t biting meat"
à tè ssé nè ndímtè mbàb wó "he isn’t reheating meat"

The preceding paradigm concludes our examination of realis verb constructions. We now switch to irrealis constructions where the noticeable differences will be different tone patterns on the verbs (with
downstep both preceding and following the verb root in regular irrealis tone patterns) and the absence of the realis imperfective nasal prefix on the verb in imperfective constructions.

The first irrealis patterns that we will look at are the non-progressive irrealis constructions of the zero tense. This construction is not realized on the regular irrealis tone patterns when it is positive, but has its own unique tonal pattern described in detail in section 2.3.3. above. The resulting surface structure is highly unusual in that underlying H tone verbs are realized on a lower pitch level than underlying L tone verbs, as below:

(496) PRES positive irrealis non-progressive imperfective:
   à zàʔà mbàb "he is cutting the meat"
   à gwòʔò mbàb "he is pounding the meat"
   à lùmtè mbàb "he is biting the meat"
   à lìmtè mbàb "he is reheating the meat"

The irrealis non-progressive negative examples of the present tense are unusual in a different way. While the verb roots are realized on the regular irrealis tone patterns in the negative paradigm, the normal imperfective suffix has been completely eliminated leaving the downstep which follows the verb root to only occur on the following object. Such a suffix deletion rule would normally neutralize such a construction with a
parallel perfective construction, but here it is possible to maintain the contrast in that this takes place in just the environment where the parallel $P_0$ NEG has its own unique negative marker /kà...wɔ/ described further above in this section. The resulting structure is the only one therefore which maintains its imperfective meaning in the absence of the imperfective verb suffix, as the following paradigm shows:

(497) **PRES negative irrealis non-progressive imperfective:**

- à tè zã? mbàb wò "he isn't cutting meat"
- à tè gwɔ? mbàb wò "he isn't pounding meat"
- à tè lûmtè mbàb wò "he isn't biting meat"
- à tè lîmtè mbàb wò "he isn't reheating meat"

The progressive irrealis variant of the present tense has the regular irrealis tone pattern on the verb roots but an unusual LH rising tone on the subject pronoun. The derivation of this rising tone is discussed in section 2.3.4. above. The semantic force of these progressive irrealis constructions is that the speaker believes his proposition to be true but he is not absolutely sure. The positive examples are:
(498) PRES positive irrealis progressive imperfective:

ǎ nè zǎ?à mbàb "he is probably cutting meat"
ǎ nè gwǒ?ò mbàb "he is probably pounding meat"
ǎ nè lǔmtè mbàb "he is probably biting meat"
ǎ nè lîmtè mbàb "he is probably reheating meat"

The parallel irrealis progressive negative sentences do not have the unusual LH rising tone on the subject pronoun, but instead an unusual downstep feature before the progressive /nè/ marker. The derivation of this downstep feature and its relation to the LH rising tone of the positive sentences is discussed in detail in section 2.3.4. above. Our negative paradigm is:

(499) PRES negative irrealis progressive imperfective:

à tè nè zǎ?à mbàb wó "he probably isn't cutting meat"
à tè nè gwǒ?ò mbàb wó "he probably isn't pounding meat"
à tè nè lǔmtè mbàb wó "he probably isn't biting meat"
à tè nè lîmtè mbàb wó "he probably isn't reheating meat"

This concludes our section on the zero tense where both parallel realis and irrealis constructions are found. The following future tenses will all be underlyingly irrealis and all completely regular in their verb tones in that they will be realized on the regular irrealis tone patterns.
3.6. **Today Future F₁ : /gè/**

The first of our future tenses is different from all the other future tenses in that the morpheme /gè/ acts tonally like a marker while the other future morphemes act like verbs in consecutive verb constructions. The crucial difference between a marker and a verb in irrealis constructions is the absence or presence of downstep before the word in question. Since /gè/ is the only future morpheme not to be modified by downstep, it is also the only one which is not grammatically still a verb, as in the following examples:

(500) **F₁ positive perfective:**

à gè zā? mbàb "he will cut the meat" (later today)
à gè gwō? mbàb "he will pound the meat"
à gè lûmté mbàb "he will bite the meat"
à gè lîmtè mbàb "he will reheat the meat"

Just as the positive paradigm above was realized on regular irrealis tone patterns, so too for all verbs in negative future constructions. The parallel F₁ negative constructions are quite unusual however in that they contain a nasal prefix attached to the future marker and a tone perturbation on the preceding NEG marker /tè/ from a L tone to a rising tone. The derivation for these constructions is discussed in detail in
section 2.3.5. above. The resulting surface paradigm is the following:

(501) **F₁ negative perfective:**

à té ngè ză? mbâb wó "he will not cut the meat"
à té ngè gwõ? mbâb wó "he will not pound the meat"
à té ngè lũmté mbâb wó "he will not bite the meat"
à té ngè lũmtè mbâb wó "he will not reheat the meat"

Switching now to the non-progressive imperfective constructions of the F₁ tense, we notice that the tones on the verbs are the regular irrealis tone patterns. Significantly, the realis imperfective nasal prefix on the verb is always absent with future constructions because future constructions are always irrealis in mode. Though the nasal is absent, the constructions still convey the same habitual meaning as their past realis counterparts. The resulting positive paradigm is the following:

(502) **F₁ positive non-progressive imperfective:**

à gè ză?â mbâb "he will be meat-cutting" (later today)
à gè gwõ?ô mbâb "he will be meat-pounding"
à gè lũmté mbâb "he will be meat-biting"
à gè lũmtè mbâb "he will be meat-reheating"
Once again, the parallel negative paradigm finds the unusual rising tone on the NEG marker and the equally unusual nasal prefix on the F₁ marker, as below:

(503) **F₁ negative non-progressive imperfective:**

   à tè ngè zāfà mbàb wò  "he will not be meat-cutting"
   à tè ngè gwōfò mbàb wò  "he will not be meat-pounding"
   à tè ngè lūmtè mbàb wò  "he will not be meat-biting"
   à tè ngè lîmtè mbàb wò  "he will not be meat-reheating"

Moving on to progressive constructions with the F₁ tense, all the tones are completely regular for irrealis constructions, including the L tone on the progressive marker /nè/, as below:

(504) **F₁ positive progressive imperfective:**

   à gè nè zāfà mbàb  "he will be cutting meat" (later today)
   à gè nè gwōfò mbàb  "he will be pounding meat"
   à gè nè lūmtè mbàb  "he will be biting meat"
   à gè nè lîmtè mbàb  "he will be reheating meat"

Once again, the parallel negative paradigm contains the unusual rising tone on the NEG marker /tè/ and the unusual nasal prefix before the F₁ tense marker /gè/, as below:
(505) $F_1$ negative progressive imperfective:

à tě ngè nè zǎʔà mbàb wó  "he will not be cutting meat"

à tě ngè nè gwɔʔɔ mbàb wó  "he will not be pounding meat"

à tě ngè nè lǔmće mbàb wó  "he will not be biting meat"

à tě ngè nè lîmtće mbàb wó  "he will not be reheating meat"
3.7. Tomorrow Future $F_2$ : /tó/ or /gyò/

The rest of the future constructions all use verbs in consecutive verb constructions. The nature of the consecutive verb constructions in Bamileke languages was first detailed by Hyman who showed that consecutive verbs differ from serial verbs in that they are separated by a consecutive verb marker which is the homorganic nasal prefix in most Bamileke languages (1971:30). A true consecutive verb construction in Ngyembçoön not only contains two adjacent verbs (the first verb almost always being a verb of motion) and the intervening homorganic nasal consonant prefix, it is also marked by multiple downstep features, one preceding, one separating and one following the pair of verbs, as in the following typical examples:

(506) $F_1$ positive perfective with two consecutive verbs:

à gè cwón zǎ? mbàb  "he will come down and cut the meat"

à gè cwón gwɔ? mbàb  "he will come down and pound the meat"

à gè pyù zǎ? mbàb  "he will go up and cut the meat"

à gè pyù gwɔ? mbàb  "he will go up and pound the meat"

In the preceding examples, the two (underlined) motion verbs which are the first verbs in our consecutive verb construction are /cwón/ "to come down" and /pyù/ "to go up." These two H and L tone verbs were
preceded by downstep when placed at the beginning of consecutive verb constructions. The F₂ tense also has a H and a L tone verb which can indicate future time when placed in such a construction. We will refer to such verbs as "auxiliary verbs" because though they still function grammatically as verbs, they have lost their original verbal meaning and, in consecutive constructions like the following, they only signal future time. Our first two positive paradigms are as follows:

(507) F₂ positive perfective:

à tō zā? mbāb "he will cut the meat" (tomorrow)
à tō gwō? mbāb "he will pound the meat"
à tō lūmté mbāb "he will bite the meat"

(508) F₂ positive perfective:

à gyō zā? mbāb "he will cut the meat" (tomorrow)
à gyō gwō? mbāb "he will pound the meat"
à gyō lūmté mbāb "he will bite the meat"
à gyō līmté mbāb "he will reheat the meat"

Close comparison of the preceding two paradigms with the one preceding them will show the reader that the F₂ tense is marked by either of the auxiliary verbs /tō/ or /gyō/ in a consecutive verb construction. The negative paradigms parallel to the preceding are as below:
(509) \( F_2 \) negative perfective:

à tè tó zã? mbàb wó  "he will not cut the meat"
à tè tó gwɔ? mbàb wó  "he will not pound the meat"
à tè tó lǔmté mbàb wó  "he will not bite the meat"
à tè tó lîmtè mbàb wó  "he will not reheat the meat"

(510) \( F_2 \) negative perfective:

à tè gyò zã? mbàb wó  "he will not cut the meat"
à tè gyò gwɔ? mbàb wó  "he will not pound the meat"
à tè gyò lǔmté mbàb wó  "he will not bite the meat"
à tè gyò lîmtè mbàb wó  "he will not reheat the meat"

The \( F_2 \) tense can also use either /tó/ or /gyò/ with the imperfective
verb suffix to form non-progressive imperfective constructions, as with
the pair of positive paradigms below:

(511) \( F_2 \) positive non-progressive imperfective:

à tó zã?fà mbàb  "he will be a meat-cutter" (tomorrow)
à tó gwɔ?fà mbàb  "he will be a meat-pounder"
à tó lǔmtè mbàb  "he will be a meat-biter"
à tó lîmtè mbàb  "he will be a meat-reheater"
(512) \( F_2 \) positive non-progressive imperfective:

à gyò zã?à mbàb "he will be a meat-cutter" (tomorrow)
à gyò gwõ?õ mbàb "he will be a meat-pounder"
à gyò lũmtè mbàb "he will be a meat-biter"
à gyò lîmtè mbàb "he will be a meat-reheater"

The negative paradigms are as regular as their positive counterparts, as shown by the two below:

(513) \( F_2 \) negative non-progressive imperfective:

à tè tõ zã?ã mbàb wó "he will not be meat-cutting"
à tè tõ gwõ?õ mbàb wó "he will not be meat-pounding"
à tè tõ lũmtè mbàb wó "he will not be meat-biting"
à tè tõ lîmtè mbàb wó "he will not be meat-reheating"

(514) \( F_2 \) negative non-progressive imperfective:

à tè gyò zã?ã mbàb wó "he will not be meat-cutting"
à tè gyò gwõ?õ mbàb wó "he will not be meat-pounding"
à tè gyò lũmtè mbàb wó "he will not be meat-biting"
à tè gyò lîmtè mbàb wó "he will not be meat-reheating"

Moving on to the progressive constructions, two separate paradigms are also possible with the same \( F_2 \) meaning, as in the following examples:
(515) F_2 positive progressive imperfective:

à tō nē zāʔā mbāb  "he will be cutting meat" (tomorrow)

à tō nē gwōʔō mbāb  "he will be pounding meat"

à tō nē lūmtē mbāb  "he will be biting meat"

à tō nē lūmtē mbāb  "he will be reheating meat"

(516) F_2 positive progressive imperfective:

à gyō nē zāʔā mbāb  "he will be cutting meat" (tomorrow)

à gyō nē gwōʔō mbāb  "he will be pounding meat"

à gyō nē lūmtē mbāb  "he will be biting meat"

à gyō nē lūmtē mbāb  "he will be reheating meat"

The parallel F_2 negative progressive constructions also have the option of either /tō/ or /gyō/ to indicate tomorrow future time, as in the two following positive paradigms:

(517) F_2 negative progressive imperfective:

à tē tō nē zāʔā mbāb wō  "he will not be cutting meat"

à tē tō nē gwōʔō mbāb wō  "he will not be pounding meat"

à tē tō nē lūmtē mbāb wō  "he will not be biting meat"

à tē tō nē lūmtē mbāb wō  "he will not be reheating meat"
(518) $F_2$ negative progressive imperfective:

à tè gyô nè zã?à mbàb wó "he will not be cutting meat"
à tè gyô nè gwô?ô mbàb wó "he will not be pounding meat"
à tè gyô nè lũmtè mbàb wó "he will not be biting meat"
à tè gyô nè lîmtè mbàb wó "he will not be reheating meat"

This ends our section on the tomorrow future tense and the two parallel constructions that may alternatively be employed throughout that tense.
3.8. Distant Future $F_3$ : /lù/

The distant future is marked in Ngyemboon by the auxiliary verb /lù/ in a consecutive verb construction. Its tonal properties are always completely regular for irrealis constructions and we shall therefore present the parallel positive and negative paradigms as pairs, as with our perfective examples below:

(519) **$F_3$ positive perfective:**

à lù zá? mbàb  "he will cut the meat" (some time from now)
à lù gwô? mbàb  "he will pound the meat"
à lù lûmté mbàb  "he will bite the meat"
à lù lîmtè mbàb  "he will reheat the meat"

(520) **$F_3$ negative perfective:**

à tè lù zá? mbàb wó  "he will not cut the meat"
à tè lù gwô? mbàb wó  "he will not pound the meat"
à tè lù lûmté mbàb wó  "he will not bite the meat"
à tè lù lîmtè mbàb wó  "he will not reheat the meat"

Moving on to the non-progressive imperfective constructions, the $F_3$ tense is completely regular for examples with irrealis mode, as below:
(521) **F₃ positive non-progressive imperfective:**

- à lù zǎ̀là mbàb "he will be a meat-cutter"
- à lù gwɔ̀o mbàb "he will be a meat-pounder"
- à lù lũmtè mbàb "he will be a meat-biter"
- à lù lõmtè mbàb "he will be a meat-reheater"

(522) **F₃ negative non-progressive imperfective:**

- à tè lù zǎ̀là mbàb wò "he will not be meat-cutting"
- à tè lù gwɔ̀o mbàb wò "he will not be meat-pounding"
- à tè lù lũmtè mbàb wò "he will not be meat-biting"
- à tè lù lõmtè mbàb wò "he will not be meat-reheating"

We now move on to the parallel progressive constructions, which allow only the normal progressive marker /nè/ because they are marked for irrealis mode. All the tones are completely regular as shown in the following paradigm pair:

(523) **F₃ positive progressive imperfective:**

- à lù nè zǎ̀là mbàb "he will be cutting meat"
- à lù nè gwɔ̀o mbàb "he will be pounding meat"
- à lù nè lũmtè mbàb "he will be biting meat"
- à lù nè lõmtè mbàb "he will be reheating meat"
(524) **$F_3$ negative progressive imperfective:**

à tè lù nè zǎʔā mbàb wó  "he will not be cutting meat"

à tè lù nè gwɔʔɔ mbàb wó  "he will not be pounding meat"

à tè lù nè lũmtɛ mbàb wó  "he will not be biting meat"

à tè lù nè lũmtɛ mbàb wó  "he will not be reheating meat"

This concludes our section on the distant future tense where the auxiliary verb /lù/ in a consecutive irrealis construction is always realized on regular irrealis tone patterns.
3.9. Remote Future F₄: /láʔ/ or /fó/

The remote future tense can be signalled by two different H tone auxiliary verbs, /láʔ/ and /fó/, in a consecutive verb construction, as in the positive perfective paradigms below:

(525) F₄ positive perfective:
à láʔ záʔ mbàb "he will cut the meat" (a long time from now)
à láʔ gwòʔ mbàb "he will pound the meat"
à láʔ lúmtè mbàb "he will bite the meat"
à láʔ lìmtè mbàb "he will reheat the meat"

(526) F₄ positive perfective:
à fó záʔ mbàb "he will cut the meat" (a long time from now)
à fó gwòʔ mbàb "he will pound the meat"
à fó lúmtè mbàb "he will bite the meat"
à fó lìmtè mbàb "he will reheat the meat"

The parallel negative paradigms are also completely regular for irrealis mode, as below:
(527) \( F_4 \) negative perfective:

\[
\begin{align*}
\text{à tè là? zà? mbàb wó} & \quad \text{"he will not cut the meat"} \\
\text{à tè là? gwò? mbàb wó} & \quad \text{"he will not pound the meat"} \\
\text{à tè là? lúmté mbàb wó} & \quad \text{"he will not bite the meat"} \\
\text{à tè là? lìmtè mbàb wó} & \quad \text{"he will not reheat the meat"}
\end{align*}
\]

(528) \( F_4 \) negative perfective:

\[
\begin{align*}
\text{à tè fò zà? mbàb wó} & \quad \text{"he will not cut the meat"} \\
\text{à tè fò gwò? mbàb wó} & \quad \text{"he will not pound the meat"} \\
\text{à tè fò lúmté mbàb wó} & \quad \text{"he will not bite the meat"} \\
\text{à tè fò lìmtè mbàb wó} & \quad \text{"he will not reheat the meat"}
\end{align*}
\]

Switching to non-progressive imperfective constructions, the \( F_4 \) tense continues to permit both auxiliary verbs as future morphemes in connection with the verb suffix which marks imperfective aspect, as below:

(529) \( F_4 \) positive non-progressive imperfective:

\[
\begin{align*}
\text{à là? zà?à mbàb} & \quad \text{"he will be a meat-cutter"} \\
\text{à là? gwò?ò mbàb} & \quad \text{"he will be a meat-pounder"} \\
\text{à là? lúmtè mbàb} & \quad \text{"he will be a meat-biter"} \\
\text{à là? lìmtè mbàb} & \quad \text{"he will be a meat-reheater"}
\end{align*}
\]
(530) \( F_4 \) positive non-progressive imperfective:

- à fō zāʔā mbāb "he will be a meat-cutter"
- à fō gwōʔō mbāb "he will be a meat-pounder"
- à fō lūmtē mbāb "he will be a meat-biter"
- à fō lūmtē mbāb "he will be a meat-reheater"

The parallel negative paradigms are also tonally regular including the irrealis tones on the verbs, as below:

(531) \( F_4 \) negative non-progressive imperfective:

- à tē lāʔ zāʔā mbāb wó "he will not be meat-cutting"
- à tē lāʔ gwōʔō mbāb wó "he will not be meat-pounding"
- à tē lāʔ lūmtē mbāb wó "he will not be meat-biting"
- à tē lāʔ lūmtē mbāb wó "he will not be meat-reheating"

(532) \( F_4 \) negative non-progressive imperfective:

- à tē fō zāʔā mbāb wó "he will not be meat-cutting"
- à tē fō gwōʔō mbāb wó "he will not be meat-pounding"
- à tē fō lūmtē mbāb wó "he will not be meat-biting"
- à tē fō lūmtē mbāb wó "he will not be meat-reheating"

Our final paradigms will refer to the progressive aspect in combination with the \( F_4 \) tense, as in the two positive paradigms below:
(533) F₄ positive progressive imperfective:

à láʔ nè záʔà mbàb  "he will be cutting meat"
à láʔ nè gwɔʔɔ mbàb  "he will be pounding meat"
à láʔ nè lũmtè mbàb  "he will be biting meat"
à láʔ nè lũmtè mbàb  "he will be reheating meat"

(534) F₄ positive progressive imperfective:

à fõ nè záʔà mbàb  "he will be cutting meat"
à fõ nè gwɔʔɔ mbàb  "he will be pounding meat"
à fõ nè lũmtè mbàb  "he will be biting meat"
à fõ nè lũmtè mbàb  "he will be reheating meat"

The parallel negative paradigms are also tonally regular for irrealis constructions, as below:

(535) F₄ negative progressive imperfective:

à të láʔ nè záʔà mbàb wò  "he will not be cutting meat"
à të láʔ nè gwɔʔɔ mbàb wò  "he will not be pounding meat"
à të láʔ nè lũmtè mbàb wò  "he will not be biting meat"
à të láʔ nè lũmtè mbàb wò  "he will not be reheating meat"

(536) F₄ negative progressive imperfective:

à të fõ nè záʔà mbàb wò  "he will not be cutting meat"
à të fõ nè gwɔʔɔ mbàb wò  "he will not be pounding meat"
à të fõ nè lũmtè mbàb wò  "he will not be biting meat"
à të fõ nè lũmtè mbàb wò  "he will not be reheating meat"
This concludes our sub-section on the $F_4$ tense as well as our entire section on the indicative construction in Ngyemboon main clauses.
4.0. Morpheme Rules

During the course of this dissertation, we have discussed many morphological and morpho-tonological rules as well as the tone rules which were our major focus. In this section, we will formalize the morphological and morpho-tonological rules necessary for all the examples from the Ngyembocn language that have been cited above.

We saw in section 2.3.5. above a summary of the tone rules needed in the Ngyembocn language. In addition to the main body of unordered rules, there exist just one early tone mapping rule and two late downstep rules. Each of the resulting three bodies of tone rules is preceded by various morphological and morpho-tonological rules. We discuss below the three bodies of these morphological and morpho-tonological rules, citing for each rule both a possible formalism and a prose rendition of its effects. The first group of morphological rules are those which precede the tone mapping rule. All the sentences presented in this dissertation are indicative and transitive, with words and phrases ordered as below:

(537) **Sentence Structure:**

SNP (T) (NEG) (RP) (P) V ONP (W)
The preceding formula shows that the sentences in our data are realized beginning with a subject noun phrase (SNP), followed by an optional tense marker (T), an optional negative marker (NEG), an optional realis progressive marker (RP), an optional progressive marker (P), a verb, an object noun phrase (not optional in our data), and an optional sentence-final negative clitic /w5/ (symbolized as "W").

This ordering of subjects before verbs and objects is certainly the case for all the data in this dissertation and most likely the case for all sentences in Ngyemboon. While Ngyemboon can occasionally front an object in front of the verb, almost all the examples in this dissertation follow the overwhelming pattern of verb before object. Therefore, in typological terms, Ngyemboon is most definitely an SVO language, and a fairly rigid SVO language at that. While the optional markers each have various restrictions on their occurrence, it should be remarked that the negative morphemes in this dissertation are always bipartite and discontinuous, with the main marker of negation immediately following the tense marker and the final negative clitic always accompanying it at the end of the sentence. The limited number of subject noun phrases in our data have the following structure:
Subject Noun Phrase Structure:

\[
\begin{align*}
\{ & N \ (ACT \ N) \\
& \{SM \ \\
& Pro \}
\end{align*}
\]

The preceding formula shows that subject noun phrases are realized by either a noun (N) followed by an optional associative concord tone (ACT) and a second noun or by a pronoun, each of these choices occurring before a final subject marker (SM). While noun phrases were not the main focus of this dissertation, we did develop our basic tonal rules on the surface tonal realizations of nouns in isolation and in associative noun phrases (see section 2.2. above). In section 2.4.1. also above, we discussed both the realization of subject pronouns and the nature and behavior of their subject markers which separate them from the following verb phrases. The variety of noun phrase material we examined in the object position was much more limited, as shown below:

Object Noun Phrase Structure:

\[
OM \ N
\]

The preceding formula states that object noun phrases were realized by an object marker (OM) preceding a single noun (N). While this dissertation has limited itself to object noun phrases which only contain a
single noun, it is of course possible to have noun phrases which contain associative constructions or pronouns. Our first morphological rule is the following:

\[ \text{(540) Normal Subject Marker Rule:} \]

\[ \emptyset \rightarrow [\text{SMCT}] \cap [\text{SM}] \cap \{ \{ +T \text{past} \} \times \{ +\text{verb} \} \} \]

This rule states that the subject marker (SM) is realized as a subject marker concord tone (SMCT) in all past and future tense sentences (zero tense being the only tense where [past] and [fut] features are identical). The preceding rule is also triggered for the zero tense, but only for constructions which are marked for irrealis mode with imperfective and non-progressive aspects. Our next rule is the following:

\[ \text{(541) Noun Rule:} \]

\[ N \rightarrow \text{NCP} \text{ NR} \]

This rule states that the noun (N) is realized as a noun class prefix (NCP) followed by a noun root (NR). The following rule spells out the ten noun class prefixes of Ngyemboon (Anderson, 1980a:38), with the
parentheses enclosing those vowels on the segmental tier which are optional at the beginning of a sentence:

(542) **Noun Class Prefix Syllabic Rule**:

<table>
<thead>
<tr>
<th>Rule</th>
<th>Example</th>
<th>Symbol</th>
<th>Prefix</th>
<th>Noun Class</th>
<th>Syllable</th>
<th>Noun Class</th>
<th>Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \emptyset )</td>
<td>/a/N-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/m/-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/(e)/N-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/meN-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/le-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/me-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/(a)/-</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/(e)/-</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/(e)/N-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>/(e)/N-/</td>
<td>+NCP</td>
<td>+NR</td>
<td>+C10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This rule specifies the segmental material found on the syllabic tier for the noun class prefix in each of the ten classes (symbolized by a capital "C" with a number). The tone assigned to each of these prefixes is specified by the following rule:

\[
(543) \textbf{Noun Class Prefix Tone Rule:} \\
\begin{array}{c}
\begin{array}{c}
\text{[+NCP]} \\
+ \quad \$ \quad +
\end{array} \\
\begin{array}{c}
\emptyset \longrightarrow L \\
/ \\
+ \quad \_\_\_ \quad +
\end{array}
\end{array}
\]

This rule says that any syllable on the syllabic tier ($) which is a noun class prefix [+NCP] is given a L tone in the same morpheme on the tonal tier. Since this rule precedes the tonal mapping rule, this rule does not specify the association line which that rule will add between the two tiers. It should be mentioned that the actual noun roots (NR) and the pronouns (Pro) would be spelled out be the lexicon before any of these present rules are allowed to operate. The reader interested in a small 1500-word French-Ngземbombon lexicon is referred to Anderson (1980b). Our next rule is the following:
(544) **Concord Tone Rule:**

\[
\begin{align*}
\emptyset & \rightarrow L & \left( \begin{array}{c}
+NR \\
{+C1} \\
{+C9}
\end{array} \right) & \left[ + \ldots CT \right] \\
& & + + \\
& \rightarrow H & \left[ + \ldots CT \right] \\
& & + + \\
\end{align*}
\]

This rule states that any concord tone marker (...CT) is further specified as a L tone tonal morpheme following noun class roots (NR) from classes 1 and 9, and as a H tone tonal morpheme following noun roots from other classes. Our next rule is the following:

(545) **Object Marker Rule:**

\[
\begin{align*}
\emptyset & \rightarrow H & \left( \begin{array}{c}
+OM
\end{array} \right) & \left( \begin{array}{c}
+NCp \\
{+C2} \\
{+C4} \\
{+C5} \\
{+C6}
\end{array} \right) \\
& & + + + \\
\end{align*}
\]

This rule states that the object marker is additionally specified as a H tone tonal morpheme preceding object prefixes (NCP) from noun classes 2, 4, 5 or 6.

The preceding rules have handled the overall sentence structure and the noun phrase insofar as they are developed in this dissertation. We now move on to the many different elements which relate to the verbal
marking of a sentence. Our first two rules handle all the additional segmental material necessary in negative constructions. The following rule specifies the nature of the sentence-final NEG clitic:

(546) **Negative Clitic Rule:**

\[
\begin{align*}
&\emptyset \longrightarrow + \ \omega \ // \\
&\hspace{1cm} \emptyset \longrightarrow + \ \widetilde{H} \ // \\
&\hspace{1cm} + \ \widetilde{W} \\
&\hspace{1cm} + \ \mathrm{neg} \\
\end{align*}
\]

This rule states that our sentence-final NEG clitic (W) is further specified as /\omega/ on the segmental syllabic tier and a single H tone on the tonal tier. Once again, the units specified on the two tiers are not associated by an association line by this rule as this rule precedes the general tone mapping rule which accomplishes the task. Our next rule is:

(547) **Negative Marker Rule:**

\[
\begin{align*}
&\emptyset \longrightarrow # \ \mathrm{ka} \ # \\
&\hspace{1cm} # \ \mathrm{L} \ # \\
&\hspace{1cm} + \ \mathrm{T} \ \mathrm{past} \ \mathrm{neg} \\
\end{align*}
\]

This rule states that the negative marker (NEG) is additionally specified as a /ka/ in \(P_0\) constructions and as a /te/ in all other constructions, each of these markers also consisting of a single unassociated L tone on the tonal tier.
We will now examine the rules needed to convey the semantic concept of tense. The following rules further specify the syllabic and tonal content of tense markers and auxiliary verbs according to their temporal features. We begin with the most remote past tense and work our way to the most remote future tense. Since the rule for the remote past tense (P₄) marker actually changes one of the grammatical features in order to feed the rule for the distant past tense (P₃) marker, all rules referring to the original P₄ features must precede the marker rule. In addition, the rule which specifies our nasal prefix for imperfective realis constructions must precede the changing of the realis feature from "+" to "-." Our next rule is therefore the following:

(548) **Imperfective Realis Prefix Rule:**

$$\emptyset \rightarrow /N-/ / \left[ +\text{verb} \right] \left[ +\text{real} \right] \left[ -\text{perf} \right]$$

This rule adds a homorganic nasal consonant prefix onto the beginning of the verb stem if that stem is both realis mode and imperfective aspect. It should be noticed that the added material was stated as /N-/ to imply that this prefix is not syllabic, i.e. it cannot associate to any tone, (in contrast to most homorganic nasal consonant prefixes in Ngyembçon). Now that the imperfective realis prefix has been specified, we are free to change the realis feature for those constructions
which end up with irrealis tones instead of realis ones. Our next rule is thus the following:

(549) **Realis —> Irrealis Rule:**

\[
{[+\text{real}] \rightarrow [-\text{real}]} \quad / \quad \begin{cases} 
{[+\text{T}]} & {[+\text{verb}]} \\
{[+\text{past}]} & {[-\text{prog}]} \\
{[+\text{rem}]} & {[-\text{neg}]} \\
{-\text{near}} & {[-\text{near}]} \\
{[+\text{past}]} & {[+\text{prog}]} \\
{-\text{fut}} & {[-\text{neg}]} \\
{[+\text{T}]} & {[+\text{verb}]} \\
\end{cases}
\]

This rule changes the feature \([+\text{real}]\) to \([-\text{real}]\) for three kinds of constructions: \(P_4\) positive perfectives, \(P_4\) positive non-progressive imperfectives (both of the preceding being \([-\text{prog}]\)), and zero positive progressive imperfectives. This rule therefore bleeds the realis polar tone rule and feeds the irrealis polar tone rule.

We are now ready to examine our tense marker rules, the first of which handles the complicated \(P_4\) construction, as below:

(550) **Remote Past Tense Marker Rule:** \((P_4)\)

\[
{-\text{near}} \rightarrow [+\text{near}] \ldots \\
\rightarrow [+\text{T}] \quad / \quad \begin{cases} 
{1a?} & {+\text{T}} \\
{ [+\text{past}]} & {+\text{past}} \\
{[+\text{rem}]} & {[+\text{rem}]} \\
{[+\text{T}]} & {[+\text{T}]} \\
\end{cases} \times [+\text{verb}]
\]
This rule changes the [near] feature from "-" to "+" and adds an additional H tone marker /laʔ/ immediately preceding the verb root whenever the tense marker (T) is marked for P₄ tense. The changing of the feature thereby feeds our next rule which is the following:

(551) **Distant Past Tense Marker Rule**:  (P₃)

\[
\begin{array}{c}
\emptyset \\
\# \text{ la } \# & \begin{cases}
  \begin{array}{c}
    +T \\
    \text{past} \\
    \text{rem} \\
    \text{near}
  \end{array}
\end{cases}
\
\# \text{ L } \#
\end{array}
\]

This rule specifies the P₃ tense marker to consist of /la/ on the segmental syllabic tier and a L tone on the tonal tier. Our next rule is the following:

(552) **Yesterday Past Tense Marker Rule**:  (P₂)

\[
\begin{array}{c}
\emptyset \\
\# \text{ ka } \# & \begin{cases}
  \begin{array}{c}
    +T \\
    \text{past} \\
    -\text{rem} \\
    -\text{near}
  \end{array}
\end{cases}
\
\# \text{ L } \#
\end{array}
\]

This rule specifies the P₂ tense marker to consist of /ka/ on the segmental syllabic tier and a L tone on the tonal tier. Our next rule is the following:
(553) **Today Past Tense Marker Rule:** \( P_1 \)

\[
\begin{array}{c}
\emptyset \\
\rightarrow \\
^# \text{ne} \ # \\
\Rightarrow \\
\text{+T} \\
\text{+past} \\
\text{-rem} \\
\text{+near} \\
\end{array}
\]

This rule specifies the \( P_1 \) tense marker to consist of /ne/ on the segmental syllabic tier and L, H and downstep (D) features on the tonal tier. Since this marker needs the LH rising tone glide to be always present, the association lines from the segmental tier are drawn in by the preceding morphological rule and are not left to the later tone mapping rule, which would wrongly associate only the first tone of this morpheme to the syllabic /ne/. Our next rule is the following:

(554) **Today Future Tense Marker Rule:** \( F_1 \)

\[
\begin{array}{c}
\emptyset \\
\rightarrow \\
^# \text{ge} \ # \\
\Rightarrow \\
\text{+T} \\
\text{+fut} \\
\text{-rem} \\
\text{+near} \\
\end{array}
\]

This rule specifies that the \( F_1 \) tense marker consists of /ge/ on the segmental syllabic tier and a single L tone on the tonal tier, and they are inserted immediately preceding the verb. This is the only future tense marker that does not itself become an auxiliary verb in a consecutive verb construction, as all the following tense markers do. Our next rule is the following:
(555) **Tomorrow Future Tense Marker Rule:** (F₂)

\[
\emptyset \rightarrow \begin{cases} 
[+\text{verb}] \\
\quad \# \text{ to } \# \\
\quad \# \text{ H } \# \\
\end{cases} \quad / \quad \begin{cases} 
\quad +\text{T} \\
\quad +\text{fut} \\
\quad -\text{rem} \\
\quad +\text{near} \\
\end{cases} \quad x \quad _{\phantom{\#}}[+\text{verb}] \\
\quad \begin{cases} 
[+\text{verb}] \\
\quad \# \text{ gyo } \# \\
\quad \# \text{ L } \# \\
\end{cases}
\]

This rule adds either of two auxiliary verbs to signify the action will take place tomorrow. The first of these auxiliary verbs (ordered immediately before the main verb in a consecutive verb construction) consists of /to/ on the segmental syllabic tier and a H tone on the tonal tier, while the second consists of /gyo/ on the syllabic tier and a L tone on the tonal tier. Since both of these markers are labelled "[+ verb]," whichever one is chosen is later given a downstep feature by means of the rule for irrealis mode. Our next rule is similar, as below:

(556) **Distant Future Tense Marker Rule:** (F₃)

\[
\emptyset \rightarrow \begin{cases} 
[+\text{verb}] \\
\quad \# \text{ lu } \# \\
\end{cases} \quad / \quad \begin{cases} 
\quad +\text{T} \\
\quad +\text{fut} \\
\quad +\text{rem} \\
\quad +\text{near} \\
\end{cases} \quad x \quad _{\phantom{\#}}[+\text{verb}] \\
\quad \begin{cases} 
\quad \# \text{ L } \# \\
\quad \# \text{ L } \# \\
\end{cases}
\]

This rule specifies that the time signified by distant tense features is realized by adding immediately preceding the main verb an auxiliary verb
which consists of /lu/ on the segmental syllabic tier and a L tone on the tonal tier. Our next rule is the following:

(557) Remote Future Tense Marker Rule: \((F_4)\)

\[
\begin{array}{c}
\emptyset \\
\left\{ \begin{array}{c}
[+\text{verb}] \\
\# \text{ la?} \# \\
\# \text{ H} \#
\end{array} \right\}/ \left\{ \begin{array}{c}
+T \\
+fut \\
+\text{rem} \\
-\text{near}
\end{array} \right\} \times \_\_\_\_\_\_ [+\text{verb}]
\end{array}
\]

This rule states that the most remote future time reference is indicated by the addition of either of two auxiliary verbs immediately preceding the main verb. The first of these auxiliary verbs consists of /la?/ on the segmental syllabic tier while the second consists of /fo/. Whichever verb is chosen is accompanied by a single H tone on the tonal tier. As with all the other irrealis auxiliary verbs, a downstep feature is added by our late irrealis mode rule. This concludes the additional specification of our different tense features.

The next rules which we will formalize are those dealing with the internal structure of the verb. The first of these rules is the following:
(558) Realis Prefix Rule:

\[
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
+\text{verb} \\
+\text{real}
\end{array}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
+\text{T} \\
+\text{past}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array}
\]

This rule adds a floating polar tone (-\(\alpha T\)) tonal prefix immediately before any realis verb stem. Our next rule is the following:

(559) Imperfective Suffix Rule:

\[
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
+\text{verb} \\
-\text{perf}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
+\text{T} \\
\text{arem}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
+\text{L} \\
+\text{TE}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
\begin{array}{c}
+\text{T} \\
+\text{TE}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array}
\]

This rule specifies that the imperfective verb suffix will be added to the end of a verb stem except for P₂ and P₃ non-progressive imperfective constructions where it is attached to the tense marker [+T]. The suffix consists of a L tone echo vowel (EV) except immediately following the
toneless suffix /-te/ where it consists of a L tone tonal morpheme. Our next rule is the following:

(560) **Realis Progressive Marker Rule:**

```
\[
\begin{array}{c}
\text{\# sse \#} \\
\text{\# H L \#} \\
\text{\# \#} \\
\text{\# H \#}
\end{array}
\]
```

\[\emptyset \rightarrow \left\{ \begin{array}{c}
\text{\# sse \#} \\
\text{\# H L \#} \\
\text{\# \#} \\
\text{\# H \#}
\end{array} \right\} \rightarrow \left\{ \begin{array}{c}
\text{\# sse \#} \\
\text{\# H L \#} \\
\text{\# \#} \\
\text{\# H \#}
\end{array} \right\}
\]

This complex rule states that the realis progressive marker (RP) is further specified as either /sse/ on the segmental syllabic tier with an accompanying H tone followed by a downstep feature (D) on the tonal tier or by a H tone tonal morpheme when the sentence is marked for both past tense and realis mode and the regular progressive marker (P) is present. When the regular progressive marker is absent in such a construction, the only choice for the realis progressive marker is the /sse/ with H tone and downstep features. Since the P₄ tense has been marked [-real] by this
time, it is not affected by the preceding part of the rule. Similarly, zero
tense realis progressive constructions are not affected because they are
[-past]. The $P_4$ and zero realis progressive constructions will be affected
by the last part of the preceding rule which says that they must be
realized by the marker /sse/ on the segmental tier and HD on the tonal tier
if the realis progressive marker is present whether the regular progressive
marker is present or not. The association lines are not specified by this
rule as the later tone mapping rule will rightly associate just the H tone on
the tonal tier to the /sse/ on the syllabic tier. The H tone tonal morpheme
is the focus of a morpho-tonological rule which follows the tone mapping
rule. Our next rule is the following:

(561) **Progressive Marker Rule:**

\[ \begin{array}{c}
0 \\
\# L \# \\
\# le \# \\
\end{array} \quad \begin{array}{c}
/ +P \\
\end{array} \]

This rule states that the normal progressive marker is realized as /ne/
on the segmental syllabic tier along with a corresponding L tone on the
tonal tier. This marker is not limited in distribution with respect to mode,
but may be used to signal progressive aspect in both realis and irrealis
constructions.
We now move on to a group of morpho-tonological rules which add, delete and change both tones and association lines in restricted grammatical environments. Most of these rules are ordered after the general tone mapping rule has operated but before the normal tone rules have had an opportunity to apply. The few morpho-tonological rules which must be ordered after the normal tone rules will only be described at the end of this section.

The first morpho-tonological rules which we shall examine are those which change tones and association lines within the verb according to various temporal, aspectual and modal features. The first of these is the following:

(562) **P₃ Positive Perfective Rule:**

\[
\begin{align*}
# & + V + # \\
\# & -\alpha T + \alpha T + \emptyset # \\
\text{L} &
\end{align*}
\]

This rule adds a single L tone tonal morpheme after the verb stem (V) and associates this new tone back to the last syllable of that stem without disassociating the tone (αT) already associated there. This rule is only triggered when the construction is marked for P₃ tense, perfective aspect (resulting in the polar (-αT) tone prefix) and positive polarity. Our
This rule adds a L tone inside the polar realis tone (-αT) morpheme and associates this new tone to both the immediately preceding syllable ($) and the following verb root (V) without disassociating any tones found there. The rule is only triggered in constructions which are marked for P₂ tense, perfective aspect and positive polarity. Our next rule is the following:

(564) P₁ Positive Perfective Rule:
This rule moves the polar realis tone tonal morpheme (-αT) from immediately preceding the verb stem (V) to immediately following the same stem while leaving in its original position a homorganic nasal consonant prefix (symbolized as a lower-case "n" because it cannot associate with any tone). This rule is only triggered when constructions are marked for P₁ tense, perfective aspect and positive polarity.

We are now ready to move on to detail the non-past morphotonological rules. The first of these is the following:

(565) **Zero Positive Perfective Rule:**

This rule changes the subject marker (SM) concord tone (T) to a L tone and associates this new tone across the phrase boundary (¶) and the intervening polar realis tone tonal morpheme (-αT) to the verb root syllable (V) without disassociating the tone (αT) already found there. This rule is only triggered in constructions which are marked for zero
tense, perfective aspect and positive polarity. Our next rule is the following:

(566) **Zero Positive Irrealis Non-progressive Imperfective**

**Rule:**

\[
\begin{array}{c}
\# & V & + & + & I & \# \\
\# & T & + & \emptyset & + & L & \#
\end{array}
\]

\[
/ \begin{pmatrix} +T \\ -\text{past} \\ -\text{fut} \end{pmatrix} \times \begin{pmatrix} +\text{verb} \\ -\text{real} \\ -\text{perf} \\ -\text{prog} \\ -\text{neg} \end{pmatrix}
\]

This rule adds a L tone tonal morpheme after the verb stem (V) but before the imperfective (I) L tone suffix. The rule is only triggered when constructions are marked for zero tense (neither past nor future), irrealis mode, both imperfective and non-progressive aspects, and positive polarity.

We can now examine those morpho-tonological rules which affect the negative and progressive markers in a verb phrase. Our first rule docks the H tone tonal morpheme which may occur to mark realis progressive constructions, as below:
Realis Progressive H Tone Docking Rule:

This rule associates the H tone tonal morpheme of the realis progressive marker (RP) to the negative marker (N) on its left if such a negative marker is present. Otherwise, the H tone tonal morpheme is associated to the progressive marker (P) on its right. In both cases, the additional association lines do not disassociate any tones already associated with the chosen syllables. Our next rule is the following:

Realis Progressive Revision Rule:
This highly complicated and equally restricted morpho-tonological rule deletes the tone (T) preceding the realis progressive (RP) marker /ssé'/, associates the H tone of that marker to the immediately preceding syllable, deletes the association line between the H tone and the syllable /sse/, inserts or changes an optional floating tone into a L tone, and changes the the final associated L tone into a H tone. This tone rule only operates on constructions which are marked for zero tense, realis mode, imperfective and progressive aspects, positive polarity, and has chosen the /ssé'/ option from the earlier realis progressive morpheme rule. Our next rule is the following:

\[(569) \textbf{F, Negative Revision Rule:}\]

This rule adds a morpheme immediately after the NEG marker /tè/ and immediately before the tense marker /gè/ in all F₁ constructions. The additional morpheme consists of a homorganic nasal consonant prefix
(symbolized as a lower case "n-" because it cannot associate with a tone) on the segmental tier and a H tone on the tonal tier. This additional H tone is always associated back to the immediately preceding NEG marker without disassociating the tone already associated there. Our next rule is the following:

\[(570) \text{Future Tense Subject Marker Revision Rule:}\]

```
+ S # / [ +SM ] [ +verb ] [ +fut ]
+ H # H / [ +SM ] [ +verb ] [ +fut ]
+ L # H   [ +SM ] [ +verb ]
0
```

This rule only applies to H tone subject marker (SM) concord tones in future tense constructions. The rule has two parts, depending upon the nature of the last tone associated to the immediately preceding syllable ($). If the last associated tone of the preceding syllable is a H tone, the H tone tonal morpheme is associated to that syllable on its left without
disassociating the H tone already associated there, and the newly
associated H tone is also moved to the right and inserted inside the verb
root morpheme (V). This rule only makes sense when it is recalled that it
feeds the late irrealis mode rule which will now insert a polar tone
between the two H tones associated with the same syllable ($). If the last
associated tone of the preceding syllable is a L tone, the H tone tonal
morpheme drops out completely, as in the second part of the preceding
rule. Our next rule is the following:

(571) **P₀ Positive Subject Marker Rule:**

![Diagram of P₀ Positive Subject Marker Rule]

This rule adds a L tone tonal morpheme for the subject marker (SM)
in positive P₀ constructions and associates that tone across the
intervening polar realis tone (-αT) to the verb root syllable (V) without
disassociating the verb root tone (αT) already associated there. Our next
rule is the following:
(572) **Zero Tense Realis Non-progressive Imperfective Subject**

**Marker Rule:**

```
+ S +    | + V +
\  | /     \ +T + +\ -αT + +\ αT +
\  | /     \       L
+ T + 0    \ -αT + +\ αT +
```

This rule adds a L tone subject marker immediately preceding the verb (V) and associates this tone back to the immediately preceding syllable ($) without disassociating any tones already associated there. The rule is triggered only by constructions which are marked for zero tense and realis mode with both imperfective and non-progressive aspects. Our next rule is the following:

(573) **Zero Tense Irrealis Non-progressive Imperfective**

**Subject Marker Rule:**

```
+ T + 0    | + V +
\ /       \ +T + +\ -T +
\ /       \ -fut + +\ -perf +
+ 0 + 0    \ -fut + +\ -prog +
```

L
This rule adds a L tone subject marker immediately preceding the verb (V) and associates this tone to the verb root syllable (V) without disassociating any tones already associated there. The rule is triggered only by constructions which are marked for zero tense and irrealis mode with both imperfective and non-progressive aspects. Our next rule is the following:

(574) Zero Tense Irrealis Progressive Imperfective Subject

Marker Rule:

This rule adds a H tone subject marker immediately preceding the verb (V) and associates this tone back to the immediately preceding syllable ($) without disassociating any tones already associated there. The rule is triggered only by constructions which are marked for zero tense and irrealis mode with both imperfective and progressive aspects. Our next rule is the following:
(575) **Object Prefix Desyllabification Rule:**

![Diagram of the object prefix desyllabification rule]

This rule deletes the syllabic status of any noun class prefix (NCP) when it immediately precedes any noun root (NR) which is an object and from either noun class 3, 8, 9 or 10 (all with an optional "c" vowel in the prefix). The association line from the deleted vowel to the L tone is automatically deleted as well as the remaining nasal consonant does not have syllabic status.

We are now ready to formalize those morpho-tonological rules which **must** be ordered after the regular tone rules have operated. There are only five rules which must be so ordered. We state first the late vowel assimilation rule, as below:
(576) **Vowel Assimilation Rule:**

![Diagram of Vowel Assimilation Rule]

This rule is only stated in its most specific form in order to handle the vowel and tone changes presented in this dissertation. It is highly probable that should one make an exhaustive study of vowel assimilation in Ngyembɔn̩, any word initial vowel would assimilate to the vowel quality of the final vowel of the preceding word, probably accompanied by the tone changes shown above.

This rule thus states that whenever the vowel "a" is the noun class prefix (NCP) of an object noun phrase (ONP), it is disassociated from those tones already associated with it, it is moved to the end of the immediately preceding word, it is assimilated to the vowel quality (ə) of the immediately preceding syllable (CɔC) and finally, this new vowel is reassigned to the final associated tone of that same syllable.

Our next morpho-tonological rule replaces the derived tones on specific past imperfective constructions which succeed in neutralizing the normal tonal contrast between H and L tone verb roots while correctly feeding the late downstep adjustment rule, as below:
(577) $P_3/P_2$ Non-progressive Imperfective Rule:

```
#      -αT + αT #

\[
\begin{array}{c}
\text{V} \\
\text{+} \\
\text{ perf} \\
\text{ prog} \\
\text{ fut} \\
\text{past} \\
\end{array}
\times
\begin{array}{c}
\text{ verb} \\
\end{array}
\]
```

This rule changes the polar realis tone (-αT) to a H tone and the verb root tone (αT) to a L tone in $P_2$ or $P_3$ constructions (marked by [αrem] and [αnear] feature combinations) whenever they are also marked for imperfective and non-progressive aspects.

We can now examine our four final morpho-tonological rules, the effect of each being to insert floating tone tonal morphemes where they will correctly trigger the downstep rules (which are the only tone rules to follow these late morpho-tonological rules). The first of these rules is the following:

(578) **Zero Positive Perfective Object Marker Rule:**

```
\[
\begin{array}{c}
\text{V} \\
\text{+} \\
\text{ perf} \\
\text{ neg} \\
\text{ fut} \\
\text{past} \\
\end{array}
\]
\times
\begin{array}{c}
\text{ verb} \\
\text{ OM} \\
\end{array}
\]
```

335
This rule adds or changes the object marker tonal morpheme to a polar tone (-αT) which is opposite the first associated tone (αT) found on its right. The rule is only triggered by constructions which are marked for zero tense, perfective aspect and positive polarity. It always feeds the late downstep rule which follows. Our next rule is the following:

(579) **Zero Irrealis Progressive Imperfective H Tone**

**Insertion and Docking Rule:**

\[
\begin{align*}
&+N+\ #P+ \\
&+L+\ #L+ \\
&\downarrow H
\end{align*}
\]

\[
\begin{align*}
&+S+\ #P+ \\
&+T+\ #L+ \\
&\downarrow H
\end{align*}
\]

This rule adds a H tone tonal morpheme immediately before the progressive marker (P) in constructions marked for zero tense, irreals
mode, and progressive and imperfective aspects. This H tone tonal morpheme does not associate to any syllable when the preceding syllable is a negative marker, but does associate to the immediately preceding syllable when a negative marker is not present, as in the second part of the preceding rule. Our next rule is the following:

\[(580) \textbf{Irrealis Polar Tone Insertion Rule:}\]

\[
\begin{align*}
\# & + V & + & \downarrow & + & \$ & + \\
\# & 0 & + \alpha T & + & 0 & \downarrow & (T) & + & \beta T & + \\
-\alpha T & \downarrow & -\beta T & \downarrow & & & & & 0
\end{align*}
\]

This rule inserts two floating polar tones whose tone quality is determined by the immediately following associated tone. Thus the first polar tone (-\(\alpha T\)) is inserted immediately preceding the verb stem (V) and its tone is opposite to that which is already associated with the stem (\(\alpha T\)). The second polar tone (-\(\beta T\)) is inserted immediately following the verb stem and its tone is opposite to the one (\(\beta T\)) which is associated with the immediately following syllable (\$. If a floating tone tonal morpheme (T) should occur between a polar tone and its following associated tone determiner, it is deleted by this rule. The effect of this rule is to feed the
following downstep rule and thus always have a surface downstep immediately preceding and immediately following the verb stem in any construction which is marked for irrealis mode. Our final morphophonological rule is the following:

(581) P₁ and Realis Progressive Disassociation and

Polarization Rule:

![Diagram]

This rule revises the tones for our realis progressive and P₁ markers by converting the final associated L tone of the marker into a floating polar (-αT) tone and by deleting any floating tones before this newly disassociated tone. This rule applies of course only to those structures where either of these two markers is found.

This concludes our discussion of the morphological and morphophonological rules necessary for the data presented and analyzed in this dissertation.
CHAPTER 5

5.0. Conclusion

In this dissertation, we have examined the morphological, tonological (conditioned by purely phonological criteria), and morpho-tonological (tonal rules conditioned by grammatical criteria) rules. We have formalized each rule necessary for the data presented and have focused on the ordering of rule application as well as the interaction between the different kinds of rules. Notable in this respect was the need to posit a few morpho-tonological rules which actually followed the main body of tone rules. The resulting ordering can be summarized as below:

(582) Rule Ordering

(underlying deep structure subject to grammatical well-formedness conditions - see (68) above)

1. Morpheme spelling rules
2. Tone mapping rule
3. Early morpho-tonological rules
4. Tone rules
5. Late morpho-tonological rules
6. Downstep rules

(surface phonetic output)
The basic focus of this dissertation has been to determine the number and complexity of rules necessary to handle the largest amount of Ngyembcon data possible. We first developed a basic set of tone rules based on disyllabic nouns in isolation and in associative noun phrases. These basic tone rules were formalized according to conventions developed for autosegmental phonology by Goldsmith (1976). An important analytical advantage was gained by adopting the idea of a tonal metathesis rule from Stewart (1981) and Pullyblank (1982). This led in turn to positing a downstep rule which depended on floating (unassociated) tones of polar quality.

Once we had developed a basic core of tonal rules and conventions on the basis of noun phrases, we attempted to expand and revise them as little as possible as we examined a large body of data from the indicative mood. Though refinements and restrictions had to be posited, the main addition resulted from the need to posit several morphological and morpho-tonological rules which added tones or slightly revised the tonal derivation in order to attain the correct surface phonetic realizations. Noteworthy among these additions was that part of the "Well-formedness Condition" posited by Goldsmith and revised by Clements and Ford, was made into a normal left-to-right tone rule in our analysis. Later, in order to derive the numerous downsteps for irrealis verb constructions, we posited a late morpho-tonological rule which inserted polar floating tones.
just in time to trigger our downstep rules at the right place. We also went on to posit subject and object marker tonal morphemes in order to handle the tone changes which occur between subject, verb and object.

The final result of all this was that we posited only seven tone rules in addition to the early tone mapping rule and the late downstep rule, to achieve the desired results. These rules are the following:

(583) **Normal Tonal Rules:**

- **No. 1** : Final Downglide
- **No. 3′** : Metathesis
- **No. 4** : Rise-Formation
- **No. 5′** : Leftward-docking L-tone Morphemes
- **No. 6′** : Rise-Deletion
- **No. 7′** : Rightward-docking H-tone Morphemes
- **No. 8′** : Well-formedness Rule (WFR)

These tone rules were formulated in such a way that they are not rigidly ordered with respect to each other. Instead, we posited a principle of local ordering where any rule is permitted to operate as its structural conditions are met as one proceeds along the tonal tier from left to right.
This general principle of local rule ordering always gave us the desired result in each specific derivation.

The downstep rule we posited lowers the tonal register one notch for each floating polar tone that immediately precedes an associated tone of opposite character. The positing of a floating L tone before an associated H tone has long been regarded by linguists as the underlying explanation for the occurrence of downstepped H tones. The derivation of downstepped L tones, however, is much more problematic due to the extremely small number of languages which exhibit this phenomenon. While Pullyblank (1983:4) has posited that downstepped L tones come only from floating L tones before associated L tones, we have posited that downstepped L tones come from floating H tones before associated L tones. This proposal seems much more in keeping with our noun phrase tone perturbations and has been equally explanatory in our examination of verb phrase phenomena.

As in all languages which have phonological downstep, downsteps in Ngyembçon were found to be both cumulative and perseverative. This refers to the successive lowering of the tonal register within the tonal phrase and to the maintaining of the lowered register until the speaker reaches a pause. The result is that it is quite simple to construct a phrase where the H tone at the end is realized phonetically on a lower pitch than a L tone at the beginning. While this characteristic is not often found, it
seems especially appropriate in languages like N'gembɔɔn where phonological downstep occurs in the absence of phonetic downdrift.

Extending the data from the normal associative noun phrase material usually analyzed in Grassfields Bantu languages to include a large portion of indicative mood constructions has necessitated few changes to our basic tone rules but has necessitated the formation of a number of morpho-tonological rules. Since many of these morpho-tonological rules posit that various grammatical features are realized as tonal morphemes, similar examinations of these phenomena in other related languages could eventually lead to the reconstruction of various grammatical morphemes along with the related historical processes which resulted in today’s rather opaque tonal paradigms.
REFERENCES


APPENDIX A

This appendix gives a list of the final tone rules in their respective groups and then restates each of these rules in its autosegmental formalism. First, the list of our final rules is the following:

(584) Rule Ordering (see (416) above)

(Morpheme Spelling Rules)

Left-to-Right Mapping Rule (universal)

(Early Morpho-tonological Rules)

Rule 1 : Final Downglide

Rule 3’ : Metathesis

Rule 4 : Rise-Formation

Rule 5’ : Leftward-docking L-tone Morphemes

Rule 6’ : Rise-Deletion

Rule 7’ : Rightward-docking H-tone Morphemes

Rule 8’ : Well-formedness Rule (WFR)

(Late Morpho-tonological Rules)

Rule 2’ : Downstep
Now that we have seen the list of the various tone rules and their order of application, we will give each rule in its formal autosegmental format in numerical order, as below:

(585) **Rule 1**: Final Downglide  (see (417) above)

(586) **Rule 2’**: Downstep  (see (428) above)

(587) **Rule 3’**: Metathesis  (see (424) above)
(588) **Rule 4: Rise-Formation** (see (420) above)

\[
\begin{array}{c}
\$ & \$ \\
\# & \text{L} & \text{H} & \# \\
\end{array}
\]

(589) **Rule 5': Leftward-docking L-tone Morphemes** (see (430) above)

\[
\begin{array}{c}
\$ + + \\
\text{T} & \text{L} & + \\
\end{array}
\]

**Condition:** This rule shall not operate if it would associate the floating L tone across a phrase boundary to a syllable already associated with an immediately preceding H tone.

(590) **Rule 6': Rise-Deletion** (see (426) above)

\[
\begin{array}{c}
\$ & \$ \\
\text{L} & (T) & \text{H} & \text{/} & \text{L} \\
\text{Ø} \\
\end{array}
\]
(591) **Rule 7'**: Rightward-docking H-tone Morphemes (see \(423\) above)

Condition: Association line deleted only if boundary between H and T tones is weaker than a phrase boundary (¶).

(592) **Rule 8'**: Well-formedness Rule (WFR) (see \(427\) above)

Condition: When a toneless syllable associates to the first tone on its left, it only disassociates that tone from another syllable if that syllable is already associated to yet another tone.
APPENDIX B

This appendix will further specify the main chart (see 82, 167 and 431 above) which has been used to summarize all the tone changes on the verb root. Before revamping this chart, it is shown again below:

(593) **Revised Realis/Irrealis Tone Distribution**

(see (167) above)

<table>
<thead>
<tr>
<th>Features</th>
<th>P₄</th>
<th>P₃</th>
<th>P₂</th>
<th>P₁</th>
<th>Ø</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>+perf +real</td>
<td>x/R x/R x/R x/R</td>
<td>x/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real -prog</td>
<td>x/R x/x x/x R/R</td>
<td>R/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real +prog</td>
<td>R/R R/R R/R R/R</td>
<td>x/R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+perf -real</td>
<td></td>
<td>I/I I/I I/I I/I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf -real -prog</td>
<td>x/I</td>
<td>I/I I/I I/I I/I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf -real +prog</td>
<td>I/I</td>
<td>I/I I/I I/I I/I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In order to specify the actual surface tones for each H and L tone verb root for each of the symbols in the preceding chart, we will have to divide
the chart into two charts, one for positive constructions and a second for negative. Thus in the following two charts, the symbol preceding the slash mark indicates the surface tone of an underlying H tone verb root while the symbol following the slash mark indicates the surface tone of an underlying L tone verb root. Our first chart refers to positive constructions, as below:

(594) **Surface Verb Root Tones, Positive Constructions**

<table>
<thead>
<tr>
<th>Features</th>
<th>P₄</th>
<th>P₃</th>
<th>P₂</th>
<th>P₁</th>
<th>Ø</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>+perf +real</td>
<td>'H/'L HL/'HL L/L' L' 'H/'L</td>
<td>LH/LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real -prog</td>
<td>'H/'L 'L/'L 'L/'L 'H 'H</td>
<td>H/'H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf +real +prog</td>
<td>H/'H H/'H H/'H H/'H</td>
<td>'H/'L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+perf -real</td>
<td>'H/'L 'H/'L 'H/'L 'H/'L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf -real -prog</td>
<td>'L/L 'H/'L 'H/'L 'H/'L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-perf -real +prog</td>
<td>'H/'L 'H/'L 'H/'L 'H/'L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The preceding chart showed the surface verb tones for all the positive constructions. The following chart shows the surface verb tones for all their respective negative counterparts:

(595) **Surface Verb Root Tones, Negative Constructions**

<table>
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<th>Features</th>
<th>( P_4 )</th>
<th>( P_3 )</th>
<th>( P_2 )</th>
<th>( P_1 )</th>
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<th>( F_1 )</th>
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<td>-perf +real +prog</td>
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