Tone in Saxwe

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4 Word-level phenomena beyond monomorphemic tone patterns

In this chapter, I go beyond the identification of monomorphemic tone patterns and examine futher tonal phenomena, including those which are associated with a variety of strategies used in Saxwe to build the lexicon. This direction of study leads to observations about what may constitute the phonological word (PW) in Saxwe and how word-level prosodic structure plays a significant role in the tone system of Saxwe.

In section 4.1, I look at the right H_ω PW boundary—a prosodic boundary tone that is generated in the presence of certain prosodic structures and which is observed in many word-formation strategies. In section 4.2, I discuss a process of initial vowel elision that occurs between words. Although this process is not word-internal, the discussion of this initial vowel elision is intended as background for later comparisons with word-internal vowel elision. In section 4.3, I look at the floating M- tone on the left side of those nouns which do not have an initial vowel, and I explore the relationship of between this M- tone and the initial vowel on monomorphemic nouns.

The discussion of structurally-driven boundaries in section 4.1 is foundational to the description of complex nouns in the following sections. The complex nouns discussed in section 4.4 are those derived through either compounding or derivational reduplication of a verb. Then in section 4.5, I look at another kind of reduplication other than the derivational reduplication seen in section 4.4.

The chapter ends with a variety of other word-level topics involving interesting tonal phenomena. In section 4.6, I look at the affixation of the first and third singular object suffixes to the verb and describe how tone is dealt with in the ensuing morphophonemic changes. Section 4.7 addresses the tonal treatment of nouns that have been borrowed into Saxwe from English. In section 4.8, I look at the morphemes [lá] and [nǎ], which are enclitics with unusual tonal behavior. In section 4.9, I look at tone as it relates to ideophones. Finally, section 4.10 ends with conclusions regarding the various topics of this chapter.

4.1 Word-level prosodic structures and the H_ω boundary

In Saxwe, there is a H_ω prosodic boundary tone that is found on the right edge of certain structures, such as a noun-noun compound. In this section, I first give some background on prosodic boundaries. I then describe the prosodic structure that must

be present to generate this H_ω boundary and give examples of conditions where the boundary exists and conditions where it does not exist. I demonstrate that phrase-level prosodic structures are not responsible for the H_ω boundary. Rather, this boundary is related to word-level prosodic structures and specifically to recursion at the level of the phonological word which yields a]PW]PW structure.

4.1.1   Background on tonal boundaries

In the literature, there are many examples of how tonal phenomena may be either assigned with relation to prosodic structure or bounded by prosodic structure (section 2.5). A frequent finding is that tonal phenomena can be related to how the phonological phrase (PhP) is constructed. For example, edges of PhPs may be established with reference to the right or left edge of either the head or the maximal projection of a morphosyntactic structure ((Selkirk, 1986), building on Chen (1987)).

While much of the literature has focused on phonological phrases, there is also some discussion of how tonal phenomena may be related to prosody at the level of the PW. An example of this is described by Myers (1995) for Shona. In Shona, the PW can include what he terms a 'full word' together with a string of procliticized 'function words'. Within this domain, various rules may operate: a rule of stress, a rule of epenthesis, and Meeussen's Rule.

Some examples are shown in (203) and (204). The brackets and subscript labeling of PWs are my addition.

(203)   [babá]PW   [vá-babá]PW   [vángu]PW
        father   of-father   my
        father of my father (Myers (1995:85))

(204)   [ívo]PW   [ndí-babá]PW   [vángu]PW
        he   COP-father   my
        he is my father (Myers (1995:85))

Myers states that languages may differ on how they divide closed word classes; some are assigned 'full word' status while others are assigned 'function word' status.

According to Hyman (2008), when there are multiple procliticized elements, there are two possible ways this may be structured in a language. This is shown below, where CG stands for the clitic group.

(205)   Possible structures for Luganda [kù-bà-kàtóndá] 'on the gods' from
            Hyman (2008, p. 339)

a.   PW   b.   CG

PW=   PW=   PW   PW=   PW=   PW
[kù= [bà= [kàtóndá]$_{PW}$]$_{PW}$]$_{PW}$ [kù= bà= kàtóndá]$_{CG}$
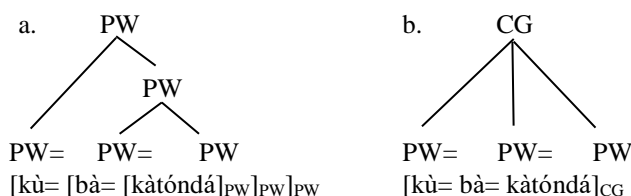
Note that in Hyman's depictions shown in (205), the proclitics are assumed to be bound PWs. In (205)a, there is a nesting of PWs, with the prosodic category of PW being found at multiple levels in the hierarchy.[64] In (205)b, there is a flat structure of PWs within a single CG.

Hyman (2008) also discusses the fact that in a given language, affixes (such as an inflectional prefix or a plural prefix) may be equivalent to cliticized words (such as a preposition), or they may not. Equivalence in this case be judged by whether these affixes are treated in the phonology as being part of certain PWs or not, reflected in the geometry and particularly in the branching patterns of PWs.

In summary, languages may vary as to which smaller units make up the PW and how these smaller units are structured within the PW. Before seeing how this applies to Saxwe, I touch briefly on some data points from Gen and Ewe which will become relevant in the following discussion. These data points deal with noun compounding—a process through which the PW may be composed of smaller units.

In other Gbe languages, H has been documented to be associated with noun compounding. For example, Bole-Richard (1983) notes that in noun compounds in Gen, there is always a raising of pitch at the right edge of the compound (p. 253).

(206)   **Isolation form**   **At right edge of compound**
         all consonants   CV̀   CV̌
         depressors   CV̌   CV́
         non-depressors   CV́   CV́

Ameka (1999; 1991) documents that in Ewe, there is a H tone suffix that co-occurs with a variety of structures, all of which are polymorphemic: certain kinds of complex nominal duplication structures, adjectivals derived by a process of verbal reduplication, adjectivals derived without affixation from verbs that have a CVCV

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[64] Selkirk (1984) proposes that any given level of prosodic hierarchy (*e.g.* PhP or PW) cannot appear recursively in a nested fashion. This is known as the Strict Layer Hypothesis (Selkirk, 1984). However, Selkirk and Lee (2015) include a number of modifications on Selkirk's earlier work, including a recognition of the possibility of recursivity in prosodic structure.

structure, adjectivals derived by compounding a verb and a nominal element, adjectivals derived through the compounding of a certain inverse marker and a verb, and adjectivals derived through the chaining of constituents of a clause—usually with the inclusion of a negative marker.

So we see that in general, there seems to be some connection across several of the Gbe languages between compounding or derivational processes and right edge H tone phenomena.

4.1.2   The right H_ω boundary

In Saxwe, the assignment of the H_ω boundary is related not to structures at the level of the PhP, but rather at the level of the PW. Recursivity in the prosodic structure at the level of the PW is an important notion in the explanation of the H_ω boundary in Saxwe.

There are two categories that are important when considering the structure of PWs and the assignment of the H_ω boundary in Saxwe. These two categories are: (1) PWs, and (2) affixes. The H_ω boundary is generated whenever there is a juxtaposition of two right edge PW boundaries in a nested hierarchical structure. This is shown in (207).

(207)   Prosodic conditions for the generation of the H_ω boundary
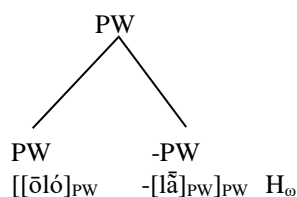
...]PW]PW H_ω

I take first the example of a N-N compound. Compounding serves a variety of semantic functions, including marking a part-whole relationship, a relationship of ownership, and a qualifying relationship. In the process of compounding, the second noun in a N-N compound loses both its initial vowel and the tone associated to this initial vowel.[65] This is seen in (208).

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[65] As discussed in section 4.4, the bisyllabic minimality condition for nouns is satisfied in a structure like a noun-noun compound, so the initial vowel and its TBU is no longer necessary and is deleted along with its tone. This is different from the loss of the initial vowel of a noun in normal to fast speech; in that case, the features of the vowel are elided, but the tone remains. See sections 4.2 and 4.4.

(208)   N-N compounds with a right edge H_ω boundary

a.   /ōló + ōlā̄̃ ᴴᵒ/   [ōló-lā̃́]   crocodile meat
      sxw-L0269-polymorphemic nouns-un
b.   /āḍí + ōfṹ ᴴᵒ/   [āḍí-fṹ]   soap fur (soapsuds)
      sxw-L0051-polymorphemic nouns-un
c.   /ōtō + ōgǎ ᴴᵒ/   [ōtō-gǎ]   village leader
      sxw-L0169-polymorphemic nouns-un

      The initial vowel of the second noun is elided, along with its TBU. We know this initial vowel is deleted because in (208)b [āḍí-fṹ], which is derived from /āḍí/ 'soap' and /ōfṹ/ 'fur', there is no downstep between the first H and the second H. If there was a floating M between the two nouns of the compound, the second H would be downstepped. The compound [ōló-lā̃́] 'crocodile meat' in (208)a comes from /ōló/ 'crocodile' and /ōlā̄̃/ 'meat, animal' and its structure is as follows.

(209)   Structure of [ōló-lā̃́] 'crocodile meat'


```
                        PW
                       /  \
                      /    \
                     /      \
                 PW          -PW
              [[ōló]PW    -[lā̄̃]PW]PW   H_ω
```

      Three phonological phenomena support the idea that these N-N compounds are hierarchically organized under a single PW and that this new PW has a H_ω boundary at its right edge. First, there is the obligatory loss of the initial vowel of the second noun along with its TBU—which would not happen if the bisyllabic minimality condition were not considered to be met in the new word.

      Second, there is the failure of the utterance-final L_% boundary to associate to the final TBU of this PW when the underlying tone is M or L—an operation which would normally result in final fall or downglide of F_0. (There is no final fall or downglide on any of the compounds in (208).)

      Third, there is the failure of the rule B of Contour simplification (121) to be applied in these N-N compounds (section 4.4.2). This operation would normally simplify an underlying LH contour which follows a L or M TBU by delinking the H. We see in (208)c [ōtō-gǎ] 'village leader', derived from /ōtō/ 'village' and /ōgǎ/ 'ruler, leader' that the contour is not simplified in order to avoid a case of OCP violation whereby a floating H delinked because of simplification would be adjacent to the H_ω boundary.

      The failure of the L_% boundary to associate and the failure of the H of the underlying LH contour to dissociate can both be explained by the presence of a H_ω

boundary. Some support of the existence of this H_ω boundary comes from the observation that other Gbe variants have a surface H tone linked to their right edge of compounds (section 4.1.1). In Saxwe, the H_ω boundary does not ever link to a TBU, but operates instead as a floating tone.
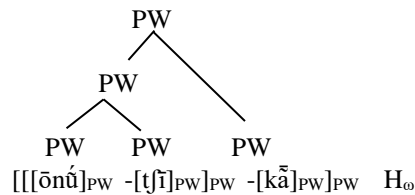
We can now turn to more examples of compounds that have on their right edge a H_ω boundary.

(210) More compounds which have on their right edge a H_ω boundary

N-V-N   a.   /ōnǘ-tʃĭ-kã̄ Hω/   [ōnǘ-tʃĭ-kã́]   thing-sew-cord (thread)
                     sxw-L0020-right H boundary tests-un.wav
              b.   /āwū-tʃĭ-kã̄ Hω/   [āwū-tʃĭ-kã̄°]   shirt-sew-cord (thread)
                     sxw-L0021-right H boundary tests-un.wav
              c.   /āvɔ̀-tʃĭ-kã̄ Hω/   [āvɔ̀-tʃì-kã̀°]   cloth-sew-cord (thread)
                     sxw-L0022-right H boundary tests-un.wav
N-N   d.   /ōwí-sĩ̄ Hω /   [ōwí-sí]   bee-water (honey)
                     sxw-L0173-polymorphemic nouns-un.wav
N-V-V   e.   /ōxó-kã̄-sē Hω /   [ōxó-kã́-sé]   word-search-hear (question)
                     sxw-L0023-right H boundary tests-un.wav

If we look at these complex nouns, we see that none of them have a final falling or downgliding F_0. The pitch level throughout the final syllable is stable—either H, M, or L depending on whether Tonal spread has occurred. The right $L_\%$ boundary has not linked to any of these utterances. In addition (and not coincidentally), they all have a …]$_{PW}$]$_{PW}$ structure on the right edge of the utterance. The example illustrated in (211) is [ōnǘ-tʃĭ-kã́] 'thread', derived from /ōnǘ/ 'thing', /tʃĭ/ 'sew', and /ōkã̄/ 'cord'.

(211)   N-V-N complex nouns


```
                    PW
                  /    \
            PW          \
          /    \          \
      PW      PW       PW
[[[ōnǘ]PW -[tʃĭ]PW]PW -[kã̄]PW]PW    Hω
```

It is not just compounding that generates the right H_ω boundary. This boundary is also seen when complex words are created through verbal reduplication. Reduplication in Saxwe can be used to create either an action nominalization form or an adjectival form. This is shown in (212).
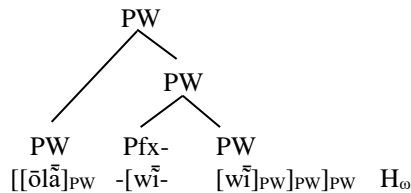
(212) Reduplicated forms which have on their right edge a H_ω boundary

N-redupV-V	a.	/ōsɔ́-wĩ̄-wĩ̄ ᴴᵂ/	[ōsɔ́-wĩ́-wĩ́]	horse REDUP-raise
(action		sxw-L0007-right H boundary tests-un.wav		(horse-raising)
nominalization)	b.	/ōlã̄-wĩ̄-wĩ̄ ᴴᵂ/	[ōlã̄-wĩ̄-wĩ̄°]	animal REDUP-raise
		sxw-L0008-right H boundary tests-un.wav		(animal-raising)
	c.	/ōɦà-wĩ̄-wĩ̄ ᴴᵂ/	[ōɦà-wĩ̀-wĩ̀°]	pig REDUP-raise
		sxw-L0009-right H boundary tests-un.wav		(pig-raising)
N redupV-V	d.	/ōnṹ xī-xɔ̄ ᴴᵂ/	[ōnṹ xí-xɔ́]	thing REDUP-buy
(N + modifier)		sxw-L0004-right H boundary tests-un.wav		(purchased thing)
	e.	/āwū xī-xɔ̄ ᴴᵂ/	[āwū xī-xɔ̄°]	shirt REDUP-buy
		sxw-L0005-right H boundary tests-un.wav		(purchased shirt)
	f.	/āvɔ̀ xī-xɔ̄ ᴴᵂ/	[āvɔ̀ xì-xɔ̀°]	cloth REDUP-buy
		sxw-L0006-right H boundary tests-un.wav		(purchased cloth)

The details of derivation for these reduplicated forms in (212)a-f are discussed in section 4.4.3. Here, I focus on the prosodic structure, stating simply that there is a reduplication prefix that is used to produce both the nominal and adjectival forms derived from verbs.

The depiction in (213) represents the action nominalization from (212)b, [ōlã̄ wĩ̄-wĩ̄°] 'animal-raising/animal husbandry'. Here, the entire structure represents a single PW. The right edge H_ω boundary is reponsible for the final non-falling M tone.

(213)   Verbal reduplication (action nominalization)


```
                    PW
                   /  \
                    PW
                   /  \
      PW        Pfx-    PW
  [[ōlã̄]PW   -[wĩ̄-    [wĩ̄]PW]PW]PW   H_ω
```

If we look at (212)e [āwū xī-xɔ̄°] 'purchased shirt', we see that it is a noun phrase composed of two PWs—one which is the noun head of the noun phrase and one which is a deverbal modifier. For this noun phrase, we have the structure in (214). At the top of the hierarchy is the level of PhP rather than PW. Under the level of PhP are two PWs, one of which is the modifier derived through verbal reduplication.

(214)   Verbal reduplication (deverbal modifier)

```
                    PhP
                   /   \
                 PW     PW
            [āwū]PW    /  \
                   Pfx-    PW
                   [xī-   [xɔ̄]PW]PW   Hω
```
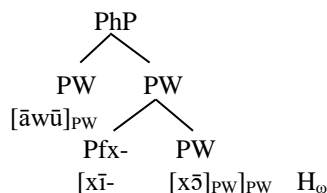
In both cases, we have nested PW brackets on the right edge of the utterance, giving the]PW]PW prosodic structure which generates a Hω boundary. The evidence of this Hω boundary is the non-falling pitch at the end of the utterance, despite the fact that the underlying tone on this TBU is M.

One may wonder whether the Hω boundary is not related to phrase-level prosody rather than word-level prosody. We have looked at examples of structures where the Hω right edge boundary is present. I now turn to examples of noun phrases where there is clearly no Hω boundary. In all of the noun phrases shown in (215), the word on the right edge of the noun phrase is realized with a final falling F_0; the right edge L% boundary has clearly been linked to the final TBU. Not coincidentally, the morpheme on the right edge of the NP is a PW that is not involved in any sort of word-formation process. One indication that this is the case is that the initial vowel is present on all these morphemes.

(215) Noun phrases which do not have a Hω right edge boundary

a.	simple N	/ōxɛ̄/	[ōxɛ̂]	bird
		sxw-L0262-VCV nouns-bird-un.wav		
b.	N AM N	/ɛ̄mɛ̃̄ wé ōtō/	[ɛ̄mɛ̃̄ wé ótô]	person AM village
		sxw-L0008-associative construction-un.wav		(person's village)
c.	N numeral	/ōnɰ́ ōwē/	[ōnɰ́ ówê]	thing two
		sxw-L0012-numbers-un.wav		(two things)
d.	N complex	/āwū kō nṹkɰ́ ōwē/	[āwū kō nṹkɰ́ ówê]	shirt 20 and[66] 2
	numeral	sxw-L0030-right H boundary tests-un.wav		(22 shirts)

If we take the example of (215)c, we can show the prosodic structure involved. Here, the top level shown is the PhP. There are two PWs under this PhP.

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[66] The form [nṹkɰ́] has no clear meaning, but it does appear to be related to such words as [ŋʷɰ̃̄kɰ́sɪ̃́] 'eye' and [ŋʷɰ̃̄kɔ̂] 'area in front/area before'. As such, it seems to indicate a number that is ordered first prior to that which follows. Grammatically, it could be a modifier or a connective.

(216)   Noun phrase composed of noun + numeral

```
              PhP
             /    \
           PW      PW
        [ōnṹ]PW   [ōwē]PW
```
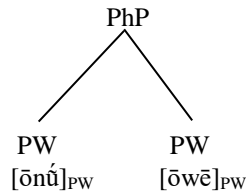
There are word-formation processes that do not generate a right H$_\omega$ boundary. I turn now to examples where the H$_\omega$ right edge boundary is absent because there is a suffix rather than a lexical morpheme at the right edge of the utterance. In (217), we see these examples.

(217)   Words involving affixation which do not have a H$_\omega$ right edge boundary

a.   N-deriv   /ōfṹ-nɔ̃̄/   [ōfṹ-nɔ̂̃]   fur-ATTRIB
     suffix   sxw-L0015-polymorphemic nouns-un.wav   (hairy person)
b.   [N-N]-deriv   /ōwí̄-sí̄-nɔ̃̄/   [ōwí̄-sí̄-nɔ̂̃]   bee-water-ATTRIB
     suffix   sxw-L0001-right H boundary tests-un.wav   (honey salesperson)
c.   [N-V]-deriv   /ōtó-kú-nɔ̃̄/   [ōtó-kú-nɔ̂̃]   ear-die-ATTRIB
     suffix   sxw-L0002-right H boundary tests-un.wav   (deaf person)
d.   N pronoun-   /ōtú jē-tɔ̃̄/   [ōtú jé-tɔ̂̃]   gun 3PL-POSS
     poss suffix   sxw-L0021-possessive pronouns-un.wav   (their gun)
e.   N N-poss   /āwū kōfí-tɔ̃̄/   [āwū kōfí-tɔ̂̃]   shirt Kofi-POSS
     suffix   sxw-L0003-right H boundary tests-un.wav   (Kofi's shirt)

The suffix /-nɔ̃̄/ is an attributive suffix that means roughly 'one characterized by X', where X is the base that it is affixed to. The structure of (217)a [ōfṹ-nɔ̂̃] 'hairy person' is given below.

(218)   N-suffix complex noun

```
                PW
              /    \
           PW      -Sfx
       [[ōfṹ]PW    -nɔ̃̄]
```
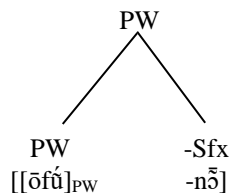
Because affixes are not PWs, there is not a nested]PW]PW structure at the right edge of this larger PW. Thus the conditions for the generation of the H$_\omega$ boundary are not present. The same holds true for (217)b through e, further

examples of complex nouns that have suffixes—either the attributive suffix /-nɔ̄/ or the possessive suffix /-tɔ̄/. In the absence of a right H$_\omega$ boundary, the IP-final left L$_\%$ links to the right TBU of these complex forms.

To summarize thus far, we see that when there are two nested PW boundaries at the right edge of a PW (as a result of compounding processes), a H$_\omega$ right edge boundary is generated. When there is a suffix at the right edge of a PW (as a result of affixation processes), the H$_\omega$ right edge boundary is not generated. It is possible therefore to have the following progression as words are built.

(219)   Progressive word-formation processes and the H$_\omega$ right edge boundary

a.   /ɛ̄sĩ̄/   [ɛ̄sĩ̀]   water   sxw-L0099-VCV nouns-
                                                                         water-un.wav
b.   /ōwí-sĩ̄ ᴴᵂ/   [ōwí-sĩ́]   bee-water   sxw-L0173-polymorphemic
                                              (honey)   nouns-un.wav
c.   /ōwí-sĩ̄ ᴴᵂ -nɔ̄/   [ōwí-sĩ́-nɔ̂]   bee-water-ATTRIB   sxw-L0001-right H
                                              (honey-seller)   boundary tests-un.wav

Once a suffix is added to a compound, the conditions on the rightmost edge of the word are no longer met for the generation of the right H$_\omega$ boundary. We see evidence of the right H$_\omega$ boundary in (219)b (where there is no final falling pitch), but not in (219)c (where there is a final falling pitch). The structure of (219)c is shown below. The conditions for the generation of the H$_\omega$ right edge boundary exist word-medially, but not word-finally. Because the H$_\omega$ boundary only serves to prevent right L$_\%$ association and does not ever link directly to a TBU, its presence is not felt at the surface level if it is generated word-medially.

(220)   N-N-nɔ̄ complex noun

$$[[[ōwí]_{PW} \text{ -}[sĩ̄]_{PW}]_{PW} \text{ H}_\omega \text{ -nɔ̄}]$$
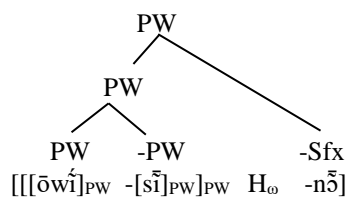
Before finishing with this topic, I point out that there seems to be a connection between the H$_\omega$ boundary and the floating H that is part of the lexically assigned noun tone patterns /M.M ᴴ/ and /M.L ᴴ/.

Compounding in Saxwe is a form which is used for a number of different semantic functions. For example, compounds can be used for a part-whole relationship, a qualifying relationship, a kinship relationship, a relationship of possession, a relationship of association without possession, and a relationship of

spatial orientation. Interestingly, a number of the words in my inventory that are assigned the /M.M ^{H}/ and /M.L ^{H}/ are words that frequently appear in compounds and which, in their most common usages, involve these kinds of semantic relationships with another element.

Recall that the underlying tone patterns that include a floating H are relatively unusual; the /M.M ^{H}/ tone pattern is found in six percent of the nouns in my database and the /M.L ^{H}/ tone pattern is found in four percent of these nouns (section 3.7).

There are two nouns in Saxwe that reference body parts and that, when in a compounding construction, locate entities in space. These nouns are /ōtà ^{H}/ 'head' and /ōnṹ ^{H}/ 'mouth', both of which have a floating H in their lexically-assigned tone pattern. The locative senses derived from these nouns when they follow a noun in a compound structure are /tà ^{H}/ 'at the top of' and /nṹ ^{H}/ 'at the opening to' (note the deletion of the initial vowel). It is interesting that these words whose semantics involve a connection between one element and a larger whole are assigned a tone pattern with a floating H.

The next case to examine is that of color terms. There are three monomorphemic color terms in Saxwe: /wé/ 'white, bright', /wī ^{H}/ 'black, dark', and /vè ^{H}/ 'red'. ^{67} All three color terms have a linked or pre-associated H in their adjectival and nominal forms. (The former two are derived from the verbs /wé/ 'be white, be bright' and /wī/ 'be black, be dark'; the term /vè ^{H}/ 'red' seems to be the only underived color word.) These color terms all have a nominalized V.CV form: /ōwé/ 'that which is white/bright', /ōwī ^{H}/ 'that which is black/dark', and /ōvè ^{H}/ 'that which is red'. When a noun is modified by a color word, the color word immediately follows the noun in a structure that looks very much like a compound.

Another case is kinship terms. When a relationship of kinship is given, one possibility is that the kinship term comes second in what looks like a compounding construction.^{68} The initial vowel of the word denoting the kinship relationship is deleted, along with its TBU. For example, /$^{M-}$ kōfí-nɔ̄ ^{Hω}/, realized [kōfí-nɔ́] 'Kofi's mother', comes from /$^{M-}$ kōfí/ 'Kofi (proper noun)' and /ōnɔ̄ ^{H}/ 'mother'. It is interesting to note that all monomorphemic kinship terms have either a floating or a pre-associated H in their lexically-assigned tone patterns; they are assigned the tone patterns /M.H/, /M.LH/, or /M.M ^{H}/.

A cursory look at some of the other words which have the /M.M ^{H}/ and /M.L ^{H}/ tone patterns shows that a number of them are words that would normally

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^{67} The rest of the color words are noun compounds referencing items such as leaves or egg yolks.

^{68} Another possibility is that the kinship terms is given in an associative construction using the associative morpheme. In the compounding construction, there is often also a toneless suffix ([-ɛ] or [-a]) associated to this form which is incorporated into the final syllable of the compound following a process of resyllabification.

appear in a context where they describe a part of a whole or would receive some sort of qualification in a compounding construction. This would be true of /ōkjɔ̃ ᴴ/ 'root', /āmã̄ ᴴ/ 'leaf', /ākpā ᴴ/ 'bark, peel, shell', and /āɦà ᴴ/ 'side'.

In all of these cases, a lexically-assigned floating H on the V.CV form renders the prosodically assigned H$_\omega$ boundary on complex forms redundant. One wonders if it is because these words so often appear in a context where they are assigned a right H$_\omega$ boundary that their V.CV forms have been reinterpreted as having a floating H as part of their underlying tone patterns.

It must be said that the proposed correlation does not explain the existence of all of the words that are assigned the /M.M ᴴ/ and /M.L ᴴ/ tone patterns.[69] For example /ōkpō ᴴ/ 'stick', /ōɦwè ᴴ/ 'fish', /ɛ̄glɛ̀ ᴴ/ 'species of black snake', and /ōɦjà̃ ᴴ/ 'corn weevil' do not clearly suggest a relationship with another element. Perhaps the safest conclusion that can be drawn is that we observe that some of the words that have a /M.M ᴴ/ or /M.L ᴴ/ tone pattern in today's lexicon are words that often appear together with another element in a relationship that often takes the form of a compound, and there is a possibility that the floating H of their tone patterns is related diachronically to that circumstance.

4.2   Word-initial elision of the initial vowel of a noun

In Saxwe, the initial vowel of a monomorphemic V.C(C)V noun is either /a/, /ɛ,/ or /o/ (section 1.4.6).[70] These initial vowels are presumed to have had a historic role as class marker prefixes, although current Saxwe and other Gbe varieties show little indication of this still being a relevant role (Good, 2012; Williamson, 1989).

Another possibility is that these initial vowels might have had a role as derivational prefixes, deriving a noun from a verb (Lefebvre & Brousseau, 2002, p. 193). This possibility is suggested by pairings where verbs and nouns are clearly semantically related, the difference being the presence of the initial vowel (*e.g.* [kú] 'die' and [ōkú] 'death'). However, addition of a word-initial vowel to a verb in order to derive a noun is not a productive process from a synchronic perspective.

The initial vowel has a predilection for being elided in processes such as noun compounding and in fast speech. Sometimes it is merely the segmental features of the vowel that are lost, and sometimes the loss includes the segmental features together with the tone. In this section, I explore the details of word-initial elision of the initial vowel of a noun. This is done to provide a backdrop for the discussion in section 4.4 of the word-medial elision of the initial vowel that occurs in lexical compounding processes.

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[69] It may be that another means for obtaining these tone patterns diachronically was that some of these nouns were derived from other parts of speech in a way that is no longer transparent. This might explain why there are a number of consonant clusters among these nouns.

[70] The prefix /o/ in Saxwe corresponds to the prefix /e/ in cognate words in neighboring languages such as Gen and Aja.

In normal to fast speech, the initial vowels /o/ and /ɛ/ of an object noun are optionally elided following a verb. Since verbs and most other monomorphemic parts of speech usually have the form C(C)V, this elision is a means of maintaining the preferred C(C)V pattern throughout the utterance.

There are many factors that play into whether an initial vowel is elided. For example, vowel elision is most frequent for common nouns such as [ōnǘ] 'thing', [ēmɛ̃] 'person', [ōxó] 'word, utterance', [ōgbè] 'speech, voice, language'. The tendency to elide the initial vowel of a noun is also more pronounced when these nouns are used in phrasal verbs, where the semantic meaning of the verb phrase is greater than the sum of its parts. Futhermore, an initial vowel is more likely to be elided when the vowel of the verb and the initial vowel of the noun share the same features. The following are examples of initial vowel elision identified from oral texts.

(221)	/sɔ́ ōnǘ/	→	[sɔ́ ↓nǘ]	gather one's things	lit. take thing
			sxw-T0040-texts-un.wav		
	/ḓē ōkɔ̄/	→	[ḓē kɔ̄]	turn head	lit. remove neck
			sxw-T0046-texts-un.wav		
	/ḓū ōgǎ/	→	[ḓū gàᴿ]	become the leader	lit. eat leader
			sxw-T0055-texts-un.wav		
	/kã̄ ēmɛ̃/	→	[kã̄ mɛ̃]	look for someone	lit. look for person
			sxw-T0099-texts-un.wav		
	/jī ōtō mɛ̃/	→	[jī tō mɛ̃]	go to town	lit. go town in
			sxw-T0099-texts-un.wav		
	/ḓū ōnǘ/	→	[ḓū nǘ]	eat	lit. eat thing
			sxw-T0131-texts-un.wav		
	/ɲɛ̃ ōmǐ/	→	[ɲɛ̃ mì̃ᴿ]	defecate	lit. expel feces
			sxw-T0132-texts-un.wav		
	/kplɑ́ ōdǎ/	→	[kplɑ́ dà̃ᴿ]	learn a job	lit. learn work
			sxw-T0150-texts-un.wav		
	/kplɑ́ ōnǘ/	→	[kplɑ́ ↓nǘ]	learn something	lit. learn something
			sxw-T0155-texts-un.wav		
	/nɑ́ ōɦǒ/	→	[nɑ́ ɦò̃ᴿ]	give money	lit. give money
			sxw-T0172-texts-un.wav		
	/xɔ̄ ōnǘ/	→	[xɔ̄ nǘ]	buy something	lit. buy thing
			sxw-T0173-texts-un.wav		
	/sō ōmɔ́/	→	[sō mɔ́]	cross a street	lit. cut [archaic] path
			sxw-T0063-texts-un.wav		

The more infrequent or unusual the noun, the less likely it is that its prefix vowel will be elided in normal speech. A brief examination of several of the texts in my corpus also indicates that a noun that has discourse-level pragmatic focus on it is

also less likely to have its prefix vowel elided. This is a topic that merits further study.

The initial vowel /a/ is not generally subject to being elided.[71] Note the difference for this phrasal verb when /ōmɔ́/ 'path' is changed to the compound /āwɔ̄-mɔ́/ 'asphalt-path'.

(222)   /sō ōmɔ́/   →   [sō mɔ́]   cross a street   lit. cut [archaic]
                                  sxw-T0063-texts-un.wav   path

        /sō āwɔ̄-mɔ́ ᴴω/   →   [sō āwɔ̄-mɔ́]   cross a paved   lit. cut [archaic]
                                  *[sō wɔ̄-mɔ́]   street   asphalt-path
                                  sxw-T0104-texts-un.wav

Word-initially, the tone of an initial vowel of a noun is not deleted when the vowel features are elided.[72] The tone remains present on the autosegmental tier as a floating tone. In the examples below, the tonal realization of these verb phrases is the same whether the vowel features of the initial vowel are elided or not.

(223)   a.   /kplɑ́ ōdǎ/   →   [kplɑ́ ódà̀ᴿ]   'learn a job'
                                  or   (lit. learn work)
        b.   →   [kplɑ́ dà̀ᴿ]

        c.   /kplɑ́ ōnǔ/   →   [kplɑ́ ó↓nǔ]   'learn something'
                                  or   (lit. learn thing)
        d.   →   [kplɑ́ ↓nǔ]

It is the floating M which is responsible for the manner in which the underlying LH contour of /ōdǎ/ 'work' is simplified in (223)b. As shown in the rule of Contour simplification A (120), an underlying contour which follows a H would be simplified by deleting the L of the LH contour. If there were no floating M, the surface realization would be *[kplɑ́ dɑ́].

Again in (223)d, there is a floating M. This floating M between the two surface Hs is what triggers non-automatic downstep of the second H during the phonetic implementation.

The rule of Optional vowel elision can be represented as follows.

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[71] The one case I am aware of where the prefix vowel /a/ is elided is in /ɖī āsā/, a phrasal verb meaning 'go for a stroll', which is pronounced as [ɖī sā].

[72] Word-medially, tone is deleted along with vowel features. This is discussed in section 4.4.

(224)   Optional vowel elision (postlexical)

$$
\begin{array}{l}
\text{T} \quad \rightarrow \quad \text{\textcircled{T}} \quad / \quad \text{V]}_{\text{Verb Noun}}[\underline{\quad} \\
\text{\textbardbl} \\
\mu \\
| \\
\text{V} \\
| \\
\left\{\begin{array}{l} \text{o} \\ \varepsilon \end{array}\right\}
\end{array}
$$

This rule states that at the boundary between a verb and a following noun, the initial vowels /o/ or /ɛ/ of the noun may be optionally elided. The tone, however, remains present when vowel features are elided. This is a postlexical rule, as it operates across word boundaries.

The rule of Optional vowel elision does not have to be ordered in any particular way with respect to the other derivational rules in the Saxwe tone system. Tonal phenomena and alternations are unaffected by the segmental features associated to a vowel. It is simply the presence of the tone—whether associated to the initial vowel or whether floating—which is important.

Against this backdrop of floating tones that result from fast speech elision of the noun-initial vowel, we can turn to an examination of the left M- floating tone that is found on nouns that do not have in their lexical form any initial vowel.

4.3   The left floating M- tone on nouns

The canonical shape of monomorphemic nouns in Saxwe that are not borrowed or ideophonic is V.C(C)V. As mentioned in section 4.2, there is a word-initial vowel (either /a/, /ɛ/ or /o/) which is usually associated to M tone for these canonical monomorphemic nouns. In a few cases, this initial vowel is associated to L tone (section 3.7).

There is a hypothesis that holds that these initial vowels in Gbe historically had a role as class marker prefixes and are now a vestige of that system (Good, 2012; Williamson, 1989). As has been argued for other Kwa languages (Bradshaw, 1999; Lefebvre & Brousseau, 2002), in Saxwe these initial vowels are no longer part of a functioning class system. They are merely the remnants of such a system. However, there is reason to believe that these are not the only vestige of historical class marking systems; there is in addition to these vowels one other vestige of class prefix marking which is purely tonal in nature. This is the topic of this section.

In Saxwe, there are many words which may function as the head of a noun phrase which do not have a V.C(C)V shape in isolation. Examples of this include borrowed nouns, nouns of ideophonic origin, noun compounds, derived nouns, pronouns, and words of other syntactic categories which have been nominalized.

Regardless of whether it has a V.C(C)V shape or not (and whether it begins with an initial vowel or not), any PW that functions as the head of a noun phrase in Saxwe has an initial M- tone preceding it on its left edge. When the noun does not have the initial vowel of the canonical V.C(C)V shape (because it is a compound, a borrowed noun, a derived noun, ideophonic, etc.), there is instead a left floating M-tone on the noun. In an effort to visually distinguish this tone from lexically assigned floating tones (and as a nod to the possibility of it being derived historically from a noun class prefix, a subject discussed further at the end of this section), I use the notation M- to represent this tone which is assigned to the left edge of nouns.

Just as the right edge boundary H$_\omega$ in Saxwe never associates to a TBU (section 4.1.2), so too the left M- floating tone never associates to a TBU. However, it has the same influence that any floating M would have on the surrounding tones within the utterance. Specifically, it triggers non-automatic downstep on a following H, and it influences the manner in which a following underlying LH contour is simplified (see section 3.4 and operations described in (120) and (121)).

In this section, I show evidence for the existence of this M- floating tone on nouns. I then discuss cognates of this tone that have been observed in other Gbe varieties, as well as other possible evidences for the historical development of this tone.

Subject pronouns, which are monosyllabic in Saxwe, have a M- floating tone on their left edge. This is not discernible when the pronoun itself is M (as is the case for /kō/ '1SG', /ō/ '2SG', or /jē ^{H}/ '3PL'). On the other hand, it is discernible for /é/ '3SG' and /mǐ/ '1PL'. In (225) and (226), the left M- floating tone triggers non-automatic downstep between the H of the pronoun and the H of the word which precedes.

(225) /$^{M-}$é   kpɔ́ $^{M-}$mǐ/
       [é   kpɔ́ $^↓$mǐ]
       3SG   see   1PL
       He saw us.   sxw-L0046--pronouns-un.wav

(226) /blɛ́ $^{M-}$é   lē   Ø $^{H\%}$/ ^{73}
       [blɛ́ $^↓$é   lé]
       there   3SG   be.at
       There he is.   sxw-L0021-left boundary tests-un.wav

Borrowed nouns also have this left M- floating tone. In (227), we see non-automatic downstep triggered between the H of the borrowed noun and the H of the preceding verb.

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^{73} The Ø and the H$_\%$ boundary are not relevant to the topic at hand and can be ignored for the moment. They are discussed in section 5.8.

(227) /ᴹ⁻é   kpɔ́   ᴹ⁻tʃîtʃā   lá/
       [é   kpɔ́   ↓tʃîtʃá   ↓lá]
       3SG   see   teacher   DEF
       He saw the teacher.   sxw-L0055-borrowed words-un.wav

     Complex nouns obtained through compounding or derivation have on their left edge a M- floating tone in every case where the complex noun has no initial vowel. For example, for certain complex nouns, the initial vowel is absent by convention. This is the case in (228). Here, despite the fact that the initial vowel is absent by convention, the underlying LH contour in the complex noun 'hunter' is simplified in a manner that happens only when there is a preceding L or M tone—that is, the H of the underlying LH contour is delinked (see the rules of Contour simplification described in (120) and (121)).

(228) /ᴹ⁻é   kpɔ́   ᴹ⁻gbě-ɲā̃-tɔ́/
       [é   kpɔ́   gbè-ɲā̃-tɔ́]
       3SG   see   grass-chase-AGENT
       He saw a hunter.   sxw-L0010-NP boundary tests-un.wav

     Words that are not from the class of nouns but that function as the head of an NP in a given utterance also have this initial M- floating tone assigned to them.

     In the examples below, the demonstrative [xé] has no boundary tone when it is not being nominalized, as can be seen in (229) where there is no non-automatic downstep of H triggered between [ōtú] and the demonstrative. However, it is assigned a M- floating tone when it fills the slot of head of the NP in (230).

(229) /ᴹ⁻jē ᴴ   kpɔ́   ōtú   xé/
       [jē   kpɔ́   ó↓tú   xé]
       3PL   see   gun   DEM
       They saw this gun.   sxw-L0002-NP boundary tests-un.wav

(230) /ᴹ⁻jē ᴴ   kpɔ́   ᴹ⁻xé/
       [jē   kpɔ́   ↓xé]
       3PL   see   DEM
       They saw this [one].   sxw-L0003-NP boundary tests-un.wav

     The possessive adjective in (231) has no left M- floating tone, but this boundary tone is generated when the possessive adjective fills the noun slot in (232).

(231) /ᴹ⁻ é   kpɔ̃́   ājá   é-tɔ̃́/
       [é   kpɔ̃́   á↓já   é-tɔ̂]
       3SG   see   comb   3SG-POSS
       He saw his comb. sxw-L0007-NP boundary tests-un.wav

(232) /ᴹ⁻ é   kpɔ̃́   ᴹ⁻ é-tɔ̃́/
       [é   kpɔ̃́   ↓é-tɔ̂]
       3SG   see   3SG-POSS
       He saw his. sxw-L0006-NP boundary tests-un.wav

Similarly, the numeral in (233) has no left M- floating tone when it functions to modify the noun, but the M- floating tone is present when the numeral becomes the head of the NP in (234).

(233) / ᴹ⁻ jē ᴴ   kpɔ̃́   ōtú   ḍókpó   lá/
       [jē   kpɔ̃́   ó↓tú   ḍókpó   lá]
       3PL   see   gun   one   DEF
       They saw the one gun. sxw-L0020-NP boundary tests-un.wav

(234) / ᴹ⁻ jē ᴴ   kpɔ̃́   ᴹ⁻ ḍókpó   lá/
       [jē   kpɔ̃́   ↓ḍókpó   lá]
       3PL   see   one   DEF
       They saw the one. sxw-L0022-NP boundary tests-un.wav

And again in (235) and (236), the same pattern is seen. Here the adjective created through verbal reduplication in (235) functions as the head of the noun phrase in (236).

(235) / ᴹ⁻ jē ᴴ   kpɔ̃́   ōwí̄   kú-kú   lá   jē ᴴ /
       [jē   kpɔ̃́   ó↓wí̄   kú-kú   lá   jé]
       3PL   see   bee   RED-die   DEF   PL
       They saw the dead bees. sxw-L0025-NP boundary tests-un.wav

(236) /ᴹ⁻ jē ᴴ   kpɔ̃́   ᴹ⁻ kú-kú   lá   jē ᴴ /
       [jē   kpɔ̃́   ↓kú-kú   lá   jé]
       3PL   see   RED-die   DEF   PL
       They saw the dead [ones]. sxw-L0026-NP boundary tests-un.wav

The absence and presence of the M- floating tone is again shown below. In (237), the underlying LH contour on the first vowel of the adjective /zětě/ 'all' is simplified by deleting the L. This is what occurs when there is an immediately preceding H. In (238), the same underlying LH contour is simplified by delinking the H. This is the process that occurs when there is an immediately preceding L or M. The M that is responsible for the contour simplifying in this manner is the M-

floating tone which is present at the left edge of the NP head, which in (238) is filled by the adjective /zĕtɛ́/.

(237) /ᴹ⁻ jē ᴴ   kpɔ̌   ōnŭ   zĕtɛ́   jē ᴴ/
        [jē   kpɔ̌   ó↓nŭ   zétɛ́   jé]
        3PL   see   thing   all   PL
        They saw all of the things. sxw-L0030-NP boundary tests-un.wav

(238) /ᴹ⁻ jē ᴴ   kpɔ̌   ᴹ⁻ zĕtɛ́   jē ᴴ/
        [jē   kpɔ̌   zɛ̀tɛ́   jé]
        3PL   see   all   PL
        They saw all [of them]. sxw-L0032-NP boundary tests-un.wav

      I have stated that the M- tone is found at the left edge of the head of a noun phrase (assuming that the word there does not already have an initial vowel). The M- tone is not found word-internally within compounds. This is demonstrated below and in section 4.4.2 which deals with compounding.

(239) /ᴹ⁻ jē ᴴ   jɔ́   ᴹ⁻ gɔ̀sú-tálí-ɛ́/ ⁷⁴
        [jē   jɔ́   gɔ̀sú-tálí-ɛ́]
        3PL   call   Gosu-paternal.aunt-POSS
        They called Gosu's paternal aunt.   sxw-L0044-NP boundary tests-un

      In (239), the kinship relationship is structured within a single PW looking like a noun-noun compound.⁷⁵ There is no M- tone immediately to the left of /tálí/ 'paternal aunt' because the head of the NP is the entire PW [gɔ̀sú-tálí-ɛ́]. In an alternative structure in (240) involving the associative marker /wé/, a M- floating tone is present at the left edge of /tálí/ 'paternal aunt', because that is the head of a noun phrase in this utterance.

(240) /ōtɔ́   wé   ᴹ⁻ tálí-ɛ́/
        [ōtɔ́   wé   ↓tálí-ɛ́]
        father   AM   paternal.aunt-POSS
        his father's paternal aunt. sxw-L0047-NP boundary tests-un

      Before closing this section, I consider evidence from other Gbe varieties in support of the existence of the M- floating tone described here. In these Gbe varieties, the cognate of the M- floating tone (a non-high tone in all these varieties)

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⁷⁴ I have been told by other speakers that 'paternal aunt' is /táɲí/. My consultant consistently pronounced it as [tálí].

⁷⁵ Internally within compounding constructions, there is obligatory deletion of any noun-initial vowel that is normally part of the lexical form of the second noun.

docks to a TBU and is therefore observed not merely indirectly through its effect on adjacent tones, but at the level of surface implementation.

Ameka (1999) notes that in Ewe, when a verb undergoes nominalization through reduplication processes, the reduplication prefix is assigned the same tone as the verb if it is preceded by a complement. If there is no preceding complement in the nominalized form (*i.e.* the verb is left-most in the nominalized form), a high-tone verb will have a low-tone prefix (p.79, 80). We can say that the reduplicated forms of the verb have either nominal or adjectival roles. These are illustrated below for the Peki dialect from Ansre (1961, p. 39) and Stahlke claims they are the same in the Kpando dialect.

(241) **Underlying form**		**Nominal derivation**		**Adjectival derivation**	
/bú/	to lose	[bùbú]	loss	[búbú]	lost
/bū/	to respect	[bùbù]	respect	[būbūú]	respected
/vó/	to rot	[vòvó]	rottenness	[vóvó]	rotten
/vō/	to be free	[vòvò]	freedom	[vōvōó]	free
/tú/	to shut	[tùtú]	shutting	[tútú]	closed
/tū/	to grind	[tùtù]	grinding	[tūtūú]	ground

Stahlke (1971) explains these and other data by saying that *all* nouns in Ewe have a prefix. Where there is no segmental element to that prefix, the prefix is simply a floating M (which is lowered to L preceding an obstruent).

Specifically in the case of verbal reduplication to create a nominalized form, Stahlke asserts that the reduplication prefix does not have any pre-assigned tone. In cases where the reduplicated form serves as a noun, the floating tone that is the noun prefix (Stahlke employs the term 'prefix' for this tone) becomes linked to the vowel of the reduplication prefix. Otherwise, the tone of the prefix is presumably obtained through spread from the verb root, although this is not explicitly stated by Stahlke.

Unlike Saxwe, Ewe has a number of monomorphemic nouns which in their lexical forms have a C(C)V shape, with no initial vowel present. The following is taken from Stahlke (1971, p. 167) and is claimed to be representative of both the Peki and the Kpando dialects. Here, Stahlke shows examples where a H verb that is followed by a H noun is realized with a falling [HL] contour.

(242)   Ewe data from Stahlke (1971, p. 167)
         kpɔ́ + àtí   see + tree   →   [kpɔ́ àtí]
         kpɔ́ + `tó   see + ear   →   [kpɔ́ɔ̀ tó]

As we can see in (242), the verb /kpɔ́/ 'see' does not have a HL contour when followed by a noun that has an /a-/ prefix (Stahlke also uses the term 'prefix' to speak of initial vowels such as /a/). But when the noun does not have an initial

vowel prefix as with /tó/ 'ear', Stahlke argues that a floating M prefix on this noun (lowered to L by a rule of M prefix lowering) becomes associated leftward to the vowel of the preceding verb. This is the reason then for the HL contour appearing on the verb /kpɔ́/ 'see' when it precedes /tó/ 'ear'.

I turn now to question of how this left floating M- tone came to exist on nouns. If we consider the initial vowels /a/, /ɛ/, and /o/ with their associated tones to be vestiges of a historical noun class prefix system, the left floating M- tone could also be considered to be a vestige of a noun prefix marker—reduced to a floating tone and generalized to be found on any noun not having the more canonical initial vowel. The reduction of noun class systems in some Niger-Congo languages to a minimal number of categories is attested, as is the existence of class prefixes that are tonal in nature with no segmental association (Akumbu & Hyman, 2017; Ernst, 1992; Maho, 1999).

I do not, however, consider this left floating M- tone to be a true prefix at the present time, whether derivational or inflectional. It is not productive by itself in the derivation of nouns; one cannot add this tone to a verb or other part of speech to create a noun (although when the reduplication prefix is affixed to a verb in the derivation of a noun, it also appears). It is not clearly inflectional either; if /a/, /ɛ/, /o/ and this floating tone are considered in a paradigmatic relationship, there are no semantically-driven reasons for these to be considered class markers, nor is there any grammatical agreement that would signal them to be class markers.

While no longer playing a role in a functional class system, the floating M- may function today to satisfy certain phonological templatic requirements for nouns: (1) that all PWs functioning as nouns begin with a TBU associated to a non-high tone, and (2) that this TBU precede the initial consonant within the PW.

Theoretically, nouns that have one of the initial vowels /a/, /ɛ/, or /o/ could also have this left floating M- tone in addition to their initial vowel. This possibility is untestable, as the floating tone would in no context provide additional information relevant to the conditioning of surrounding tonal phenomena. For the purposes of this study, I will not mark it on nouns that have one of the initial vowels /a/, /ɛ/, or /o/. In so doing, I make the assumption that this floating tone is the default in the absence of one of these initial vowels, but that it exists in a paradigmatic relationship with the three vestigial prefixes /a/, /ɛ/, and /o/—all four being vestiges of a historic noun class prefix system.

We now move to the discussion of complex nouns. In this discussion, we observe further evidence for the floating M- tone.

4.4   Complex nouns

4.4.1   Two elision processes seen in complex nouns

When morphemes are combined to create complex nouns, one or both of two different elision processes may enter into play to determine what happens to the initial vowel of a monomorphemic noun which becomes part of the complex form.

First, I look at what happens to the initial vowel of a monomorphemic noun when, after word-formation, it appears on the left edge of a complex noun. In complex nouns, the bisyllabic minimality condition is met without the presence of the initial vowel of the monomorphemic noun. The result is that in their isolation forms, some noun compounds are realized by convention with an initial vowel, while others are realized by convention without this initial vowel. The rule of Word-initial vowel elision is as follows.

(243)   Word-initial vowel elision (optional, lexical)

$$V \quad \rightarrow \quad \emptyset \quad / \ \#[[\_\_\ldots]_{PW}\ldots]_{PW}$$

This rule states that on the left edge of a complex noun, there is optional deletion of a word-initial vowel together with its tone. This rule is lexical because it deals only with word-formation processes and it represents an operation which is limited to the internal boundaries of the PW.

In (244), we see examples of complex nouns that are conventionally pronounced with an initial vowel, while in (245), we see examples of complex nouns that are conventionally pronounced without an initial vowel. There is a fair amount of variation in this regard and some people make an effort to include the initial vowel (assuming they know from the lexeme what it should be) in written form even if they do not pronounce it orally.

(244)   Complex nouns which conventionally have an initial vowel

a.   /āzǐ/ + /āmī̄/ ^{Hω} peanut+oil   [āzì̄-mī̄°]   peanut oil
     sxw-L0075-polymorphemic nouns-un

b.   /ɛ̄kpjɔ̄́/ + /wé/ ^{Hω} cough+white   [ɛ̄kpjɔ̄́-wé]   tuberculosis
     sxw-L0085-polymorphemic nouns-un

c.   /āfɔ̄/ + /kú/ ^{Hω} foot+die   [āfɔ̄-kú]   accident
     sxw-L0054-polymorphemic nouns-un

(245) Complex nouns which conventionally do not have an initial vowel

a. /ōgằ/ + /ōnɨ́/ ᴴᵚ metal+thing [gằ-nɨ̌] metal bowl
sxw-L0099-polymorphemic nouns-un

b. /ōfí/ + /āzɔ̀/ ᴴᵚ ashes+smoke [fí-zɔ̀°] dust
sxw-L0089-polymorphemic nouns-un

c. /āfɔ̄/ + /ākpā ᴴ/ ᴴᵚ foot+shell [fɔ̄-kpā°] shoe
sxw-L0091-polymorphemic nouns-un

d. /ōtí/ + /ōkjɔ̄ ᴴ/ ᴴᵚ tree+root [tí-kjɔ́] tree root
sxw-L0190-polymorphemic nouns-un

    Note that unlike with the postlexical rule of Optional vowel elision which operates at the boundary between a noun and a verb (see section 4.2), in this rule of Word-initial vowel elision there is no distinction made between the prefixes /a-/, /ɛ-/, and /o-/; all are equally likely to be lost in the lexical form of the new word. In addition, the same monomorphemic form may have its initial vowel elided in the conventional pronunciation of one complex form (such as the /a-/ of /āfɔ̄/ in (245)c), but not in another form (as in (244)c).

    When the initial vowel is elided, the alternative left M- floating tone on nouns described in section 4.3 appears by default. This left M- tone triggers non-automatic downstep in (246) and (247).[76]

(246) / ᴹ⁻ jē ᴴ kpɔ́ ᴹ⁻ fí-zɔ̀ ᴴᵚ lē blɛ́/
[jē kpɔ́ ꜜfí-zɔ̀ lè blɛ́/
3PL see ashes-smoke at there
They saw dust there. sxw-L0019-other clauses-un.wav

(247) / ᴹ⁻ jē ᴴ kpɔ́ ᴹ⁻ tí-kjɔ̄ ᴴ ᴴᵚ lá lē blɛ́/
[jē kpɔ́ ꜜtí-kjɔ́ ꜜlá lē ꜜblɛ́/
3PL see tree-root DEF at there
They saw that tree root there. sxw-L0020-other clauses-un.wav

    I turn now to a discussion of the initial vowel of a lexeme that is word-internal. In complex noun formation, the initial vowel of any word-internal noun is obligatorily elided along with its TBU. Bisyllabic minimality constraints provide the motivation for the presence of this initial vowel in monomorphemic nouns. Word-medially in a complex noun, there is no motivation for preserving this initial vowel, and there is motivation to elide it, as this maintains the preferred CV syllable patterns throughout the word. Moreover, the obligatory loss of this initial vowel appears to be a way of indicating that the lexeme is part of a larger PW—assuming

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[76] One could argue that the segmental features of the initial vowel are deleted, but its tone remains behind as a floating tone. Either way, we end up with the same results with regard to surface tone.

that there is recursivity at the level of the PW. The following is the rule of Word-internal vowel elision in Saxwe.

(248)   Word-internal vowel elision (obligatory, lexical)

$$V \rightarrow \emptyset \quad / \; [_{PW}\dots [\underline{\quad} \dots]_{PW}\dots]_{PW}$$

This rule states that the initial vowel of a noun, along with its TBU, is obligatorily elided when the vowel in question is word-internal, together with its tone. This rule is a lexical rule as it refers to an operation that is only relevant during processes of word formation. There is a single exception to this rule: the noun /ɛ̄mɛ̄/ 'person' sometimes appears with its initial vowel in complex nouns. I do not know why this noun is exceptional in this way.

There is a difference between vowel elision that occurs word-initially (where there is evidence of a floating tone to the left of the noun) and this Word-internal vowel elision (where the tone is deleted with its vowel and there is no evidence of a floating tone). This can be seen below.

(249)   a.   /kplá̄ ōdǎ/   →   [kplá̄ dà̌ᴿ]   learn a job
                                                                     (lit. learn work)
         b.   /ōló/ + /ōvǐ/ ᴴᵚ   →   [ōló-ví]   baby crocodile
                                                                     (lit. crocodile child)
         c.   /kplá̄ ōnǔ̄/   →   [kplá̄ ↓nǔ̄]   learn something
                                                                     (lit. learn thing)
         d.   /ādɪ̄/ + /ōfǔ̄/ ᴴᵚ   →   [ādɪ̄-fǔ̄]   soapsuds
                                                                     (lit. soap fur)

In (249)b, we see that an underlying LH contour is simplified in the compound [ōló-ví] by deleting the L (rather than by delinking the H as in (249)a). This is the kind of simplification that is seen when there is an immediately preceding H. We can therefore assume that there is no floating M between the two nouns in this noun-noun compound, while there is between the verb and noun in (249)a.

In (249)d, we see that there is no non-automatic downstep between the two Hs in this noun-noun compound (as there is in (249)c). This is evidence that there is no floating M between these morphemes, while there is such a floating tone between the verb and the noun in (249)c.

The rules of Word-initial and Word-internal vowel elision both apply in the context of noun-noun compounds, which is the topic of the next section.

4.4.2   Noun-noun compounds

The tonal behavior of noun-noun compounds is accounted for using the analytical tools provided thus far: (1) the postlexical operations described in chapter 3 (repeated below), (2) the lexical Word-initial and Word-internal rules of vowel elision discussed in section 4.4.1, and (3) the left M- floating tone and right edge H_ω boundary tones discussed in sections 4.1 and 4.3.

(250)   Postlexical operations that generate surface tone patterns in Saxwe

$L_\%$ association (94)
Nominal floating H deletion (151)
Contour simplification A (159) and B (160)
Partial L spread (106)
Tonal spread (72)

In this section, I show how the surface forms of noun-noun compounds are obtained given the mechanisms and operations described above. To begin with, we see evidence of Word-internal vowel elision in (251). The initial prefix /ō-/, including its TBU, is elided in the formation of the compound. There is no non-automatic downstep between the two Hs, which indicates that there is no floating M between the two Hs.

(251)   /ādí/ + /ōfǔ/ $^{H\omega}$ soap+fur   [ādí-fǔ]   soapsuds
                                            sxw-L0051-polymorphemic nouns-un.wav

This rule of Word-internal vowel elision is a word-formation rule, as is the rule of Word-initial vowel elision. Being word-formation rules, these apply during the lexical component and precede all other operations discussed in this section.

Next, we must account for the fact that there is no final falling or downgliding pitch on the surface realization of any noun-noun compound. This is true of the noun compound in its isolation form and it is also true of the noun compound within a larger utterance when it appears utterance-finally. We can compare (252), where there is an utterance-final surface falling tone, with (253), where there is no utterance-final falling tone.

(252) / $^{M-}$ kōfí   ɖū   ōlã̄/
        [kōfí   ɖú   ólẫ]
        Kofi   eat   meat
        Kofi ate meat. sxw-L0021-other clauses-un.wav

(253) / ^{M-} kōfí   ḍū   ōɲĩ̄-lã̄ ^{Hω}/
        [kōfí   ḍú   óɲĩ́-lã́]
        Kofi   eat   cow-meat
        Kofi ate beef.   sxw-L0021-other clauses-un.wav

        The difference is due to the right H$_\omega$ boundary that is generated on the noun-noun compound. As discussed in section 4.1.2, a right H$_\omega$ boundary is generated whenever there are two adjacent right-edge PW boundaries due to recursivity at the level of the PW—a structure represented as]$_{PW}$]$_{PW}$. Compounding involves this type of recursivity at the level of the PW, and therefore the right H$_\omega$ boundary is generated at the right edge of all noun-noun compounds. The assignment of the right H$_\omega$ boundary is the last operation that happens in the lexical stage prior to the application of postlexical tone rules. The derivations of (252) and (253) are as follows.

(254)   Derivations of / ^{M-} kōfí ḍū ōlã̄/ and / ^{M-} kōfí ḍū ōɲĩ̄+ōlã̄/

/kōfí ḍū ōlã̄/	/kōfí ḍū ōɲĩ̄+ōlã̄/	Lexical forms
--	kōfí ḍū ōɲĩ̄-lã̄	Word-internal vowel elision
--	--	Word-initial vowel elision (opt.)
^{M-} kōfí ḍū ōlã̄	^{M-} kōfí ḍū ōɲĩ̄-lã̄	Left M- floating tone
--	^{M-} kōfí ḍū ōɲĩ̄-lã̄ ^{Hω}	Right H$_\omega$ boundary assignment

TRANSITION FROM LEXICAL STAGE TO POSTLEXICAL STAGE

^{M-} kōfí ḍū ōlã̄	--	L$_\%$ association
--	--	Nominal floating H deletion
--	--	Contour simplification
--	--	Partial L spread
^{M-} kōfí ḍú ólã̂	^{M-} kōfí ḍú óɲĩ́-lã́	Tonal spread
[kōfí ḍú ólã̂]	[kōfí ḍú óɲĩ́-lã́]	Surface

        Here we see that because of the presence of the right H$_\omega$ boundary on the noun compound, the utterance-final L$_\%$ IP boundary is prevented from associating to the final TBU of the compound. Without the association of this L$_\%$ boundary, there is no falling of pitch on the final TBU of the compound.

        Continuing in the discussion of how the postlexical tone operations discussed in chapter 3 apply to noun compounds, I turn to the rules of Contour simplification. The rules of Contour simplification A and B (see (159) and (160)) state that following a H, an underlying LH contour is simplified by deleting the L. Following a M or L, an underlying LH contour is simplified by delinking the H.

        Both rules of Contour simplification can be observed at work in noun-noun compounds. In (255), the initial vowel of the noun /ōvĭ/ 'child' is elided word-

medially, so the LH contour immediately follows the H of /ōsɔ́/. As a result, we see that the underlying LH contour of /ōvǐ/ is simplified by deleting the L.

(255) /ōsɔ́/ + /ōvǐ/ ᴴ°   horse+child   [ōsɔ́-ví]   baby horse

                                  sxw-L0012-polymorphemic nouns-un.wav

In (256) and (257), the underlying LH contours of /ɛ̄dě/ 'palm' and /ōvǐ/ 'child' both follow an initial M vowel and are simplified by delinking the H.

(256) /ɛ̄dě/+ /ōtí̋/ ᴴ°   palm+tree   [ɛ̄dè-tí̋]   palm tree

                                  sxw-L0084-polymorphemic nouns-un.wav

(257) /ōvǐ/ + /ōnɔ̃̄ ᴴ/ ᴴ°   child+mother   [ōvì-nɔ̃̄°]   young mother

                                  sxw-L0172-polymorphemic nouns-un.wav

In both cases, a floating H is created when the H of the underlying LH contour is delinked. In (257), this floating H blocks Tonal spread (the last operation of the postlexical stage), which is why M is realized on the compound-final TBU.

There is, however, one way in which Contour simplification is slightly different for complex nouns than it is for monomorphemic nouns. When a word with a final underlying LH contour appears at the right edge of a complex noun which has a H_ω boundary, the LH contour does not undergo contour simplification if this would mean delinking the H. This is shown in (258) and (259).

(258) /ɛ̄sĩ̄/ + /ōɦǔ/ ᴴ°   water+drum   [ɛ̄sĩ̄-ɦǔ]   water drum

                                (percussion)   sxw-L0087-polymorphemic nouns-un.wav

(259) /āvɔ̀/ + /ōvǐ/ ᴴ°   cloth+child   [āvɔ̀-vǐ]   handkerchief

                                  sxw-L0070-polymorphemic nouns-un.wav

In each of these noun compounds, the underlying LH contour which follows a M or L is not simplified by delinking the H. Rather, the LH contour is realized at the surface level as a [LH] contour, a situation not seen in the monomorphemic data (compare with surface monomorphemic forms [ōɦǔᴿ] and [ōvìᴿ]).

The contour is not simplified in these cases because of the constraint against creating a floating H in an environment where a H_ω boundary already exists. There is an OCP-related sensitivity to adjacent unassociated H tones in Saxwe. Note that there is no corresponding sensitivity to adjacent unassociated M tones; tonal spread creates floating M tones adjacent to the M- floating tone on nouns. For L tone, the question of sensitivity to adjacent unassociated tones never arises because

L tones are never delinked from a TBU in Saxwe phonology; they are only ever deleted.

Continuing with the way postlexical tone operations are seen applied to noun compounds, we can also see that the rule of Partial L spread applies within noun compounds. The rule of Partial L spread states that when a L tone is followed by a H tone and there is a segment between the two tones which is voiced at the surface level, there is partial spread of L to the following H TBU. This results in a surface [LH] rising tone. This rising tone is seen in (260), where a voiced obstruent is between the L and H, and (261), where a sonorant is in a similar position.

(260) /ōjɛ̀ ᴴ/ + /àdɔ́/ ᴴᵚ   spider+nest   [jɛ̀-dɔ̌]   spider web

       sxw-L0211-polymorphemic nouns-un.wav

(261) /ōgà̌/ + /ōnű/ ᴴᵚ   metal+thing   [gà̌-nǔ]   metal bowl

       sxw-L0099-polymorphemic nouns-un.wav

Finally, we can see examples of how Tonal spread is a relevant process within compounds. Tonal spread is the rightward spread of L or H to any adjacent M TBU, a process which delinks the M and leaves it floating. The following are all examples of Tonal spread within a compound.

(262)   Tonal spread within noun compounds

a.   /ōló/ + /ōlā̃/ ᴴᵚ   crocodile+meat   [ōló-lã́]   crocodile meat

       sxw-L0269-polymorphemic nouns-un.wav

b.   /ōtí/ + /ōkjɔ̃̄ ᴴ/ ᴴᵚ   tree+root   [tí-kjɔ̃́]   tree root

       sxw-L0190-polymorphemic nouns-un.wav

c.   /ōgà̌/ + /ōkā̃/ ᴴᵚ   metal+cord   [gà̌-kà̃°]   metal cable

       sxw-L0095-polymorphemic nouns-un.wav

d.   /āzɔ̀/ + /āmā̃ ᴴ/ ᴴᵚ   smoke+leaf   [zɔ̀-mà̃°]   tobacco

       sxw-L0219-polymorphemic nouns-un.wav

e.   /ōdà̌/ + /ōlā̃/ ᴴᵚ   snake+meat   [ōdà̌-là̃°]   snake meat

       sxw-L0273-polymorphemic nouns-un.wav

Again, because of the generation of the Hᵚ boundary tone and the subsequent failure of the L﹪ IP tone to associate TBU, there is no fall or downglide on the final TBU of any of these forms.

The following are paradigms of noun-noun compounds—some more natural than others—made with the possible combinations of tone patterns for monomorphemic nouns. The only compounds excluded are compounds containing words of the /M.H ᴹ/ tone pattern—due to the extreme rarity of that tone pattern.

(263)   Compounds ending with a /M.H/ noun

a.   /ādí/ + /ōfǘ/ ᴴω   soap+fur   [ādí-fǘ]   soapsuds
      sxw-L0051-polymorphemic nouns-un.wav

b.   /āfɔ̄/ + /ōkɔ́/ ᴴω   foot+sand   [āfɔ̄-kɔ́]   foot dirt
      sxw-L0053-polymorphemic nouns-un.wav

c.   /ōkpō ᴴ/ + /ōtí̋/ ᴴω   stick+tree   [kpō-tí̋]   big stick
      sxw-L0139-polymorphemic nouns-un.wav

d.   /ɛ̄dě/ + /ōtí̋/ ᴴω   palm nut+tree   [ɛ̄dè-tí̋]   palm tree
      sxw-L0084-polymorphemic nouns-un.wav

e.   /āɦwà/ + /ōtí̋/ ᴴω   locust bean+tree [āɦwà-tí̋]   locust bean tree
      sxw-L0059-polymorphemic nouns-un.wav

f.   /ōtà ᴴ/ + /ōká/ ᴴω   head+calabash   [tà-ká]   skull
      sxw-L0188-polymorphemic nouns-un.wav

g.   /àdó/ + /ōkpá/ ᴴω   mud wall+fence   [à-dǒ-kpá]   mud enclosure
      sxw-L0305-polymorphemic nouns-un.wav

(264)   Compounds ending with a /M.M/ noun

a.   /ōló/ + /ōlǟ/ ᴴω   crocodile+meat   [ōló-lǟ]   crocodile meat
      sxw-L0269-polymorphemic nouns-un.wav

b.   /ālĩ̄/ + /ōkǟ/ ᴴω   waist+cord   [ālĩ̄-kǟ°]   belt
      sxw-L0063-polymorphemic nouns-un.wav

c.   /āmǟ ᴴ/ + /ɛ̄sĩ̄/ ᴴω   leaf+water   [āmǟ-sĩ̄°]   herbal liquid
      sxw-L0299-polymorphemic nouns-un.wav

d.   /āzǐ/ + /āmĩ̄/ ᴴω   peanut+oil   [āzǐ-mĩ̄°]   peanut oil
      sxw-L0075-polymorphemic nouns-un.wav

e.   /ōgǟ/ + /ōkǟ/ ᴴω   metal+cord   [gǟ-kǟ°]   metal cable
      sxw-L0095-polymorphemic nouns-un.wav

f.   /ōɦwè ᴴ/ + /ɛ̄sĩ̄/ ᴴω   fish+water   [òɦwè-sĩ̄°]   fish water
      sxw-L0300-polymorphemic nouns-un.wav

g.   /àdó/ + /ōxɔ̄/ ᴴω   mud wall+room   [àdǒ-xɔ́]   mud building
      sxw-L0304-polymorphemic nouns-un.wav

(265)   Compounds ending with a /M.M ^H/ noun

a.   /ōtí/ + /ōkjɔ̄̃ ^H/ ^{Hω}   tree+root   [tí-kjɔ́̃]   tree root
      sxw-L0190-polymorphemic nouns-un.wav

b.   /ɛ̄mɛ̄̃/ + /ōnɔ̄̃ ^H/ ^{Hω}   person+mother   [ɛ̄mɛ̄̃-nɔ̄̃°]   uterus
      sxw-L0086-polymorphemic nouns-un.wav

c.   /ōsī ^H/ + /ōnɔ̄̃ ^H/ ^{Hω}   wife+mother   [sī-nɔ̄̃°]   mother-in-law
      sxw-L0180-polymorphemic nouns-un.wav

d.   /ōvǐ/ + /ōnɔ̄̃ ^H/ ^{Hω}   child+mother   [ōvì-nɔ̄̃°]   mother of a child
      sxw-L0172-polymorphemic nouns-un.wav

e.   /āzɔ̀/ + /āmã̄̃ ^H/ ^{Hω}   smoke+leaf   [zɔ̀-mã̀̃°]   tobacco
      sxw-L0219-polymorphemic nouns-un.wav

f.   /ōɦwè ^H/ + /ōnɔ̄̃ ^H/ ^{Hω}   fish+mother   [ōɦwè-nɔ̀̃°]   fish mother
      sxw-L0301-polymorphemic nouns-un.wav

g.   /òbó/ + /ōsī ^H/ ^{Hω}   disabled person   [òbǒ-sí]   disabled female
                                                      +female
      sxw-L0303-polymorphemic nouns-un.wav

(266)   Compounds ending with a /M.LH/ noun

a.   /ōsɔ́/ + /ōvǐ/ ^{Hω}   horse+child   [ōsɔ́-ví]   baby horse
      sxw-L0012-polymorphemic nouns-un.wav

b.   /ɛ̄sī̃/ + /ōɦǔ̃/ ^{Hω}   water+drum   [ɛ̄sī̃-ɦǔ̃]   water drum
      sxw-L0087-polymorphemic nouns-un.wav

c.   /ōsī ^H/ + /ōvǐ/ ^{Hω}   wife+child   [āsī-vǐ]   wife's child
      sxw-L0068-polymorphemic nouns-un.wav

d.   /ōgbě/ + /ōɦwǐ/ ^{Hω}   grass+knife   [gbè-ɦwǐ]   hunting knife
      sxw-L0117-polymorphemic nouns-un.wav

e.   /āvɔ̀/ + /ōvǐ/ ^{Hω}   cloth+child   [āvɔ̀-vǐ]   handkerchief
      sxw-L0070-polymorphemic nouns-un.wav

f.   /ōɦwè ^H/ + /ōɦǒ/ ^{Hω}   fish+money   [ōɦwè-ɦǒ]   budget for fish
      sxw-L0306-polymorphemic nouns-un.wav

g.   /àgbǎ́/ + /ōɦǒ/ ^{Hω}   dish+money   [àgbǎ̄-ɦó]   budget for dishes
      sxw-L0307-polymorphemic nouns-un.wav

(267)   Compounds ending with a /M.L/ noun

a.   /ōfí/ + /āzɔ̀/ ᴴω   ashes+smoke   [fí-zɔ̀°]   dust
      sxw-L0089-polymorphemic nouns-un.wav

b.   /ālɔ̄/ + /ōgà̰̀/ ᴴω   hand+metal   [ālɔ̄-gà̰̀°]   metal bracelet
      sxw-L0064-polymorphemic nouns-un.wav

c.   /ōtū ᴴ/ + /ōdò/ ᴴω   rag+edge   [ōtū-dò°]   edge of rag
      sxw-L0308-polymorphemic nouns-un.wav

d.   /ēdě/ + /āɦà̰̀/ ᴴω   palm+drink   [dè-ɦà̰̀°]   palm wine
      sxw-L0079-polymorphemic nouns-un.wav

e.   /ōzò/ + /ōmɔ̰̀/ ᴴω   fire+machine   [zò-mɔ̰̀°]   mill
      sxw-L0218-polymorphemic nouns-un.wav

f.   /ōɦɔ̰̀ ᴴ/ + /ōdò/ ᴴω   door+edge   [ōɦɔ̰̀-dò°]   edge of door
      sxw-L0310-polymorphemic nouns-un.wav

g.   /àdǒ/ + /ōglì/ ᴴω   red mud+wall   [àdǒ-glì°]   mud wall
      sxw-L0311-polymorphemic nouns-un.wav

(268)   Compounds ending with a /M.Lᴴ/ noun

a.   /ābɔ́/ + /ōtà ᴴ/ ᴴω   arm+head   [ābɔ́-tà°]   shoulder
      sxw-L0048-polymorphemic nouns-un.wav

b.   /ōxɔ̄/ + /ōtà ᴴ/ ᴴω   room+head   [ōxɔ̄-tà°]   roof
      sxw-L0176-polymorphemic nouns-un.wav

c.   /ōnɔ̄/ + /ōtà ᴴ/ ᴴω   mother+head   [ōnɔ̄-tà°]   his mother's head
      sxw-L0316-polymorphemic nouns-un.wav

d.   /ōvǔ/ + /ōtà ᴴ/ ᴴω   dog+head   [ōvǔ-tà°]   dog head
      sxw-L0317-polymorphemic nouns-un.wav

e.   /ōzò/ + /ōgò ᴴ/ ᴴω   fire+container   [zò-gò°]   pottery oven
      sxw-L0215-polymorphemic nouns-un.wav

f.   /ōɦwè ᴴ/ + /ōtà ᴴ/ ᴴω   fish+head   [ōɦwè-tà°]   fish head
      sxw-L0318-polymorphemic nouns-un.wav

g.   /òbó/ + /ōtà ᴴ/ ᴴω   handicapped   [òbǒ-tà°]   head of
                               person+head   handicapped person
      sxw-L0320-polymorphemic nouns-un.wav

(269)   Compounds ending with a /L.H/ noun

a.   /ōká/ + /àgbǎ́/ ᴴᵚ   calebash+bowl   [ōká-gbǎ́]   calebash bowl
    sxw-L0321-polymorphemic nouns-un.wav

b.   /āmĩ̄/ + /àgbǎ́/ ᴴᵚ   oil+bowl   [āmĩ̄-gbǎ́][77]   oil bowl
    sxw-L0326-polymorphemic nouns-un.wav

c.   /āmã̄ ᴴ/ + /ògbá/ ᴴᵚ   leaf+hat   [āmã̄-gbá]   leaf hat
    sxw-L0327-polymorphemic nouns-un.wav

d.   /ōgǎ/ + /ògbá/ ᴴᵚ   leader+hat   [ōgà-gbǎ]   leader's hat
    sxw-L0328-polymorphemic nouns-un.wav

e.   /āɦà̰/ + /àgbǎ́/ ᴴᵚ   drink+bowl   [āɦà̰-gbǎ]   drink bowl
    sxw-L0332-polymorphemic nouns-un.wav

f.   /ōjὲ ᴴ/ + /àdɔ́/ ᴴᵚ   spider+nest   [jὲ-dɔ́]   spider web
    sxw-L0211-polymorphemic nouns-un.wav

g.   /òdʒú/ + /ògbá/ ᴴᵚ   rain+hat   [òdʒǔ-gbá]   rain hat
    sxw-L0333-polymorphemic nouns-un.wav

      Before closing this section on noun-noun compounds, I mention that we can see an interesting distinction made when we compare noun-noun compounds that include the noun /ōnɔ̃̄ ᴴ/ 'mother' with nouns that are derived by affixing the attributive suffix /-nɔ̃̄/ to a noun base. The attributive suffix /-nɔ̃̄/ has the meaning of "person characterized by X", if X is the noun of the base. This suffix is sometimes claimed to be derived historically from the word for 'mother'. The following are examples of nouns derived by affixation of the attributive suffix.

(270)   Nouns derived with the attributive suffix /-nɔ̃̄/

a.   /ɛ̄fĩ̄/   theft-ATTRIB   [ɛ̄fĩ̄-nɔ̃̄]   thief
    sxw-L0009-polymorphemic nouns-un.wav

b.   /ājā/   suffering-ATTRIB   [ājā-nɔ̃̄]   sufferer, poor person
    sxw-L0010-polymorphemic nouns-un.wav

c.   /ōkpó/   mountain-ATTRIB   [ōkpó-nɔ̂̃]   person with a humpback
    sxw-L0014-polymorphemic nouns-un.wav

d.   /ōfṹ/   fur-ATTRIB   [ōfṹ-nɔ̂̃]   hairy person
    sxw-L0015-polymorphemic nouns-un.wav

      These derived nouns, unlike the noun-noun compounds seen in this section, clearly do not have a right edge Hᵚ boundary tone. The right edge L﹪ IP boundary tone is free to associate to the final TBU of the word, causing a final falling tone to be observed. Affixes are not PWs and therefore the prosodic environment that would

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[77] This and the following compound, [āmã̄-gbá], sometimes sound like they have a [MH] rising pitch on the final syllable.

generate a H_ω boundary (represented as]_PW]_PW) does not exist on the right edge of these derived forms.

This can be compared with noun-noun compounds that include the word 'mother'.

(271)   Nouns compounds that include /ōnɔ̃ ᴴ/ 'mother'

a.   /ɛ̄mɛ̃̄/ + /ōnɔ̃ ᴴ/ ᴴω   person+mother   [ɛ̄mɛ̃̄-nɔ̃̄°]   uterus
        sxw-L0086-polymorphemic nouns-un.wav
b.   /ōsī ᴴ/ + /ōnɔ̃ ᴴ/ ᴴω   wife+mother   [sī-nɔ̃̄°]   mother-in-law
        sxw-L0150-polymorphemic nouns-un.wav
c.   /ōvǐ/ + /ōnɔ̃ ᴴ/ ᴴω   child+mother   [ōvì-nɔ̃̄°]   mother of a child
        sxw-L0172-polymorphemic nouns-un.wav

For these compounds, no final fall is observed. The H_ω boundary is present, although its presence is in some ways redundant because the morpheme /ōnɔ̃ ᴴ/ also has a floating H in its lexically-assigned tone pattern. (Whether this is a coincidence or not is discussed in section 4.1.2.) What is interesting here is that if the suffix /-nɔ̃̄/ is historically derived from the word 'mother' /ōnɔ̃̄ ᴴ/, there has been a tonal change made to accommodate or reflect the fact that the suffix /-nɔ̃̄/ does not appear in a prosodic environment conditioning the presence of the H_ω boundary, while the morpheme 'mother' often does.

The issue of prosodic structure is also relevant in the examination of nominal forms derived through verbal reduplication, which is the topic of section 4.4.3.

4.4.3   Nouns derived through verbal reduplication

A process of reduplication can be applied to Saxwe verbs to generate either a nominal or an adjectival form. A reduplicated form that is nominal may include a complement or it may not. If the complement is included, it precedes the reduplicated verb. Often a generic complement such as /ōnǘ/ 'thing' or /ɛ̄mɛ̃̄/ 'person' will be used in the absence of a more specific complement.

When verbal reduplication is used to create an adjective, the adjective usually has a passive or stative interpretation. This deverbal adjective is often found in a position following the noun where it modifies the noun head.

The following are examples of verbal reduplication in Saxwe. Two possible meanings (depending on whether a nominal form or an adjectival form is created) are given.

(272) a.   /lĩ/   [ōnṹ <u>lí-lí</u>]   'grinding sth' or 'sth ground'
             sxw-L0007-verb reduplication-un.wav

       b.   /gɔ̀/   [ōnṹ <u>gì-gɔ̀°</u>]   'healing sth' or 'sth healed'
             sxw-L0011-verb reduplication-un.wav

       c.   /tʃĭ/   [ōnṹ <u>tʃĭ-tʃĭ</u>]   'turning sth off', or 'sth turned off'
             sxw-L0051-verb reduplication-un.wav

       d.   /gblě/   [ōnṹ <u>gbí-gblé</u>]   'ruining sth' or 'sth ruined'
             sxw-L0039-verb reduplication-un.wav

The reduplication template, which is the same for either the nominal or adjectival variant, is a C/i/- prefix. If the verb begins with a consonant cluster, only the initial consonant of the verb stem is copied to this prefix, as seen in [ōnṹ gbí-gblé] 'something ruined', derived from the verb /gblě/ 'ruin'. The prefix vowel is [i] unless the verb stem contains the vowel [u]. In the latter case, the prefix vowel becomes [u] by spread of the feature [back]. This is seen in [ōnṹ ɦũ̀-ɦũ̀°] 'opening something/something opened', derived from the verb /ɦũ̀/ 'open'.

For some speakers, the reduplication prefix becomes nasalized by spread of the feature [nasal] if the verb stem is nasalized. For speakers for whom nasal harmony is a normal part of this process, the verb /kã̄/ 'search for' would give [ōnṹ kĩ́-kã́] 'searching for something/something searched for'. Otherwise, the reduplicated form would be [ōnṹ kí-kã́]. The consultant whose data are used in this section varies between no nasalization and light nasalization on the prefix.

Words derived through verbal reduplication, like noun compounds, show evidence of having a H$_\omega$ PW boundary on their right edge; when these forms are pronounced in isolation or clause-finally, they are never realized with a final fall or downglide in pitch. This can be explained by looking at the prosodic structure of a reduplicated verbal form.

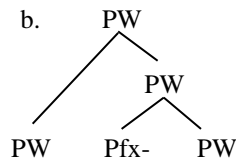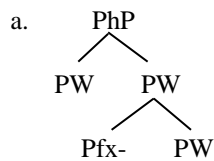(273)   Prosodic structure in verbal reduplication
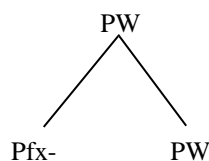
This prosodic structure has two adjacent PW boundaries at its right edge because of recursivity at the level of the PW. This is the environment in which a H$_\omega$ boundary is generated in Saxwe (see section 4.1.2). It is therefore consistent that any form (nominal or adjectival) derived through verbal reduplication should have a right H$_\omega$ boundary.

When we look further up in the prosodic structure, we see that the noun modified by the deverbal adjective (*e.g.* 'something healed') can have the structure in

(274)a, while the nominalization which includes a complement (*e.g.* 'healing something') can have the structure in (274)b.

(274)   Prosody of (a) noun with deverbal modifier *vs.* (b) nominalization
          incorporating a complement

a.
```
        PhP
       /   \
     PW      PW
            /  \
         Pfx-   PW
```

b.
```
      PW
     /  \
        PW
       /  \
   PW  Pfx-  PW
```

When the C/i/- template is prefixed to the verb stem, the tone of the verb stem is copied onto the TBU of the C/i/- prefix and the H_ω boundary is generated during the lexical stage. Following this, both TBUs in the reduplicated form are submitted to the same postlexical derivational rules as any other form. The following are the derivations of (272)a and (272)d.

(275)   Derivations of [ōnɏ́ lí-lí] and [ōnɏ́ gbí-gblé]

/ōnɏ́ [C]i-lī̄/	/ōnɏ́ [C]i-gblě/	Underlying
ōnɏ́ lī̄-lī̄	ōnɏ́ gbǐ-gblě	Copy initial C and tone to prefix
--	--	Word-internal vowel elision
--	--	Word-initial vowel elision (opt.)
--	--	Left M- floating tone
ōnɏ́ lī̄-lī̄ $^{H\omega}$	ōnɏ́ gbǐ-gblě $^{H\omega}$	Right H_ω boundary assignment

TRANSITION FROM LEXICAL STAGE TO POSTLEXICAL STAGE

--	--	$L_\%$ association
--	--	Nominal floating H deletion
--	ōnɏ́ gbí-gblé $^{H\omega}$	Contour simplification
--	--	Partial L spread
ōnɏ́ lí-lí $^{H\omega}$	--	Tonal spread
[ōnɏ́ lí-lí]	[ōnɏ́ gbí-gblé]	Surface

So far, we have seen examples of nominalization where the complement is included in the nominalized form together with the reduplicated verb. However, nominalization through the process of verbal reduplication does not always have to include a complement.

For example, a reduplicated verb can be followed by the determiner /lá/ and can be interpreted in one of two ways. First, it can reference a discourse-specific action nominalization, as in (276)b and d. In these utterances, the object on which the action is performed is assumed to be understood from the context of the utterance. Second, it can be interpreted as a nominalized form of the deverbal adjective, as in (276)a and c.

In both cases, the bare reduplicated form now functions syntactically as the head of the noun phrase. This being the case, we see a left M- floating tone on the noun (see section 4.3).

(276)   Reduplicated forms that appear alone as head of the NP

a.   /$^{M\text{-}}$ lī-lī $^{H\omega}$/   [é kpɔ́ <u>lílí</u> $^{\downarrow}$lá]   'He saw the ground [one].'
                                                               sxw-L0073-verb reduplication-un.wav
                                     [jē xɔ̄ <u>līlī</u> lá]   'They bought the ground [one].'
                                                               sxw-L0074-verb reduplication-un.wav
b.   /$^{M\text{-}}$ gì-gò $^{H\omega}$/   [é kpɔ́ <u>gìgò</u> là°]   'He saw the healing.'
                                                               sxw-L0071-verb reduplication-un.wav
                                     [jē sē <u>gìgò</u> là°]   'They heard about the healing.'
                                                               sxw-L0072-verb reduplication-un.wav
c.   /$^{M\text{-}}$ tí-tá $^{H\omega}$/   [é kpɔ́ $^{\downarrow}$<u>títá</u> lá]   'He saw the drawn [one].'
                                                               sxw-L0077-verb reduplication-un.wav
                                     [jē xɔ̄ <u>títá</u> lá]   'They bought the drawn [one].'
                                                               sxw-L0078-verb reduplication-un.wav
d.   /$^{M\text{-}}$ zǐ-zǎ $^{H\omega}$/   [é kpɔ́ <u>zìzǎ</u> lá]   'He saw the mistreating.'
                                                               sxw-L0081-verb reduplication-un.wav
                                     [jē sē <u>zìzǎ</u> lá]   'They heard about the mistreating.'
                                                               sxw-L0082-verb reduplication-un.wav

The presence of this left M- floating tone is detected by its role in triggering: (1) the non-automatic downstep observed in (276)c, and (2) the delinking of the H of the LH contour in (276)d. The following are the derivations of (276)c and d.

(277)   Derivations of [é kpɔ́ ꜜtítá lá] and [é kpɔ́ zìzǎ lá]

/ᴹ⁻ é kpɔ̃́ [C]i-tá lá/	/ᴹ⁻ é kpɔ́ [C]i-zǎ lá/	Underlying
ᴹ⁻ é kpɔ̃́ tí-tá lá	ᴹ⁻ é kpɔ́ zǐ-zǎ lá	Copy initial C and tone to prefix
--	--	Word-internal vowel elision
--	--	Word-initial vowel elision (opt.)
ᴹ⁻ é kpɔ̃́ ᴹ⁻ tí-tá lá	ᴹ⁻ é kpɔ́ ᴹ⁻ zǐ-zǎ lá	Left M- floating tone on nouns
ᴹ⁻ é kpɔ̃́ ᴹ⁻ tí-tá ᴴω lá	ᴹ⁻ é kpɔ́ ᴹ⁻ zǐ-zǎ ᴴω lá	Right Hω boundary assignment

TRANSITION FROM LEXICAL STAGE TO POSTLEXICAL STAGE

--	--	L﹪ association
--	--	Nominal floating H deletion
--	ᴹ⁻ é kpɔ́ ᴹ⁻ zì-zǎ́ ᴴω lá	Contour simplification
--	ᴹ⁻ é kpɔ́ ᴹ⁻ zì-zǎ ᴴω lá	Partial L spread
--	--	Tonal spread
[é kpɔ̃́ ꜜtítá lá]	[é kpɔ́ zìzǎ lá]	Surface

To summarize, we see that a nominal form derived from a verb without an accompanying complement has two different PW boundaries generated on it for two different reasons. It has a left M- floating tone because it is functioning syntactically as the head of a noun phrase (section 4.3). It has a right Hω boundary because it has at its right edge two adjacent PW brackets (adjacent because of recursivity at the level of the PW).

We now have all the background necessary for looking at the isolation forms of derived nouns which are created though a process of verbal reduplication and which do not include a complement.

(278)   Isolation forms: nouns derived from verbs by reduplication

a.   ᴹ⁻ /jī-jī/ ᴴω   [jī-jī°]   'going/travel'
      sxw-L0103-verb reduplication-un.wav

b.   ᴹ⁻ /gbì-gbɔ̀/ ᴴω   [gbì-gbɔ̀°]   'returning/return'
      sxw-L0104-verb reduplication-un.wav

c.   ᴹ⁻ /sí-sɔ́/ ᴴω   [sí-sɔ́]   'leaving/departure'
      sxw-L0105-verb reduplication-un.wav

d.   ᴹ⁻ /vǐ-vǎ/ ᴴω   [vì-vǎ]   'coming/arrival'
      sxw-L0106-verb reduplication-un.wav

In these isolation forms, the M- floating tone triggers the delinking of the H of the underlying LH contour in (278)d. The Hω boundary accounts for the absence of final pitch fall on all forms.

This ends the discussion of verbal reduplication involving a reduplication prefix. I turn now to the discussion of another kind of reduplication which applies to other word classes and which involves a process of copying rather than prefixation.

4.5   Reduplication by copy rather than by prefixation

There is a second process of reduplication in Saxwe that is unlike the verbal reduplication discussed in section 4.4.3. In this section, I describe a type of reduplication which is not limited to verbs and does not involve a reduplication prefix. In this process of reduplication, a copy is made of a word and the two copies are juxtaposed.

The kind of reduplication I discuss here is a subgroup of forms created by a phenomenon Ameka (1999) describes as 'syntactic iteration'—the repetition of words or phrases for a number of reasons, including to express intensity, emphasis, serial ordering, multiplicity, repetition, and durativity (p. 82-84). This kind of repetition is applied to words of various classes, including nouns, adjectives, numerals, adverbs, and ideophones serving various syntactic functions. Here, I look only at the forms that involve the copying of a single morpheme.

What is interesting from a tonal point of view is that in these cases of reduplication by copy, there is evidence of a floating M between the two copies of the word which is being reduplicated. The following are some examples of this type of reduplication. The left column shows the likely etymology of the forms which clearly have undergone this process of reduplication by copy, but which do not have an obvious stem form in the lexicon.

(279)   Word reduplication by copy with intervening floating M

a.	/āgɔ̀/ tardiness	[jē sɔ́ ágɔ̀-àgɔ̀] they left very late	sxw-L0020-alternate reduplication-un.wav
b.	/ōbú/ that which is other	[ōnɯ́ bú-↓bú] different things	sxw-L0027-alternate reduplication-un.wav
c.	/āmɯ̋/ that which is raw	[ōnɯ́ mɯ̋-↓mɯ̋] a raw thing	sxw-L0033-alternate reduplication-un.wav
d.	/ḍókpó/ one	[jē sɔ́ ḍókpó-↓ḍókpó] they left one by one	sxw-L0028-alternate reduplication-un.wav
e.	*etymology* *unknown*	[ōnɯ́ tó-↓tó] an empty thing	sxw-L0024-alternate reduplication-un.wav

f.	*etymology* *unknown*	[ōnǘ mɑ̋-ꜜmɑ̋] a naked thing	sxw-L0031-alternate reduplication-un.wav
g.	*etymology* *unknown*	[jē sɔ̋ kpɔ́-ꜜkpɔ́] they left together	sxw-L0035-alternate reduplication-un.wav
h.	/ɖāxó/ big	[ōnǘ ɖá↓xó-ɖá↓xó] a very big thing	sxw-L0023-alternate reduplication-un.wav
i.	/tēgbɛ̀/ always	[jē nɔ̋ sɔ̋ tέgbɛ̀-tɛ̀gbɛ̀] they (HAB) <u>always</u> leave	sxw-L0030-alternate reduplication-un.wav

In (279)a-c, the morpheme which has been reduplicated to create an adjectival or adverbial form has a stem which is a noun. This type of reduplication is not a productive process. In (279)d, a numeral has been reduplicated. This is a very productive process for indicating serial ordering (*e.g.* 'two-by-two'). In (279)e-g, the etymology of these reduplicated adjectival and adverbial forms is unknown. However, it is clear that reduplication has occurred. In (279)h-i, an adjective or adverb is copied to express intensity or emphasis. This is a productive process.

In all cases, there is a floating M between the two copies of the morpheme. In (279)b-g, this floating M triggers non-automatic downstep at the boundary between the two morphemes, since there are Hs on both sides of the boundary.

To summarize the differences between this reduplication and the verbal reduplication discussed in section 4.4.3, we see that in this process of reduplication by copy, there is no templatic reduplication prefix. The morpheme or word is copied in its entirety. There is, however, a floating M inserted between the two copies. Postlexical tonal operations are applied to these forms as they are elsewhere.

4.6   Pronominal suffixes affixed to the verb

Another topic where we see tone-related morphophonological processes at work in Saxwe is the affixation of certain pronominal suffixes to the verb. When a Saxwe verb is followed by the first singular (1SG) or third singular (3SG) object pronoun, the form that represents this object is a suffix vowel which is, to a great degree, unspecified as to its segmental features.

4.6.1   First person singular object suffix

The data in (280) illustrate what happens when the 1SG pronominal suffix is affixed to a verb stem. The underlying form shows the final vowel of the verb in isolation, while the second form shows the result following suffixation.

(280)   Verb followed by 1SG pronominal suffix

a. /sí/ → [é sjû:]   he respected me   sxw-L0030-verb plus pronoun-un.wav
b. /wɪ́/→ [é w̃jṹ:]   he awakened me   sxw-L0032-verb plus pronoun-un.wav
c. /kpé/ → [é kpjô:]   he met me   sxw-L0034-verb plus pronoun-un.wav
d. /gbɛ̌/ → [é gbjɔ̂:]   he refused me   sxw-L0036-verb plus pronoun-un.wav
e. /ɦɛ̀/→ [é ɦjɔ̀:]   he supported me   sxw-L0038-verb plus pronoun-un.wav
f. /bú/ → [é bû:]   he lost me   sxw-L0040-verb plus pronoun-un.wav
g. /zù̃/→ [é zù̃:]   he insulted me   sxw-L0042-verb plus pronoun-un.wav
h. /kó/ → [é kô:]   he laughed at me   sxw-L0044-verb plus pronoun-un.wav
i. /sɔ́/ → [é sɔ̂:]   he took me   sxw-L0046-verb plus pronoun-un.wav
j. /kpɔ́̃/ → [é kpɔ̂̃:]   he saw me   sxw-L0048-verb plus pronoun-un.wav
k. /tá/ → [é tâ:]   he drew me   sxw-L0052-verb plus pronoun-un.wav
l. /fã́/ → [é fẫ:]   he embraced me   sxw-L0054-verb plus pronoun-un.wav

In (280), we see that following affixation of the 1SG pronominal suffix, all of the resulting forms end in a back vowel. The height of the vowel in the morphologically complex form is the same as the height of the vowel in the isolation form of the verb. If the verb in isolation is nasalized, the morphologically complex form is also nasalized. We also see that the vowel of the morphologically complex form is slightly lengthened.

Looking at tone, we see that if the verb in isolation has H tone, the tone of the morphologically complex form has a surface [HL] contour utterance-finally. If the verb has L tone, the tone of the morphologically complex form is surface [L] utterance-finally.

The following is the Saxwe vowel inventory copied from section 1.6.[78]

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[78] In section 1.6, I discuss arguments for why [ɛ] is considered the completely underspecified vowel.

Table 5 - Saxwe vowel inventory (repeated)

|		[nasal]	[back]			
				[nasal]	[round]	
						[nasal]
[high]	i	ĩ			u	ũ
[ATR]	e				o	
	ε	ε̃			ɔ	ɔ̃
[low]			a	ã		

Note that the vowel [a] in Saxwe is specified as [back] in the lexicon and that not all [back] vowels are [round]. This is an important aspect of the distribution of Saxwe vowels that plays into the analysis of pronominal affixation to the verb.

The 1SG pronominal suffix is comprised of a mora associated to M tone and a vowel segment that is linked only to the feature [back]. Thus we have the structure in (281) for the 1SG pronominal suffix.

(281)   1SG pronominal suffix

$$\begin{array}{c}\mu \\ | \diagdown M \\ V \\ | \\ [back] \end{array}$$
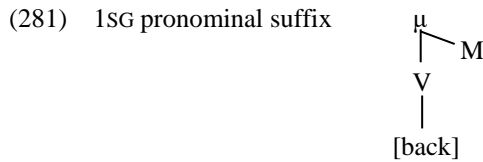
The features [high], [low], [ATR], and [nasal] are spread rightward from the nucleus of the verb to the suffix. The following is the lexical rule of Feature spread which describes this.
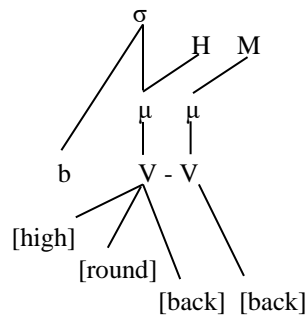
(282)   Feature spread (lexical)

V   -V

[high]

[low]

[ATR]
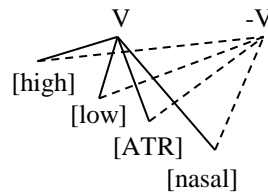
[nasal]

This rule states that the features [high], [low], [ATR], and [nasal] are spread rightward at the boundary beween a vowel and a following affixed vowel.

The following is the lexical derivation of /bú/ 'lose', which has the surface form [bû:] 'lose-1SG' utterance-finally once the 1SG pronominal suffix is attached.
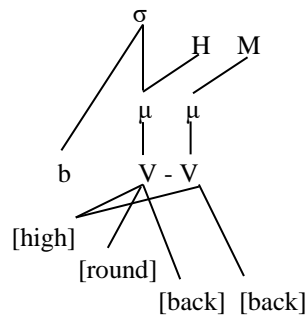
(283)   Verb /bú/ + 1SG pronominal suffix V̄[back] → [bû:]

a.

σ
H   M
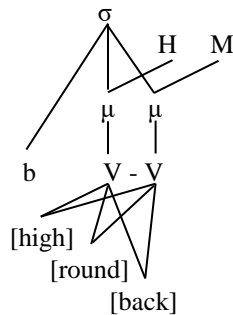μ   μ
b   V - V
[high]
[round]
[back] [back]

Input to lexical stage

b.

σ
H   M
μ   μ
b   V - V
[high]
[round]
[back] [back]

Feature spread

c.

σ
H   M
μ   μ
b   V - V
[high]
[round]
[back]

Default rounding and resyllabification

In (283)b, lexical Feature spread causes the feature [high] to become associated to the vowel of the suffix. Following this, the feature [round] is assigned by default to the suffix, since the inventory of vowels has no other option for a [back], [high] vowel. Then all adjacent identical features are merged in accordance with the OCP, and the suffix vowel is incorporated into the syllable, giving at the output from the lexical stage the structure shown in (283)c, where the presence of

two moras produces lengthening in the syllable. This is the clearest case of evidence in the language for the claim that the mora, rather than the syllable, is the TBU.

Postlexically, if the structure in (283)c is utterance-final, L$_\%$ association (94) will cause the final TBU to be associated to a right L$_\%$ IP boundary and Tonal spread (72) will spread the H tone, delinking the M. This creates a final surface [HL] contour. [79]

On the other hand, if the structure in (283)c is utterance-medial and followed by a H tone, Tonal spread still spreads the H, the M tone from the pronominal suffix is delinked, and the resulting floating M triggers non-automatic downstep between the two Hs during the phonetic implementation. This is seen by comparing (284) with (285) and (286) with (287).

(284)   /$^{M-}$ é   bú=V̄[back]/
        [é   bû:]
        3SG   lose-1SG
        He lost me.   sxw-L0040-verb plus pronoun-un.wav

(285)   /$^{M-}$ é   bú=V̄[back]   fí/
        [é   bú: ↓fí] [80]
        3SG   lose-1SG   now
        He lost me just now.   sxw-L0069-verb plus pronoun-un.wav

(286)   /$^{M-}$ é   kó=V̄[back]/
        [é   kô:]
        3SG   laugh.at-1SG
        He laughed at me.   sxw-L0044-verb plus pronoun-un.wav

(287)   /$^{M-}$ é   kó=V̄[back]   fí/
        [é   kó: ↓fí]
        3SG   laugh.at-1SG   now
        He laughed at me just now.   sxw-L0070-verb plus pronoun-un.wav

Here we see that if a H verb is followed by the 1SG suffix and then another H morpheme, the second H (that following the suffix) is downstepped by the floating M of the pronominal suffix.

---

[79] Note that there is no right H$_\omega$ boundary on this form in (283)b. As discussed in section 4.1.2, affixes are not PWs in Saxwe phonology and therefore the conditioning environment for the generation of the H$_\omega$ boundary—adjacent right edge]PW]PW brackets—is not present in this case.

[80] This can also be compared to [é bú fí] 'He got lost just now', where pronominal suffix is absent.

I return now to the data from (280), focusing on verb stems that have a vowel not specified for the feature [back]. For ease of reference, these are repeated in (288).

(288)   Verbs with a front vowel followed by 1SG pronominal suffix

a.   /sí/ → [é s**jû:**]   he respected me   sxw-L0030-verb plus pronoun-un.wav
b.   /wí̃/→ [é w̃**jû̃:**]   he awakened me   sxw-L0032-verb plus pronoun-un.wav
c.   /kpé/ → [é kp**jô:**]   he met me   sxw-L0034-verb plus pronoun-un.wav
d.   /gbɛ̌/ → [é gb**jɔ̂:**]   he refused me   sxw-L0036-verb plus pronoun-un.wav
e.   /ɦɛ̌̃/→ [é ɦ**jɔ̂̃:**]   he supported me   sxw-L0038-verb plus pronoun-un.wav

In the course of the resyllabification that follows Feature spread, the first of two non-identical vowels in the morphologically complex form is strengthened so that it is realized as a glide. The rule of lexical Glide formation is shown in (289).
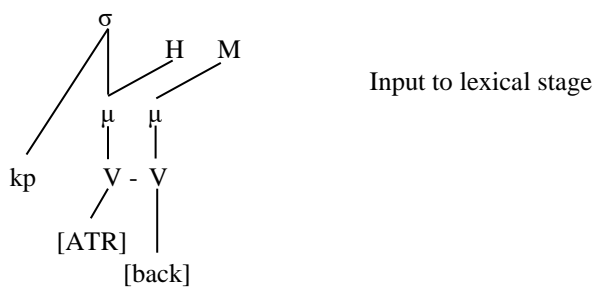
(289)   Glide formation (lexical)
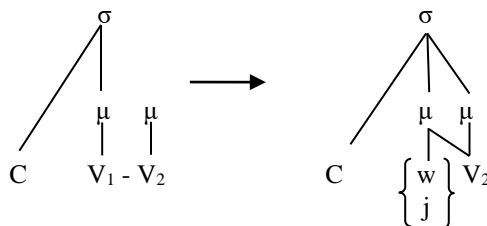
(if V$_1$ is [round] ⊃ glide is [w]; otherwise glide is [j])

This rule of lexical Glide formation states that when non-identical vowels are incorporated into a single syllable, the first vowel is strengthened to a glide—[w] if the vowel is [round] and [j] otherwise.
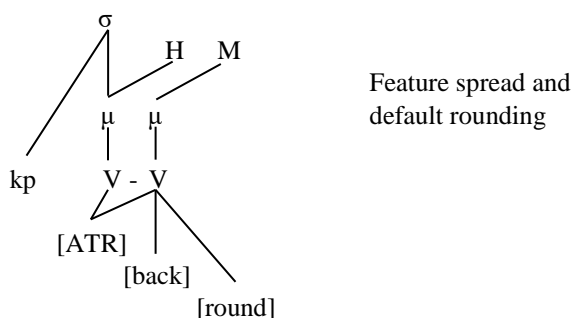
For illustration purposes, I show the lexical derivation of the combination of the verb /kpé/ 'meet' followed by the 1SG pronominal suffix.

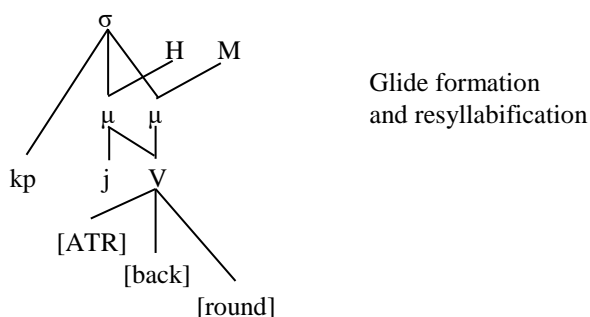(290)   Verb /kpé/ + 1SG pronominal suffix V̄[back] → [kpjô:]

a.

Input to lexical stage

b.

Feature spread and
default rounding

c.

Glide formation
and resyllabification

Here we see that the suffix vowel which is preassigned the feature [back] and gains the feature [ATR] by Feature spread is again assigned the feature [round] by default. Following this, the vowel of the verb stem is strengthened to become a glide. Because it is not a [round] vowel itself, it becomes the palatal sound [j].

When the verb stem vowel is strengthened, the tone associated to its mora is not lost. Instead, that mora and its associated tone is linked to the final vowel in the polymorphemic form. At the postlexical stage, if the structure in (290)c is utterance-final, L_% association (94) will first cause the final TBU to be associated to a right L_% IP boundary and then Tonal spread (72) will spread the H tone, delinking the M. This creates a final surface [HL] contour. If there is a H following the

structure in (290)c, Tonal spread will spread the H tone, delinking the M. This floating M between Hs will trigger non-automatic downstep in the phonetic implementation.

Having looked at the 1SG pronominal suffix, we turn now to the 3SG pronominal suffix. Most of the phenomena observed in the affixation of the 3SG suffix can be explained given the rules developed in the study of the 1SG suffix.

4.6.2   Third person singular object suffix

When a verb is followed by the 3SG pronominal suffix, the following paradigm is observed.

(291)   Verb followed by 3SG pronominal suffix

a.	/tʃǐ/ → [é tʃî:]	he turned it off	sxw-L0001-verb plus pronoun-un.wav
b.	/wǐ/→ [é w̃î:]	he awakened it	sxw-L0003-verb plus pronoun-un.wav
c.	/flé/ → [é flê:]	he husked it	sxw-L0005-verb plus pronoun-un.wav
d.	/bɛ́/ → [é bɛ̂:]	he gathered it	sxw-L0007-verb plus pronoun-un.wav
e.	/tlɛ̃́/→ [é tr̃ɛ̃̂:]	he ripped it	sxw-L0009-verb plus pronoun-un.wav
f.	/bú/ → [é bwî:]	he lost it	sxw-L0013-verb plus pronoun-un.wav
g.	/tū̃/→ [é twĩ̂:]	he untied it	sxw-L0015-verb plus pronoun-un.wav
h.	/tó/ → [é twê:]	he pounded it	sxw-L0018-verb plus pronoun-un.wav
i.	/sɔ́/ → [é swɛ̂:]	he took it	sxw-L0020-verb plus pronoun-un.wav
j.	/kpɔ̃́/ → [é kpwɛ̃̂:]	he saw it	sxw-L0022-verb plus pronoun-un.wav
k.	/tá/ → [é tjɛ̂:]	he drew it	sxw-L0024-verb plus pronoun-un.wav
l.	/kpã́/ → [é kpjɛ̃̂:]	he carried him on his back	sxw-L0026-verb plus pronoun-un.wav

Here we see that the morphologically complex form always ends with a front vowel. Once again the suffix is realized at the same height as the vowel of the verb stem except in cases where the verb stem ends with [a]. In these cases, the final vowel of the morphologically complex form is [ɛ]. If the verb has a nasalized vowel, the morphologically complex form also has a nasalized vowel. In all cases, there is slight lengthening of the vowel in the morphologically complex form.
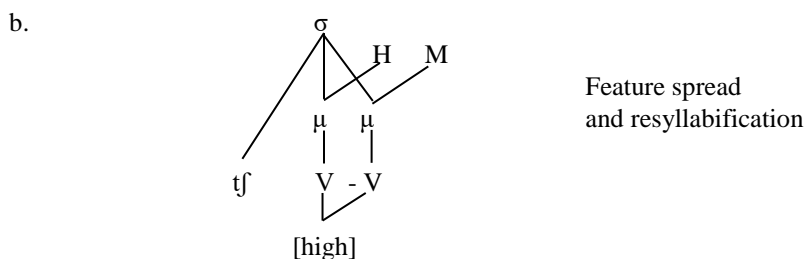
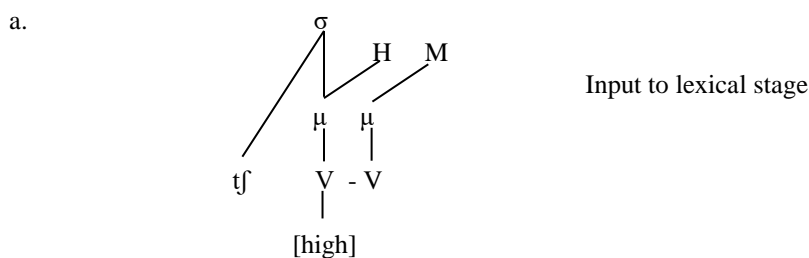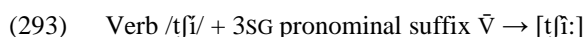Tonal behavior related to the affixation of the 3SG suffix is the same as that seen in the affixation of the 1SG suffix in section 4.6.1. For instance, if the isolation verb is H, the morphologically complex form will be realized with a [HL] contour tone utterance-finally.

The 3SG suffix is a vowel completely unspecified for features which is associated to a mora that has M tone lexically assigned to it. This is seen in (292).

(292)   3SG pronominal suffix
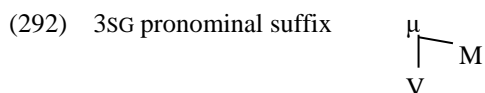
        As with the 1SG suffix, for the 3SG suffix, lexical Feature spread (282) is the operation which causes the features [high], [low], [ATR], and [nasal] to be spread to the suffix vowel from the vowel of the verb stem. Logically, because they do not participate in this spreading process and they cannot originate from the suffix vowel, we find that the features [back] and [round] are absent from all 3SG suffix vowels.

        If we take the form [t∫ǐ:] 'turn off-3SG', derived from the verb /t∫ǐ/ in (291)a, we have the following derivational structures.

(293)   Verb /t∫ǐ/ + 3SG pronominal suffix V̄ → [t∫ǐ:]

a.

Input to lexical stage

b.

Feature spread
and resyllabification

        The lexical operation Feature spread causes the feature [high] to be shared by both vowel segments. During syllabification, the suffix vowel is incorporated into the syllable. Because the two vowels share identical features, the rule of Glide formation does not effect any change. The result is a morphologically complex form with slight vowel lengthening.

        When the verb stem has the vowel [a] or [ã], as in (291)k and l, application of the lexical rule of Feature spread becomes slightly more complicated. Of the features specified for [a] and [ã]—that is, [back], [low] and, in the latter case, [nasal]—only the features [low] and [nasal] would be eligible to participate in

Feature spread. However, the spread of [low] would create a conflict, as there is no vowel in the Saxwe inventory which is [low] but not also [back].

The feature [back] cannot be assigned by default to resolve this problem, as happens for the feature [round] in (283)c and (290)b, because the very absence of the feature [back] is the single thing that differentiates the 3SG suffix from the 1SG suffix. Therefore, due to a constraint that prevents this impossible and unresolvable feature combination, [low] is simply not spread. In the absence of any feature specifications, the suffix vowel is realized as [ɛ], which is the completely unspecified vowel in Saxwe. If the single feature [nasal] is specified, the realization of the suffix vowel is [ɛ̃].

The following is the derivation of the form [kpjɛ̃̂:] 'carry on back-3SG', which comes from the affixation of the 3SG suffix to the verb [kpá̃] 'carry on the back'.
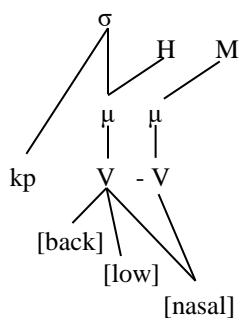
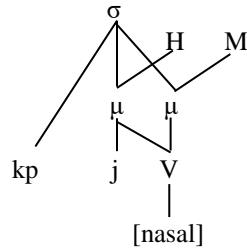(294)   Verb /kpá̃/ + 3SG pronominal suffix V̄ → [kpjɛ̃̂:]

a.
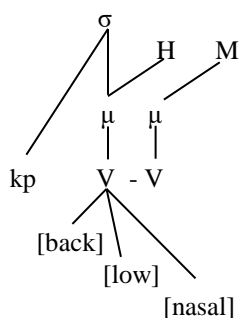
Input to the lexical stage

b.

Feature spread
([low] prohibited from spreading)

c.

```
              σ
            ╱ ╱╲      H    M
           ╱ ╱  ╲    ╱ ╲  ╱
          ╱ ╱    μ    μ
         ╱ ╱    ╱╲   ╱
        ╱ ╱    ╱  ╲ ╱
       kp      j   V
                   │
                [nasal]
```

Glide formation
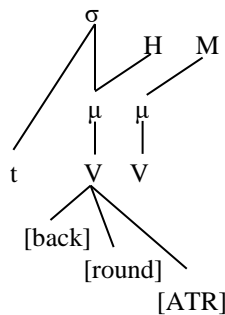and resyllabification

     In (294)b, we see that the feature [low] is not permitted to spread because its spread would create a non-existent and unresolvable feature assignment. This being the case, the suffix vowel remains unspecified for all features but [nasal] (the one feature that does spread), and the vowel is realized [ɛ̃]. The stem vowel of the verb is [ã]. During glide formation, this vowel becomes [j] because it is not specified as having the feature [round].

     Here in (294) is where the feature [round] becomes especially relevant as a phonologically active feature having a role which is different from the role of the feature [back]. The stem vowel [ã] is clearly [back]; if it were not, there would be no conflict during the affixation of the 3SG suffix; this suffix would be realized [ã] instead of [ɛ̃]. However, despite being [back], the stem vowel [ã] becomes [j] during the operation Glide formation, and not [w] as do the other [back] vowels.

     To see an example of a [back] stem vowel that becomes [w] as a result of Glide formation, we can look at a different example, that of [twê:] 'pound-3SG'. This polymorphemic form results from the affixation of the 3SG pronominal suffix to the verb [tó] 'pound'.

(295)   Verb /tó/ + 3SG pronominal suffix V̄ → [twê:]

a.

```
              σ
            ╱ │╲      H    M
           ╱  │ ╲    ╱ ╲  ╱
          ╱   μ   μ
         ╱    │   │
        t     V   V
             ╱╲  ╲
        [back] ╲  ╲
            [round] ╲
                  [ATR]
```
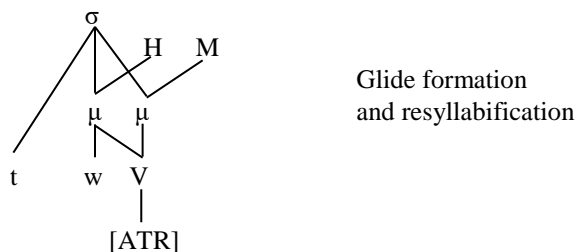
Input to the lexical stage

b.

Feature spread

c.

Glide formation
and resyllabification
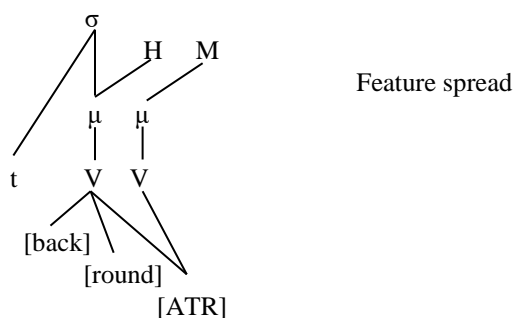
During the operation Glide formation, the vowel of the verb stem is changed to [w] because the feature [round] is associated to the verb stem vowel.

Postlexically, the tonal behavior of the 3SG pronominal suffix is the same as that of the 1SG pronominal suffix. That is, if the structure in (295)c is utterance-final, L% association (94) will cause the final TBU to be associated to a right L% IP boundary and Tonal spread (72) will spread the H tone, delinking the M and resulting in a final surface [HL] contour. If the structure is not utterance-final, any following H tone will be realized as a downstepped H; Tonal spread will spread the H tone and the floating M will be the trigger for non-automatic downstep in the phonetic implementation.

4.7 Nouns borrowed from English

Words borrowed into Saxwe from European languages come mainly from three sources: English (likely Ghanaian or Nigerian English), French, and Portuguese. The majority of the borrowed words that I have in my data are borrowed from English, so I will focus primarily on those in this section.

When words are borrowed from English, closed syllables are resyllabified into open syllables, often by the addition of an epenthetic vowel—usually [u] if the preceding vowel is rounded and [i] if the preceding vowel is unrounded. Words that end orthographically in *er* in English are pronounced with a final [a].

The default tonal assignment for borrowed words is that the nucleus of a syllable that would normally bear primary stress in the original language is assigned

H tone and the nuclei of all other syllables are assigned L tone. This is seen in the following examples. In all of these examples, primary stress (and therefore H tone) falls on a non-final syllable of the word.

(296)   Borrowed nouns—H on non-final syllable, L elsewhere

a.	/ᴹ⁻bíjà/	[bíjà]	beer	sxw-L0008-borrowed words-un.wav
b.	/ᴹ⁻bólù/	[bólù]	ball	sxw-L0010-borrowed words-un.wav
c.	/ᴹ⁻kábìtà/	[kábìtà]	carpenter	sxw-L0011-borrowed words-un.wav
d.	/ᴹ⁻zígì/	[zígì]	roofing (zinc)	sxw-L0016-borrowed words-un.wav
e.	/ᴹ⁻kótù/	[kótù]	coat	sxw-L0015-borrowed words-un.wav
f.	/ᴹ⁻fádà/	[fádà]	priest (Father)	sxw-L0012-borrowed words-un.wav
g.	/ᴹ⁻ɦlɔ́bà/	[ɦlɔ́bà]	rubber, plastic	sxw-L0021-borrowed words-un.wav
h.	/ᴹ⁻tʃɛ̃́dʒì/	[tʃɛ̃́dʒì]	change	sxw-L0022-borrowed words-un.wav
i.	/ᴹ⁻sɔ́dʒà/	[sɔ́dʒà]	soldier, police	sxw-L0023-borrowed words-un.wav
j.	/ᴹ⁻télà/	[télà]	tailor	sxw-L0025-borrowed words-un.wav
k.	/ᴹ⁻tájà/	[tájà]	tire	sxw-L0028-borrowed words-un.wav
l.	/ᴹ⁻sód̪à/	[sód̪à]	baking soda	sxw-L0040-borrowed words-un.wav
m.	/ᴹ⁻bɔ́tà/	[bɔ́tà]	butter, margarine	sxw-L0030-borrowed words-un.wav
n.	/ᴹ⁻kɛ̃́tà/	[kɛ̃́tà]	vending table (counter)	sxw-L0033-borrowed words-un.wav
o.	/ᴹ⁻kàtàpílà/	[kàtàpílà]	bulldozer (Caterpillar)	sxw-L0006-borrowed words-un.wav
p.	/ᴹ⁻kɛ̀tátà/	[kɛ̀tátà]	drama, play (cantata)	sxw-L0034-borrowed words-un.wav

Here we see that consonant quality of the syllable onset plays no role in the assignment of tone in borrowed words. Syllables that begin with voiced obstruents do not necessarily have L tone assigned to them, and L tone is present in many syllables that do not begin with a voiced obstruent.

A L which is assigned to a borrowed word interacts with other tones in a manner which is just like any other L in the language. The L on a borrowed word blocks H spread, and any following H is realized at a level which is automatically downstepped in the phonetic implementation. This is seen in (297).

(297) /^{M-} télà   kpɔ̃́   ^{M-} tòfjókà   xé/
      [télà   kpɔ̃́   tòfjókà   xé]
      tailor   see   tapioca   this
      A tailor found this tapioca. sxw-L0076-register tests-un.wav

té-   là   kpɔ̃́   tò-   fjó-   kà   xé
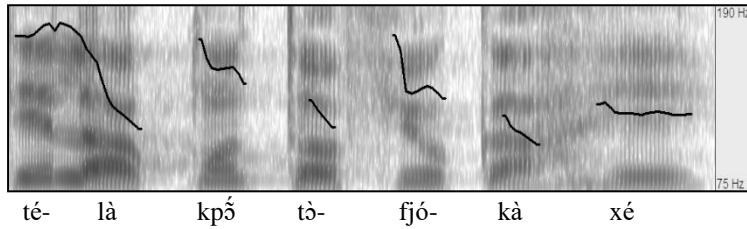
    Also, the determiner [lá] is realized with a surface L following these words, just as it is when it follows a noun of the /M.L/ tone pattern (see section 3.7). This is seen below.

(298)   Nouns borrowed from English followed by determiner [lá]

a.   [bíjà là°]   the beer   sxw-L0103-borrowed words-un.wav
b.   [bɔ́lù là°]   the ball   sxw-L0104-borrowed words-un.wav
c.   [kábìtà là°]   the carpenter   sxw-L0106-borrowed words-un.wav

    Borrowed nouns do not have the initial vowel that monomorphemic nouns in Saxwe normally have. Instead, they are assigned a left M- floating tone just like any other PW which fills the head slot of a NP but which does not have an initial vowel (see section 4.3). The presence of this left M- floating tone is detected by the fact that it triggers non-automatic downstep between the H tone of a borrowed noun and the H of the preceding TBU. This can be seen in (299).

(299)   Evidence of the left M- floating tone

a.   /^{M-} é kpɔ̃́ ^{M-} bíjà lá/   [é kpɔ̃́ ↓bíjà là°]   He saw the beer.
                                                                        sxw-L0059-borrowed words-un.wav
b.   /^{M-} é kpɔ̃́ ^{M-} bɔ́lù lá/   [é kpɔ̃́ ↓bɔ́lù là°]   He saw the ball.
                                                                        sxw-L0061-borrowed words-un.wav
c.   /^{M-} é kpɔ̃́ ^{M-} kábìtà lá/   [é kpɔ̃́ ↓kábìtà là°]   He saw the carpenter.
                                                                        sxw-L0062-borrowed words-un.wav

    A few frequently-used borrowed words that are lexically assigned H tone on a non-final syllable have M (rather than L) assigned to the adjacent TBU to the right. This means that the H is able to spread to the M TBU according to the rule of Tonal spread. Note, however, that a M tone can only be lexically assigned to a TBU

of a borrowed word if the onset of the syllable contains a non-depressor consonant. The following are the isolation forms of these words.[81]

(300)   Borrowed nouns—H on non-final syllable, M on following syllables

a.   /ᴹ⁻ tʃɔ́tʃĩ/   [tʃɔ́tʃĩ̀]   church   sxw-L0013-borrowed words-un.wav
b.   /ᴹ⁻ tʃĩ́tʃã/   [tʃĩ́tʃâ]   teacher   sxw-L0004-borrowed words-un.wav
c.   /ᴹ⁻ tìmã́tĩ/   [tìmã́tî̀]   tomato   sxw-L0042-borrowed words-un.wav

        Tonal spread causes the H to be spread rightward. As a result of the association of the L₍% IP boundary tone, there is a surface HL fall on the final TBU of the isolation forms of these words.[82]

        There is no final surface HL contour when one of these words is found utterance-medially. Instead, the floating M (rendered floating because of Tonal spread) triggers non-automatic downstep when the TBU that follows one of these words is H.

(301)   Evidence of the presence of M on nouns with H on non-final syllable

a.   /ᴹ⁻ é kpɔ́ ᴹ⁻ tʃɔ́tʃĩ lá/   [é kpɔ́ ↓tʃɔ́tʃĩ ↓lá]   He saw the church.
                                       sxw-L0064-borrowed words-un.wav
b.   /ᴹ⁻ é kpɔ́ ᴹ⁻ tʃĩ́tʃã lá/   [é kpɔ́ ↓tʃĩ́tʃǎ ↓lá]   He saw the teacher.
                                       sxw-L0055-borrowed words-un.wav
c.   /ᴹ⁻ é kpɔ́ ᴹ⁻ tìmã́tĩ̄ lá/   [é kpɔ́ tìmã́tî ↓lá]   He saw the tomato.
                                       sxw-L0089-borrowed words-un.wav

        There is a possibility that these words in (301) may have been borrowed earlier in the history of the language than those seen earlier in (296); the manner in which tone is assigned to these borrowed words in (301) reflects a two-way {H, Ø} contrast in which L is not an option to be lexically assigned to a word (see section 3.9). Another possibility is that these words arrived in Saxwe through another Gbe language and it is for this reason that their tonal assignment differs from that of words borrowed directly from Ghanaian or Nigerian English.

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[81] The word 'teacher' is realized by some speakers as [tʃĩ́tʃà], indicating that for those speakers, L rather than M is lexically assigned to the second TBU. I have not observed the same interspeaker variation for the other two words listed here.

[82] There are two words that are realized by the primary language consultant I worked with without this final HL fall. They are /ᴹω fláwã/ (surface form [fláwá]) 'flower', and /ᴹω kplúlwī/ (surface form [kplúlwí]) 'pulley'. In a clause, a H which follows either of these words is downstepped—evidence that there is a M in the underlying lexical tone assigned to these words. One possible explanation for the lack of final fall in the isolation form is that these words may have been re-interpreted as being noun compounds with a right Hω boundary.

So far the examples looked at have been words where primary stress in the source language (and therefore H tone in the target language) falls on a non-final syllable. When primary stress in the source language falls on the final syllable, the word in Saxwe is assigned a H tone associated to the TBU of the final syllable—following the same principle as with other borrowed words. In addition, it is assigned a floating M tone following this TBU. In this respect, it resembles the /M.H ^{M}/ tone pattern discussed in section 3.7.4.

The floating M at the word's right edge is indirectly responsible for creating a surface HL fall on the final syllable of the word when it is found in isolation.

(302)   Borrowed nouns—H on final syllable, floating M following

a.   /$^{M\text{-}}$ sùklú ^{M}/   [sùklû]   school   sxw-L0007-borrowed words-un.wav
b.   /$^{M\text{-}}$ sìgá ^{M}/   [sìgâ]   cigarette   sxw-L0014-borrowed words-un.wav
c.   /$^{M\text{-}}$ bèǹglá ^{M}/   [bèǹglâ]   cemetery   sxw-L0018-borrowed words-un.wav
                                                                      (burying ground)

Because the rightmost tone is non-high, the L$_%$ boundary associates to the final TBU of the word (see the rule of L$_%$ association in (94)). The combination of having both a H tone and a L$_%$ boundary associated to the same TBU creates the surface HL falling contour.

When these nouns are followed by a TBU that is underlyingly H, the floating M triggers non-automatic downstep between the H of the borrowed word and the following H.

(303)   Evidence of the right floating M on nouns with syllable-final H

a.   /$^{M\text{-}}$ é kpɔ́ $^{M\text{-}}$ sùklú ^{M} lá/   [é kpɔ́ sùklú $^{↓}$lá]   He saw the school.
                                                                              sxw-L0058-borrowed words-un.wav
b.   /$^{M\text{-}}$ é kpɔ́ $^{M\text{-}}$ sìgá ^{M} lá/   [é kpɔ́ sìgá $^{↓}$lá]   He saw the cigarette.
                                                                              sxw-L0065-borrowed words-un.wav
c.   /$^{M\text{-}}$ é kpɔ́ $^{M\text{-}}$ bèǹglá ^{M} lá/   [é kpɔ́ bèǹglá $^{↓}$lá]   He saw the cemetery.
                                                                              sxw-L0069-borrowed words-un.wav

To summarize, it is clear that when words borrowed from English are incorporated into the tonal system of Saxwe, there is a preference for assigning to the underlying tone pattern of the borrowed word a non-high tone on the right edge—either a linked L, a linked M, or a floating M.[83]

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[83] The exceptions I am aware of are: /^{Mω} klèzí/ (surface form [klèzǐ]) from 'kerosene' and /^{Mω} máŋū̄gó/ (surface form [máŋ́$^{↓}$gó]) from 'mango'.

There are some interesting cases where borrowings have been incorporated into larger PWs through compounding or derivation, and in these cases, the PW will be assigned a right H$_\omega$ boundary (section 4.1.2), and all postlexical operations will operate on the word as usual. For example, 'puffy sleeve' is /$^{\text{M-}}$ pɔ́fù-bɔ́ $^{\text{Hω}}$/, which is a compounding of /$^{\text{M-}}$ pɔ́fù/ 'puff' and /ābɔ́/ 'arm'. Partial L spread (183) causes the surface realization of this compound to be [pɔ́fù-bɔ̀].

Another interesting example is a noun derived through reduplication from the borrowed verb /kísí/ 'kiss'. The reduplication prefix is employed to derive the nominal form /$^{\text{M-}}$ kí-kísí $^{\text{Hω}}$/, with the surface output [kí-kísí] 'action of kissing'.

The topic of word borrowing in Saxwe merits a more detailed examination and analysis. Such a study could include borrowings from languages besides English and borrowings into categories of speech besides nouns.

4.8   The determiner [lá] and the relativizer [nā́]

The determiner [lá] and the relativizer [nā́] display a tonal peculiarity which I do not observe anywhere else in the data. Normally, an underlying H TBU with a sonorant onset has one of two possible surface realizations: (1) [LH] if the conditions for Partial L spread (106) are met at a certain point in the derivation; or (2) [H] elsewhere.

The determiner [lá] and the relativizer [nā́] each have four possible surface realizations: (1) non-falling [L°] utterance-finally when the morpheme follows a lexically-assigned L tone (with or without a floating H); (2) [L] utterance-medially when the morpheme follows a lexically-assigned L tone (with or without a floating H); (3) [LH] when the morpheme follows a lexically-assigned LH contour; and (4) [H] elsewhere.

The difference between the tonal behavior of the determiner [lá] and the tonal behavior of the verb /ɲɔ́/ 'be good' can be seen in (304) where the points of divergence in surface realizations are marked in bold.

(304)   Comparing the H verb /ɲɔ́/ 'be good' and the determiner [lá]

/M.H/	/ōsɔ́/	[ōsɔ́ ɲɔ́]	[ōsɔ́ lá]
	horse	sxw-L0028-clause frames-un.wav	sxw-L0113-noun phrases-un.wav
/M.M/	/ōxɛ̄/	[ōxɛ̄ ɲɔ́]	[ōxɛ̄ lá]
	bird	sxw-L0010-clause frames-un.wav	sxw-L0005-noun phrases-un.wav
/M.M ᴴ/	/ōsī ᴴ/	[ōsī ɲɔ́]	[ōsī lá]
	wife	sxw-L0088-clause frames-un.wav	sxw-L0089-noun phrases-un.wav
/M.H ᴹ/	/ōklá ᴹ/	[ōklá ↓ɲɔ́]	[ōklá ↓lá]
	soul	sxw-L0130-clause frames-un.wav	sxw-L0105-noun phrases-un.wav
/M.LH/	/ōgbɔ̌/	[ōgbɔ̀ ɲɔ́]	[ōgbɔ̀ lǎ]
	goat	sxw-L0058-clause frames-un.wav	sxw-L0017-noun phrases-un.wav
/M.L/	/ōdà̌/	**[ōdà̌ ɲɔ̌]**	**[ōdà̌ là°]**
	snake	sxw-L0052-clause frames-un.wav	sxw-L0029-noun phrases-un.wav
/M.L ᴴ/	/ōɦwè ᴴ/	**[ōɦwè ɲɔ̌]**	**[ōɦwè là°]**
	fish	sxw-L0094-clause frames-un.wav	sxw-L0077-noun phrases-un.wav
/L.H/	/òdʒú/	[ōdʒǔ ɲɔ́]	[òdʒǔ lá]
	rain	sxw-L0112-clause frames-un.wav	sxw-L0121-noun phrases-un.wav

When the determiner [lá] and the verb /ɲɔ́/ follow underlying H, M, or LH TBUs, they have identical surface realizations—either [H], [↓H], or [LH]. However, when the determiner [lá] follows an underlying L TBU (with or without a floating H), it is realized as non-falling [L°] utterance-finally. This is different from the verb /ɲɔ́/, which is realized with a surface [LH] rise following an underlying L TBU because of Partial L spread (106).

Here in (305), the relativizer [nɔ́] is utterance-medial. It is compared to the associative marker /wé/ and again, the points of divergence are marked in bold.

(305)   Comparing the H associative marker /wé/ and the relativizer [nǎ]

		/… wé ōnű́/ '...'s thing' … AM thing	**/… nã ᴹ⁻ kō kpɔ́/** '...that I saw' … REL 1SG see
/M.H/	/ōló/ crocodile	[ōló wé ó↓nű́] sxw-L0003-associative construction-un.wav sxw-L0070-low spread tests-un.wav	[ōló nǎ́ kó ↓kpɔ́]
/M.M/	/ōɲĩ̌/ cow	[ōɲĩ̌ wé ó↓nű́] sxw-L0004-associative construction-un.wav sxw-L0052-low spread tests-un.wav	[ōɲĩ̌ nǎ́ kó ↓kpɔ́]
/M.M ᴴ/	/ōnɔ̄ ᴴ/ wife	[ōnɔ̄ wé ó↓nű́] sxw-L0075-low spread tests-un.wav sxw-L0071-low spread tests-un.wav	[ōnɔ̄ nǎ́ kó ↓kpɔ́]
/M.H ᴹ/	/ōklá ᴹ/ soul	[ōklá ↓wé ó↓nű́] sxw-L0076-low spread tests-un.wav sxw-L0072-low spread tests-un.wav	[ōklá ↓nǎ́ kó ↓kpɔ́]
/M.LH/	/ōvǔ̄/ dog	[ōvǔ̄ wě ó↓nű́] sxw-L0002-associative construction-un.wav sxw-L0048-low spread tests-un.wav	[ōvǔ̄ nǎ́ kó ↓kpɔ́]
/M.L/	/ōdà̌/ snake	**[ōdà̌ wě** ó↓nű́] sxw-L0001-associative construction-un.wav sxw-L0047-low spread tests-un.wav	**[ōdà̌ nǎ̀** kò kpɔ́]
/M.L ᴴ/	/ōɦwè ᴴ/ fish	**[ōɦwè wě** ó↓nű́] sxw-L0077-low spread tests-un.wav sxw-L0073-low spread tests-un.wav	**[ōɦwè nǎ̀** kò kpɔ́]
/L.H/	/òdʒú̌/ rain	[òdʒú̌ wé ó↓nű́] sxw-L0078-low spread tests-un.wav sxw-L0074-low spread tests-un.wav	[òdʒú̌ nǎ́ kó ↓kpɔ́]

Like the determiner [lá], the relativizer [nǎ́] is realized [L] following an underlying L TBU (with or without a floating H). This is different from the associative marker /wé/, which is realized with a surface [LH] rise following an underlying L TBU (again because of Partial L spread).

Assigning an underlying tone to these two function words is problematic. If the function word is assumed to be underlyingly H, it becomes hard to explain why it is realized [L] afer an underlying L tone. If the function word is assumed to be underlyingly L, it becomes hard to explain why it is realized H after an underlying H or M tone. If the function word is assumed to be underlyingly LH, it becomes hard to explain why it is realized [H] after an underlying M tone. The data indicate that there must be something unusual about the lexical assignment of tone to these function words.

Clearly the surface tone of these function words is closely tied to the tone of the preceding element. For this reason, I start with the assumption that both these function words, [lá] and [nä́], are encliticized to the preceding PW. Any tonal interaction between these enclitics and the PW to which they are cliticized is a lexical interaction.

The working hypothesis I have is that these particular function words are underlyingly assigned an unassociated H tone—in other words, a floating H. However, before this floating H can associate to the TBU of the function word, there is a process of tone copying that takes place in the lexical stage of the phonology, like the tone copying that occurs with the reduplication prefix in verbal reduplication (section 4.4.3). A single tone is copied from the immediately preceding syllable, and only linked tones are copied. Following the copy of tone, the floating H is permitted to associate to the function word if and only if the TBU of this function word is linked to M tone. (This is reminiscent of the postlexical rule of Grammatical tone docking A (102), which states that a floating grammatical tone is only permitted to dock rightward if the TBU is M.) The lexical association of this floating H delinks the M tone that was assigned to the function word by tone copy. These hypothesized lexical processes are shown in (306). The final form entering the postlexical stage of the derivation is bolded.

(306)   Hypothetical lexical processes involved with determiner /la ^{H}/

			1st - copy tone to clitic	2nd - floating H association
/M.H/	horse	/ōsɔ́=la ^{H}/	**ōsɔ́=lá**	--
/M.M/	bird	/ōxɛ̄=la ^{H}/	ōxɛ̄=lā ^{H}	**ōxɛ̄=lá**
/M.M ^{H}/	wife	/ōsī ^{H}=la ^{H}/	ōsī ^{H}=lā ^{H}	**ōsī ^{H}=lá**
/M.H ^{M}/	soul	/ōklá ^{M}=la ^{H}/	**ōklá ^{M}=lá**	--
/M.LH/	goat	/ōgbɔ̌=la ^{H}/	**ōgbɔ̌=lá**	--
/M.L/	snake	/ōdà̄=la ^{H}/	**ōdà̄=là ^{H}**	--
/M.L ^{H}/	fish	/ōɦwè ^{H}=la ^{H}/	**ōɦwè ^{H}=là ^{H}**	--
/L.H/	rain	/òdʒú=la ^{H}/	**òdʒú=lá**	--

For ease of reading, I have left out in the rightward columns in (306) the floating H when it appears to the right of a TBU already associated to H tone. In cases where it appears to the right of a L TBU, this floating H prevents L$_{\%}$ association in the postlexical derivation.

Interestingly, the determiner [lá] displays the same tonal behavior regardless of the category of word which precedes it. We can see this below where it is cliticized to the verb of the relative clause.

(307) /ōɲĩ̄   xéní̋   sɔ̋=la ᴴ/
      [ōɲĩ̄   xéní̋   **sɔ̋**   **lá**/
      cow   REL   leave   DET
      the cow that left sxw-L0079-low spread tests-un.wav

(308) /ōɲĩ̄   xéní̋   gbɔ̌=la ᴴ/
      [ōɲĩ̄   xéní̋   **gbɔ̌**   **là˚**/
      cow   REL   return   DET
      the cow that returned sxw-L0081-low spread tests-un.wav

However it is accounted for, there is no denying that the tonal behavior of these function words is exceptional in Saxwe. It would be worth exploring in other Gbe languages whether the cognates of these morphemes also display exceptional tonal behavior.[84]

Note that while I believe that the determiner /la ᴴ/ has a floating H lexically assigned to it, in this study, I have in some examples given the underlying form of the determiner as /lá/ in derivations which show only postlexical operations. I have done this in situations where I know that at the end of the lexical stage, the determiner would have H associated to it. This is done in order to prevent having to give an explanation of the exceptional tonal behavior of /la ᴴ/ in every instance where my examples include this morpheme.

4.9 Ideophones and tone

Ideophones are words that often have unusual phonological properties. They may sound in some way like the concept being communicated. They tend to be challenging to categorize with respect to word classes (Ameka, 2001). Ideophones may be more common in narrative discourse than in other genres (Payne, 2012).

In Gbe languages, ideophones are not confined to a specific grammatical category, nor do they represent a distinct grammatical category; the same ideophonic form may function either as an adverb or as an adjective (Ameka, 2001). In Saxwe, a prototype (or central member) of the ideophonic word would have the following phonological properties: (1) all of the vowels in the word share the same features; (2) the word may be lengthened for pragmatic effect, or alternatively, part or all of the word may be repeated for effect; (3) there is only one underlying tone for the word and this tone is either H or L. Of course, not all words that might be labeled as ideophones display all of these properties.

In addition, there is a correlation between the tone of an ideophone and the semantics of the word. Words that denote reduced amplitude, smallness, closeness, immediacy, or absence have a strong tendency to be H. Words that denote increased

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[84] As a side remark, it is possible that the determiner [lá], which marks discourse specificity (see section 1.8.1) and the relativizer [ná̋] are in some way related historically.

amplitude, largeness, distance, longevity, or volume have a strong tendency to be L. Examples of each tone category are given in (309) and (310).

(309)   H ideophones - often connected with reduced quantity

a.	/kété-kété/	small	sxw-L0002-Ideophones-un.wav
b.	/pló-pló-pló/	spotless	sxw-L0005-Ideophones-un.wav
c.	/tróló/	now, just recently, fast	sxw-L0007-Ideophones-un.wav
d.	/tróló-ló/	now, just recently, fast	sxw-L0022-Ideophones-un.wav
e.	/tróló-tróló/	now, just recently, fast	sxw-L0008-Ideophones-un.wav
f.	/pɛ́-pɛ́-pɛ́/	exactly	sxw-L0010-Ideophones-un.wav
g.	/pɛ́ɛ́/	exactly	sxw-L0017-Ideophones-un.wav
h.	/tʃɛ̃́-tʃɛ̃́-tʃɛ̃́/	silently	sxw-L0011-Ideophones-un.wav
i.	/kétʃɛ̃́-kétʃɛ̃́/	describes walking with feet that are shackled	sxw-L0012-Ideophones-un.wav
j.	/sé-sé-sé/	emptied	sxw-L0013-Ideophones-un.wav
k.	/blé-blé-blé/	fast	sxw-L0021-Ideophones-un.wav
l.	/bléwɛ̃́/	quickly	sxw-L0024-Ideophones-un.wav
m.	/fí-fí/	right now	sxw-L0025-Ideophones-un.wav
n.	/gbá-gbá-gbá/	a lot	sxw-L0033-Ideophones-un.wav
o.	/tó-tó-tó/	silently	sxw-L0035-Ideophones-un.wav
p.	/xwíí/	silently	sxw-L0038-Ideophones-un.wav

(310)   L ideophones - often connected with increased quantity

a.	/fìlìdì-dì/	with heaviness	sxw-L0009-Ideophones-un.wav
b.	/jɛ̀ɛ̀/	unintelligent	sxw-L0015-Ideophones-un.wav
c.	/tὲgbɛ̀ɛ̀/	always	sxw-L0018-Ideophones-un.wav
d.	/tὲgbɛ̀ɛ̀-tὲgbɛ̀ɛ̀/	always, forever	sxw-L0019-Ideophones-un.wav
e.	/blὲwùù/	slowly	sxw-L0023-Ideophones-un.wav
f.	/dà̃-dà̃-dà̃/	necessarily	sxw-L0029-Ideophones-un.wav
g.	/gbὲd̞ὲ/	never	sxw-L0030-Ideophones-un.wav
h.	/dʒì-dʒìì/	slowly	sxw-L0031-Ideophones-un.wav
i.	/gbɔ̀kɔ̀ɔ̀/	without haste	sxw-L0032-Ideophones-un.wav
j.	/gbà-gbà-gbà/	with force	sxw-L0034-Ideophones-un.wav
k.	/glòbòtò-tòò/	round	sxw-L0037-Ideophones-un.wav

The correlation between tone and semantics is not completely clear in every instance. For example, /gbá-gbá-gbá/ of (309)n means 'a lot', but does not have L

tone, as one might expect. Taking another example, it is not clear why /jɛ̀ɛ̀/ 'unintelligent' of (310)b has L tone.

Despite these outlier cases, the general trend holds. Words that denote reduced amplitude, smallness, closeness, immediacy, or absence have a strong tendency to be H, while words that denote increased amplitude, largeness, distance, longevity, or volume have a strong tendency to be L. In pairings of opposites, for example, the reduced amplitude option is H and the increased amplitude option is L. Some examples of this are given in (311).

(311)   Ideophone opposites

a.   /bléwǔ/   quickly   sxw-L0024-Ideophones-un.wav

       /blɛ̀wùù/   slowly   sxw-L0023-Ideophones-un.wav

b.   /tróló/   now, just recently, fast   sxw-L0007-Ideophones-un.wav

       /tɛ̀gbɛ̀ɛ̀/   always   sxw-L0018-Ideophones-un.wav

Note from examples given in (309) through (311) that although the H ideophones often contain voiceless obstruents and the L ideophones often contain voiced obstruents, this is not always the case, and the reverse can hold true.

So far, I have looked mostly at ideophones that function as adjectives or adverbs. There are some words that function as nouns in Saxwe that seem to be of ideophonic origin. Of the ones I am aware of, there may be either H or L tone (or both) assigned to these words.

(312)   Nouns possibly of ideophonic origin

a.   /ᴹ⁻ gɛ̀kɛ́/   bicycle   sxw-L0011-other nouns-un.wav

b.   /ᴹ⁻ kpákpá/   duck   sxw-L0012-other nouns-un.wav

c.   /ᴹ⁻ gòklò/   chicken   sxw-L0013-other nouns-un.wav

Note that because these ideophonic words function as nouns, we see the presence of the left M- floating tone (see section 4.3).

Ideophones present an interesting example of monomorphemic words in Saxwe that are polysyllabic without the presence of an initial vowel. In section 3.7, I discuss the fact that monomorphemic nouns in Saxwe (with the exception of borrowed words and pronouns) are constrained to be minimally bisyllabic. This is usually ensured by the presence of an initial vowel preceding the C(C)V-shaped syllable. Here in these ideophonic forms, we see that a monomorphemic noun can be polysyllabic without this initial vowel.

4.10 Conclusions

The phonological word is an important entity in the Saxwe tone system. Given the multitude of word-formation and lexicon-building strategies that exist in Saxwe, tone plays a significant role in many of these strategies.

In this chapter, we see that structurally-driven boundary tone at the word-level is one of the means by which tone is used to identify categories of words that have certain structures in common. The right H$_\omega$ boundary tone helps to identify PWs that share a particular prosodic structure that involves recursivity at the level of the PW (section 4.1).

There is also a left floating M- tone which marks a word that is functioning as the head of a noun phrase (sections 4.3 and 4.4). This floating M- tone is present wherever there is no initial vowel on the noun.

Tone plays a role in distinguishing between two types of reduplication that exist in Saxwe—the kind that involves a prefix and the copying of tone from the stem, and the kind that does not involve a prefix but is simply a copying of the word with the insertion of a floating M between copies (sections 4.4.3 and 4.5).

If we take the case of the pronominal 1SG and 3SG suffixes that are affixed to the verb (section 4.6), we see that these grammatical morphemes have a high degree of segmental underspecification and that M tone is crucially one of the few things that is specified about these morphemes. The study of these pronominal suffixes also provides the clearest evidence for the claim that the mora, rather than the syllable, is the TBU in Saxwe.

Tone is often assigned in relatively consistent ways to certain types of words. For example, tone is assigned to borrowed words with relation to stress in the language of origin, with stress being reinterpreted as H tone in Saxwe (section 4.7). In the case of two encliticized function words (the determiner [la] and the preposition [nã]), it is a lexical process of tone copy which accounts for much of the surface consistency between the tone of the function word and the tone of the preceding element (section 4.8). In ideophones, tone is often correlated with the meaning conveyed by the ideophone (section 4.9), and H or L are the two options for tone assigned to the ideophone.

In this chapter, I have focused on tone as it relates to word-level structures. I turn in chapter 5 to structures at the intonational phrase level, looking at tonal boundaries that operate on phrases rather than words. I also examine tone which marks a particular syntactic meaning without any associated segmental information (labeled as grammatical tone).