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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 further 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 [ná], 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.

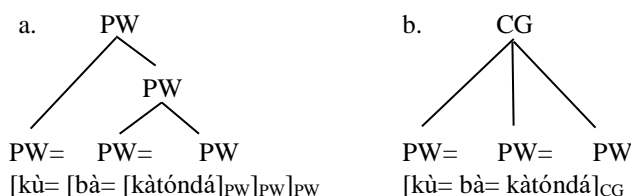
(203) [babá]_{PW} [vá-babá]_{PW} [vángu]_{PW}
 father of-father my
 father of my father (Myers (1995:85))

(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-kàtòndá] 'on the gods' from Hyman (2008, p. 339)



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 can 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	C \check{V}	C \check{V}
depressors	C \check{V}	C \acute{V}
non-depressors	C \acute{V}	C \acute{V}

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

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_0 boundary

In Saxwe, the assignment of the H_0 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_0 boundary in Saxwe.

There are two categories that are important when considering the structure of PWs and the assignment of the H_0 boundary in Saxwe. These two categories are: (1) PWs, and (2) affixes. The H_0 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_0 boundary

...]_{PW}]_{PW} H_0

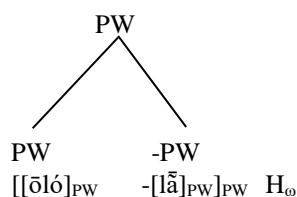
I take first the example of a N-N compound. Compounding serves a variety of semantic functions, including marking a part-whole relationship, a relationship of ownership, and a qualifying relationship. In the process of compounding, the second noun in a N-N compound loses both its initial vowel and the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

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. / $\bar{o}l\acute{o}$ + $\bar{o}l\bar{a}^{H_{\omega}}$ / [$\bar{o}l\acute{o}-l\bar{a}$] crocodile meat
 sxw-L0269-polymorphemic nouns-un
- b. / $\bar{a}d\acute{i}$ + $\bar{o}f\acute{u}^{H_{\omega}}$ / [$\bar{a}d\acute{i}-f\acute{u}$] soap fur (soapsuds)
 sxw-L0051-polymorphemic nouns-un
- c. / $\bar{o}t\bar{o}$ + $\bar{o}g\check{a}^{H_{\omega}}$ / [$\bar{o}t\bar{o}-g\check{a}$] 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 [$\bar{a}d\acute{i}-f\acute{u}$], which is derived from / $\bar{a}d\acute{i}$ / 'soap' and / $\bar{o}f\acute{u}$ / '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 [$\bar{o}l\acute{o}-l\bar{a}$] 'crocodile meat' in (208)a comes from / $\bar{o}l\acute{o}$ / 'crocodile' and / $\bar{o}l\bar{a}$ / 'meat, animal' and its structure is as follows.

(209) Structure of [$\bar{o}l\acute{o}-l\bar{a}$] 'crocodile meat'

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 [$\bar{o}t\bar{o}-g\check{a}$] 'village leader', derived from / $\bar{o}t\bar{o}$ / 'village' and / $\bar{o}g\check{a}$ / '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_0 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_0 boundary does not ever link to a TBU, but operates instead as a floating tone.

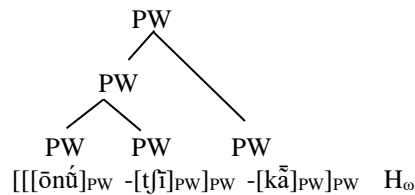
We can now turn to more examples of compounds that have on their right edge a H_0 boundary.

(210) More compounds which have on their right edge a H_0 boundary

- | | | | | |
|-------|----|----------------------------------|----------------------------|--|
| N-V-N | a. | /ōnũ-tʃĩ-kā [̄] H_0 / | [ōnũ-tʃĩ-ká] | thing-sew-cord (thread) |
| | | | | <small>sxw-L0020-right H boundary tests-un.wav</small> |
| | b. | /āwũ-tʃĩ-kā [̄] H_0 / | [āwũ-tʃĩ-kā [̄]] | shirt-sew-cord (thread) |
| | | | | <small>sxw-L0021-right H boundary tests-un.wav</small> |
| | c. | /āvò-tʃĩ-kā [̄] H_0 / | [āvò-tʃĩ-kā [̄]] | cloth-sew-cord (thread) |
| | | | | <small>sxw-L0022-right H boundary tests-un.wav</small> |
| N-N | d. | /ōwĩ-sĩ [̄] H_0 / | [ōwĩ-sĩ] | bee-water (honey) |
| | | | | <small>sxw-L0173-polymorphemic nouns-un.wav</small> |
| N-V-V | e. | /ōxó-kā-sē [̄] H_0 / | [ōxó-ká-sé] | word-search-hear (question) |
| | | | | <small>sxw-L0023-right H boundary tests-un.wav</small> |

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_0 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 [ōnũ-tʃĩ-ká] 'thread', derived from /ōnũ/ 'thing', /tʃĩ/ 'sew', and /ōkā/ 'cord'.

(211) N-V-N complex nouns



It is not just compounding that generates the right H_0 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).

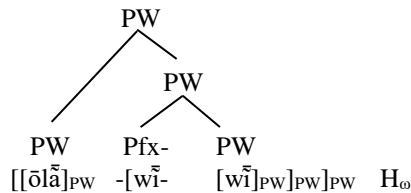
(212) Reduplicated forms which have on their right edge a H_{ω} boundary

N-redupV-V (action nominalization)	a.	/ $\bar{o}s\acute{o}-w\bar{i}-w\bar{i}$ H_{ω} /	[$\bar{o}s\acute{o}-w\acute{i}-w\acute{i}$]	horse REDUP-raise (horse-raising)
		sxw-L0007-right H boundary tests-un.wav		
	b.	/ $\bar{o}l\bar{a}-w\bar{i}-w\bar{i}$ H_{ω} /	[$\bar{o}l\bar{a}-w\bar{i}-w\bar{i}^{\circ}$]	animal REDUP-raise (animal-raising)
		sxw-L0008-right H boundary tests-un.wav		
	c.	/ $\bar{o}h\grave{a}-w\bar{i}-w\bar{i}$ H_{ω} /	[$\bar{o}h\grave{a}-w\grave{i}-w\grave{i}^{\circ}$]	pig REDUP-raise (pig-raising)
		sxw-L0009-right H boundary tests-un.wav		
N redupV-V (N + modifier)	d.	/ $\bar{o}n\acute{u} x\bar{i}-x\bar{s}$ H_{ω} /	[$\bar{o}n\acute{u} x\acute{i}-x\acute{s}$]	thing REDUP-buy (purchased thing)
		sxw-L0004-right H boundary tests-un.wav		
	e.	/ $\bar{a}w\bar{u} x\bar{i}-x\bar{s}$ H_{ω} /	[$\bar{a}w\bar{u} x\bar{i}-x\bar{s}^{\circ}$]	shirt REDUP-buy (purchased shirt)
		sxw-L0005-right H boundary tests-un.wav		
	f.	/ $\bar{a}v\grave{o} x\bar{i}-x\bar{s}$ H_{ω} /	[$\bar{a}v\grave{o} x\grave{i}-x\grave{s}^{\circ}$]	cloth REDUP-buy (purchased cloth)
		sxw-L0006-right H boundary tests-un.wav		

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.

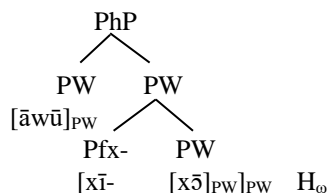
The depiction in (213) represents the action nominalization from (212)b, [$\bar{o}l\bar{a} w\bar{i}-w\bar{i}^{\circ}$] 'animal-raising/animal husbandry'. Here, the entire structure represents a single PW. The right edge H_{ω} boundary is responsible for the final non-falling M tone.

(213) Verbal reduplication (action nominalization)



If we look at (212)e [$\bar{a}w\bar{u} x\bar{i}-x\bar{s}^{\circ}$] '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)



In both cases, we have nested PW brackets on the right edge of the utterance, giving the $]_{\text{PW}}]_{\text{PW}}$ prosodic structure which generates a H_0 boundary. The evidence of this H_0 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 H_0 boundary is not related to phrase-level prosody rather than word-level prosody. We have looked at examples of structures where the H_0 right edge boundary is present. I now turn to examples of noun phrases where there is clearly no H_0 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 $\text{L}_\%$ 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.

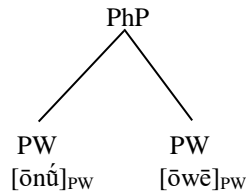
(215) Noun phrases which do not have a H_0 right edge boundary

a.	simple N	/ōxē/	[ōxē]	bird
		sxw-L0262-VCV nouns-bird-un.wav		
b.	N AM N	/ēmē wé otō/	[ēmē wé otō]	person AM village (person's village)
		sxw-L0008-associative construction-un.wav		
c.	N numeral	/ōnú owē/	[ōnú ówê]	thing two (two things)
		sxw-L0012-numbers-un.wav		
d.	N complex numeral	/āwū kō nūkú owē/	[āwū kō nūkú ówê]	shirt 20 and ⁶⁶ 2 (22 shirts)
		sxw-L0030-right H boundary tests-un.wav		

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.

⁶⁶ The form [nūkú] has no clear meaning, but it does appear to be related to such words as [ŋ^wūkúsí] 'eye' and [ŋ^wūkô] '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



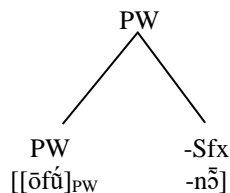
There are word-formation processes that do not generate a right H_{ω} boundary. I turn now to examples where the H_{ω} right edge boundary is absent because there is a suffix rather than a lexical morpheme at the right edge of the utterance. In (217), we see these examples.

(217) Words involving affixation which do not have a H_{ω} right edge boundary

a.	N-deriv suffix	/õfú-n̄/	[õfú-n̄]	fur-ATTRIB (hairy person)
b.	[N-N]-deriv suffix	/õwí-sí-n̄/	[õwí-sí-n̄]	bee-water-ATTRIB (honey salesperson)
c.	[N-V]-deriv suffix	/õtó-kú-n̄/	[õtó-kú-n̄]	ear-die-ATTRIB (deaf person)
d.	N pronoun- poss suffix	/õtú jē-t̄/	[õtú jé-t̄]	gun 3PL-POSS (their gun)
e.	N N-poss suffix	/āwū kōfí-t̄/	[āwū kōfí-t̄]	shirt Kofi-POSS (Kofi's shirt)

The suffix $/-n̄/$ 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 $[õfú-n̄]$ 'hairy person' is given below.

(218) N-suffix complex noun



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_{ω} 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 /-n̄/ or the possessive suffix /-t̄/. In the absence of a right H_ω boundary, the IP-final left L_% links to the right TBU of these complex forms.

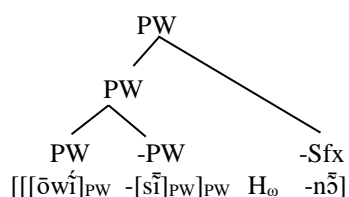
To summarize thus far, we see that when there are two nested PW boundaries at the right edge of a PW (as a result of compounding processes), a H_ω right edge boundary is generated. When there is a suffix at the right edge of a PW (as a result of affixation processes), the H_ω right edge boundary is not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

(219) Progressive word-formation processes and the H_ω right edge boundary

a.	/ɛs̄/	[ɛs̄]	water	sxw-L0099-VCV nouns- water-un.wav
b.	/ōwí-sí ^{H_ω} /	[ōwí-sí]	bee-water (honey)	sxw-L0173-polymorphemic nouns-un.wav
c.	/ōwí-sí ^{H_ω} -n̄/	[ōwí-sí-n̄]	bee-water-ATTRIB (honey-seller)	sxw-L0001-right H 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_ω boundary. We see evidence of the right H_ω 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_ω right edge boundary exist word-medially, but not word-finally. Because the H_ω 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-n̄ complex noun



Before finishing with this topic, I point out that there seems to be a connection between the H_ω 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 /ōtā^H/ 'head' and /ōnū^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 /tā^H/ 'at the top of' and /nū^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-nṣ^H/, realized [kōfí-nṣ] 'Kofi's mother', comes from /^M-kōfí/ 'Kofi (proper noun)' and /ōnṣ^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

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 ([-ε] 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 /òkjò̄^H/ 'root', /ámā̄^H/ 'leaf', /ákpā^H/ 'bark, peel, shell', and /áfā^H/ 'side'.

In all of these cases, a lexically-assigned floating H on the V.CV form renders the prosodically assigned H₀ 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 H₀ 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 /òkpō^H/ 'stick', /òfìwè^H/ 'fish', /églè^H/ 'species of black snake', and /òfjā̄^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 [òkú] '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.

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 [ɔ́nú] 'thing', [ɛ́mɛ́] 'person', [ɔ́xó] 'word, utterance', [ɔ́gbè] '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. Furthermore, 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 ɔ́nú/	→	[sɔ́ ɔ́nú]	gather one's things	lit. take thing
				<small>sxw-T0040-texts-un.wav</small>	
	/dɛ́ ɔ́kɔ́/	→	[dɛ́ kɔ́]	turn head	lit. remove neck
				<small>sxw-T0046-texts-un.wav</small>	
	/dū ɔ́gǎ/	→	[dū gǎ ^R]	become the leader	lit. eat leader
				<small>sxw-T0055-texts-un.wav</small>	
	/kǎ ɛ́mɛ́/	→	[kǎ mɛ́]	look for someone	lit. look for person
				<small>sxw-T0099-texts-un.wav</small>	
	/jī ɔ́tɔ́ mɛ́/	→	[jī tɔ́ mɛ́]	go to town	lit. go town in
				<small>sxw-T0099-texts-un.wav</small>	
	/dū ɔ́nú/	→	[dū nú]	eat	lit. eat thing
				<small>sxw-T0131-texts-un.wav</small>	
	/jɛ́ ɔ́mǐ/	→	[jɛ́ mǐ ^R]	defecate	lit. expel feces
				<small>sxw-T0132-texts-un.wav</small>	
	/kplá ɔ́dǎ/	→	[kplá dǎ ^R]	learn a job	lit. learn work
				<small>sxw-T0150-texts-un.wav</small>	
	/kplá ɔ́nú/	→	[kplá ɔ́nú]	learn something	lit. learn something
				<small>sxw-T0155-texts-un.wav</small>	
	/ná ɔ́hǒ/	→	[ná hǒ ^R]	give money	lit. give money
				<small>sxw-T0172-texts-un.wav</small>	
	/xɔ́ ɔ́nú/	→	[xɔ́ nú]	buy something	lit. buy thing
				<small>sxw-T0173-texts-un.wav</small>	
	/sɔ́ ɔ́mǐ/	→	[sɔ́ mǐ]	cross a street	lit. cut [archaic]
				<small>sxw-T0063-texts-un.wav</small>	path

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 /ōmǎ́/ 'path' is changed to the compound /āwǎ́-mǎ́/ 'asphalt-path'.

- (222) /sō ōmǎ́/ → [sō mǎ́] cross a street lit. cut [archaic]
sxw-T0063-texts-un.wav path
- /sō āwǎ́-mǎ́^{H₀}/ → [sō āwǎ́-mǎ́] cross a paved lit. cut [archaic]
 *[sō wǎ́-mǎ́] 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. /kplá ōdǎ́/ → [kplá ódǎ́^R] 'learn a job'
 or (lit. learn work)
 b. → [kplá dǎ́^R]
- c. /kplá ōnú/ → [kplá ó¹nú] 'learn something'
 or (lit. learn thing)
 d. → [kplá ¹nú]

It is the floating M which is responsible for the manner in which the underlying LH contour of /ōdǎ́/ '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 *[kplá dǎ́].

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.

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

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

(224) Optional vowel elision (postlexical)

$$\begin{array}{c}
 \text{T} \rightarrow \textcircled{\text{T}} / \text{V}]_{\text{Verb Noun}} [_ \\
 \neq \\
 \mu \\
 | \\
 \text{V} \\
 | \\
 \left. \begin{array}{c} \text{o} \\ \varepsilon \end{array} \right\}
 \end{array}$$

This rule states that at the boundary between a verb and a following noun, the initial vowels /o/ or /ε/ 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/, /ε/ 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 H₀ 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 /mí/ '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 kpó ^{M-}mí/
 [é kpó ↓mí]
 3SG see 1PL
 He saw us. sxw-L0046--pronouns-un.wav

(226) /blé ^{M-}é lē Ø^{H%} /⁷³
 [blé ↓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.

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 kpó[́] ^{M-}tʃítʃā lá/
 [é kpó[́] tʃítʃā[̀] 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 kpó[́] ^{M-}gbě-ṅā-tó/
 [é kpó[́] gbè-ṅā-tó]
 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 [ótú] 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 kpó[́] ótú xé/
 [jē kpó[́] ó[̀]tú xé]
 3PL see gun DEM
 They saw this gun. sxw-L0002-NP boundary tests-un.wav

- (230) /^{M-}jē^H kpó[́] ^{M-}xé/
 [jē kpó[́] 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 kpǎ́ ájá é-tǎ́/
 [é kpǎ́ á^ljá é-tǎ́]
 3SG see comb 3SG-POSS
 He saw his comb. *sxw-L0007-NP boundary tests-un.wav*

- (232) /^M-é kpǎ́ ^M-é-tǎ́/
 [é kpǎ́ ^lé-tǎ́]
 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 kpǎ́ ǒtú dǒkpó lá/
 [jē kpǎ́ ǒ^ltú dǒkpó lá]
 3PL see gun one DEF
 They saw the one gun. *sxw-L0020-NP boundary tests-un.wav*

- (234) /^M-jē^H kpǎ́ ^M-dǒkpó lá/
 [jē kpǎ́ ^ldǒkpó 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 kpǎ́ ǒwí kú-kú lá jē^H/
 [jē kpǎ́ ǒ^lwí 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 kpǎ́ ^M-kú-kú lá jē^H/
 [jē kpǎ́ ^lkú-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 /zětét/ '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 /zěté/.

- (237) /^{M-}jē^H kpó ɔnú zěté jē^H/
 [jē kpó ɔnú zěté jé]
 3PL see thing all PL
 They saw all of the things. sxw-L0030-NP boundary tests-un.wav

- (238) /^{M-}jē^H kpó ^{M-}zěté jē^H/
 [jē kpó zěté 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 jó ^{M-}gòsú-táǎí-é/⁷⁴
 [jē jó gòsú-táǎí-é]
 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 /táǎí/ 'paternal aunt' because the head of the NP is the entire PW [gòsú-táǎí-é]. In an alternative structure in (240) involving the associative marker /wé/, a M- floating tone is present at the left edge of /táǎí/ 'paternal aunt', because that is the head of a noun phrase in this utterance.

- (240) /ɔtós wé ^{M-}táǎí-é/
 [ɔtós wé ɫtáǎí-é]
 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)

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

⁷⁵ Internally within compounding constructions, there is obligatory deletion of any non-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	[bùbù]	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	[tùtù]	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)		
	kpó + àtí	see + tree	→ [kpó àtí]
	kpó + `tó	see + ear	→ [kpóò tó]

As we can see in (242), the verb /kpó/ '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 /kpó/ '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)

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

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/ + /āmī/ ^{H₀}	peanut+oil	[āzǐ-mī ⁰]	peanut oil
			<small>sxw-L0075-polymorphemic nouns-un</small>	
b.	/ēkpjǒ/ + /wé/ ^{H₀}	cough+white	[ēkpjǒ-wé]	tuberculosis
			<small>sxw-L0085-polymorphemic nouns-un</small>	
c.	/āfǐ/ + /kú/ ^{H₀}	foot+die	[āfǐ-kú]	accident
			<small>sxw-L0054-polymorphemic nouns-un</small>	

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

a.	/ōgǎ/ + /ōnú/ ^{Hω}	metal+thing	[gǎ-nǔ]	metal bowl
			<small>sxw-L0099-polymorphemic nouns-un</small>	
b.	/ōfí/ + /āzò/ ^{Hω}	ashes+smoke	[fí-zò°]	dust
			<small>sxw-L0089-polymorphemic nouns-un</small>	
c.	/āfǐ/ + /ākpā ^{H/ Hω}	foot+shell	[fǐ-kpā°]	shoe
			<small>sxw-L0091-polymorphemic nouns-un</small>	
d.	/ōtí/ + /ōkjǐ ^{H/ Hω}	tree+root	[tí-kjǐ]	tree root
			<small>sxw-L0190-polymorphemic nouns-un</small>	

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-/, /ε-/, 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 /āfǐ/ 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	kpǐ	^{M-} fí-zò ^{Hω}	lē	blé/
	[jē	kpǐ	↓fí-zò	lè	blé/
	3PL	see	ashes-smoke	at	there
	They saw dust there. <small>sxw-L0019-other clauses-un.wav</small>				

(247)	/ ^{M-} jē ^H	kpǐ	^{M-} tí-kjǐ ^{H Hω}	lá	lē	blé/
	[jē	kpǐ	↓tí-kjǐ	↓lá	lé	↓blé/
	3PL	see	tree-root	DEF	at	there
	They saw that tree root there. <small>sxw-L0020-other clauses-un.wav</small>					

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

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)

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

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 /*ɛmɛ*/ '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. | /kplá ɔdǎ/ | → | [kplá dǎ ^R] | learn a job
(lit. learn work) |
| b. | /ɔlɔ/ + /ɔvǐ/ ^{H₀} | → | [ɔlɔ-vǐ] | baby crocodile
(lit. crocodile child) |
| c. | /kplá ɔnǔ/ | → | [kplá ^L nǔ] | learn something
(lit. learn thing) |
| d. | /ǎdǐ/ + /ɔfǔ/ ^{H₀} | → | [ǎdǐ-fǔ] | soapsuds
(lit. soap fur) |

In (249)b, we see that an underlying LH contour is simplified in the compound [ɔlɔ-vǐ] 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 H₀ 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) /āđí/ + /ōfũ/ ^{H₀} soap+fur [āđí-fũ] 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 dū ōlā/
 [kōfí dū ólâ]
 Kofi eat meat
 Kofi ate meat. sxw-L0021-other clauses-un.wav

- (253) /^{M-}kōfí dū ɔ̄jɪ̄-lǎ^{H₀}/
 [kōfí dú ójɪ̄-lǎ́]
 Kofi eat cow-meat
 Kofi ate beef. sxw-L0021-other clauses-un.wav

The difference is due to the right H₀ boundary that is generated on the noun-noun compound. As discussed in section 4.1.2, a right H₀ 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 H₀ boundary is generated at the right edge of all noun-noun compounds. The assignment of the right H₀ 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 dū ɔ̄lǎ̄/ and /^{M-}kōfí dū ɔ̄jɪ̄+ɔ̄lǎ̄/

/kōfí dū ɔ̄lǎ̄/	/kōfí dū ɔ̄jɪ̄+ɔ̄lǎ̄/	Lexical forms
--	kōfí dū ɔ̄jɪ̄-lǎ̄	Word-internal vowel elision
--	--	Word-initial vowel elision (opt.)
^{M-} kōfí dū ɔ̄lǎ̄	^{M-} kōfí dū ɔ̄jɪ̄-lǎ̄	Left M- floating tone
--	^{M-} kōfí dū ɔ̄jɪ̄-lǎ̄ ^{H₀}	Right H ₀ boundary assignment

TRANSITION FROM LEXICAL STAGE TO POSTLEXICAL STAGE

^{M-} kōfí dū ɔ̄lǎ̄	--	L _% association
--	--	Nominal floating H deletion
--	--	Contour simplification
--	--	Partial L spread
^{M-} kōfí dū ɔ̄lǎ̄	^{M-} kōfí dū ɔ̄jɪ̄-lǎ̄	Tonal spread
[kōfí dū ɔ̄lǎ̄]	[kōfí dū ɔ̄jɪ̄-lǎ̄]	Surface

Here we see that because of the presence of the right H₀ 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 /ɔ̄vɪ/ 'child' is elided word-

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

- (255) /ōsó/ + /ōvĩ/ ^{H_ω} horse+child [ōsó-vĩ] baby horse
sxw-L0012-polymorphemic nouns-un.wav

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

- (256) /ēdĕ/ + /ōtĩ/ ^{H_ω} palm+tree [ēdĕ-tĩ] palm tree
sxw-L0084-polymorphemic nouns-un.wav

- (257) /ōvĩ/ + /ōnĕ/ ^{H/ H_ω} child+mother [ōvĩ-nĕ^o] 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) /ēsĩ/ + /ōhũ/ ^{H_ω} water+drum [ēsĩ-hũ] water drum
(percussion) sxw-L0087-polymorphemic nouns-un.wav

- (259) /āvò/ + /ōvĩ/ ^{H_ω} cloth+child [āvò-vĩ] 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 [ōhũ^ĤR] and [ōvĩ^R]).

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) /ōjè^H/ + /ádó/^{H_ω} spider+nest [jè-dǒ] spider web
 sxw-L0211-polymorphemic nouns-un.wav
- (261) /ōgǎ[̣]/ + /ōnú/^{H_ω} metal+thing [gǎ-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. /óló/ + /ólǎ/^{H_ω} crocodile+meat [óló-lǎ] crocodile meat
 sxw-L0269-polymorphemic nouns-un.wav
- b. /ótí/ + /ókjǒ/^{H/ H_ω} tree+root [tí-kjǒ] tree root
 sxw-L0190-polymorphemic nouns-un.wav
- c. /ōgǎ[̣]/ + /ókǎ/^{H_ω} metal+cord [gǎ-kǎ[̣]] metal cable
 sxw-L0095-polymorphemic nouns-un.wav
- d. /āzò/ + /āmǎ/^{H/ H_ω} smoke+leaf [zò-mǎ[̣]] tobacco
 sxw-L0219-polymorphemic nouns-un.wav
- e. /ōdǎ[̣]/ + /ólǎ/^{H_ω} snake+meat [ōdǎ-lǎ[̣]] snake meat
 sxw-L0273-polymorphemic nouns-un.wav

Again, because of the generation of the H_ω 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.	/āđí/ + /ōfú/ ^{H_o}	soap+fur	[āđí-fú]	soapsuds
		<small>sxw-L0051-polymorphemic nouns-un.wav</small>		
b.	/āfɔ̄/ + /ōkó/ ^{H_o}	foot+sand	[āfɔ̄-kó]	foot dirt
		<small>sxw-L0053-polymorphemic nouns-un.wav</small>		
c.	/ōkpō ^H / + /ōtí/ ^{H_o}	stick+tree	[kpō-tí]	big stick
		<small>sxw-L0139-polymorphemic nouns-un.wav</small>		
d.	/ēdè/ + /ōtí/ ^{H_o}	palm nut+tree	[ēdè-tí]	palm tree
		<small>sxw-L0084-polymorphemic nouns-un.wav</small>		
e.	/āfhwà/ + /ōtí/ ^{H_o}	locust bean+tree	[āfhwà-tí]	locust bean tree
		<small>sxw-L0059-polymorphemic nouns-un.wav</small>		
f.	/ōtā ^H / + /ōká/ ^{H_o}	head+calabash	[tā-ká]	skull
		<small>sxw-L0188-polymorphemic nouns-un.wav</small>		
g.	/àdó/ + /ōkpá/ ^{H_o}	mud wall+fence	[à-dō-kpá]	mud enclosure
		<small>sxw-L0305-polymorphemic nouns-un.wav</small>		

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

a.	/ōlól/ + /ōlā̄/ ^{H_o}	crocodile+meat	[ōlól-lā̄]	crocodile meat
		<small>sxw-L0269-polymorphemic nouns-un.wav</small>		
b.	/ālī̄/ + /ōkā̄/ ^{H_o}	waist+cord	[ālī̄-kā̄ ^o]	belt
		<small>sxw-L0063-polymorphemic nouns-un.wav</small>		
c.	/āmā̄ ^H / + /ēsī̄/ ^{H_o}	leaf+water	[āmā̄-sī̄ ^o]	herbal liquid
		<small>sxw-L0299-polymorphemic nouns-un.wav</small>		
d.	/āzī̄/ + /āmī̄/ ^{H_o}	peanut+oil	[āzī̄-mī̄ ^o]	peanut oil
		<small>sxw-L0075-polymorphemic nouns-un.wav</small>		
e.	/ōgā̄/ + /ōkā̄/ ^{H_o}	metal+cord	[gā̄-kā̄ ^o]	metal cable
		<small>sxw-L0095-polymorphemic nouns-un.wav</small>		
f.	/ōfhwè ^H / + /ēsī̄/ ^{H_o}	fish+water	[ōfhwè-sī̄ ^o]	fish water
		<small>sxw-L0300-polymorphemic nouns-un.wav</small>		
g.	/àdó/ + /ōxó/ ^{H_o}	mud wall+room	[àdó-xó]	mud building
		<small>sxw-L0304-polymorphemic nouns-un.wav</small>		

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

- a. /ōtí/ + /ōkjǫ̃^H/ ^Hω tree+root [tí-kjǫ̃] tree root
 sxw-L0190-polymorphemic nouns-un.wav
- b. /ēmē/ + /ōnǫ̃^H/ ^Hω person+mother [ēmē-nǫ̃^o] uterus
 sxw-L0086-polymorphemic nouns-un.wav
- c. /ōsī^H/ + /ōnǫ̃^H/ ^Hω wife+mother [sī-nǫ̃^o] mother-in-law
 sxw-L0180-polymorphemic nouns-un.wav
- d. /ōvǐ/ + /ōnǫ̃^H/ ^Hω child+mother [ōvǐ-nǫ̃^o] mother of a child
 sxw-L0172-polymorphemic nouns-un.wav
- e. /āzò/ + /āmā^H/ ^Hω smoke+leaf [zò-mā^o] tobacco
 sxw-L0219-polymorphemic nouns-un.wav
- f. /ōfwè^H/ + /ōnǫ̃^H/ ^Hω fish+mother [ōfwè-nǫ̃^o] fish mother
 sxw-L0301-polymorphemic nouns-un.wav
- g. /òbó/ + /ōsī^H/ ^Hω disabled person [òbǫ̃-sí] disabled female
 +female
 sxw-L0303-polymorphemic nouns-un.wav

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

- a. /ōsó/ + /ōvǐ/ ^Hω horse+child [ōsó-vǐ] baby horse
 sxw-L0012-polymorphemic nouns-un.wav
- b. /ēsī/ + /ōhǔ/ ^Hω water+drum [ēsī-hǔ] 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/ + /ōfwǐ/ ^Hω grass+knife [gbè-fwǐ] hunting knife
 sxw-L0117-polymorphemic nouns-un.wav
- e. /āvò/ + /ōvǐ/ ^Hω cloth+child [āvò-vǐ] handkerchief
 sxw-L0070-polymorphemic nouns-un.wav
- f. /ōfwè^H/ + /ōhǫ̃/ ^Hω fish+money [ōfwè-hǫ̃] budget for fish
 sxw-L0306-polymorphemic nouns-un.wav
- g. /àgbá/ + /ōhǫ̃/ ^Hω dish+money [àgbá-hó] budget for dishes
 sxw-L0307-polymorphemic nouns-un.wav

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

- a. /ōfí/ + /āzò/ ^{H_ω} ashes+smoke [fí-zò°] dust
 sxw-L0089-polymorphemic nouns-un.wav
- b. /ālā/ + /ōgā/ ^{H_ω} hand+metal [ālā-gā°] metal bracelet
 sxw-L0064-polymorphemic nouns-un.wav
- c. /ōtū ^{H/} + /ōdò/ ^{H_ω} rag+edge [ōtū-dò°] edge of rag
 sxw-L0308-polymorphemic nouns-un.wav
- d. /ēdē/ + /āfhā/ ^{H_ω} palm+drink [dē-fhā°] palm wine
 sxw-L0079-polymorphemic nouns-un.wav
- e. /ōzò/ + /ōmò/ ^{H_ω} fire+machine [zò-mò°] mill
 sxw-L0218-polymorphemic nouns-un.wav
- f. /ōfhò ^{H/} + /ōdò/ ^{H_ω} door+edge [ōfhò-dò°] edge of door
 sxw-L0310-polymorphemic nouns-un.wav
- g. /ādó/ + /ōglì/ ^{H_ω} red mud+wall [ādó-glì°] mud wall
 sxw-L0311-polymorphemic nouns-un.wav

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

- a. /ābó/ + /ōtā ^{H/} ^{H_ω} arm+head [ābó-tā°] shoulder
 sxw-L0048-polymorphemic nouns-un.wav
- b. /ōxā/ + /ōtā ^{H/} ^{H_ω} room+head [ōxā-tā°] roof
 sxw-L0176-polymorphemic nouns-un.wav
- c. /ōnā/ + /ōtā ^{H/} ^{H_ω} mother+head [ōnā-tā°] his mother's head
 sxw-L0316-polymorphemic nouns-un.wav
- d. /ōvū/ + /ōtā ^{H/} ^{H_ω} dog+head [ōvū-tā°] dog head
 sxw-L0317-polymorphemic nouns-un.wav
- e. /ōzò/ + /ōgò ^{H/} ^{H_ω} fire+container [zò-gò°] pottery oven
 sxw-L0215-polymorphemic nouns-un.wav
- f. /ōfhwè ^{H/} + /ōtā ^{H/} ^{H_ω} fish+head [ōfhwè-tā°] fish head
 sxw-L0318-polymorphemic nouns-un.wav
- g. /òbó/ + /ōtā ^{H/} ^{H_ω} handicapped person+head [òbó-tā°] head of handicapped person
 sxw-L0320-polymorphemic nouns-un.wav

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

a.	/òká/ + /àgbá/ ^{H_ω}	calebash+ bowl	[òká-gbá]	calebash bowl
		<small>sxw-L0321-polymorphemic nouns-un.wav</small>		
b.	/āmī/ + /àgbá/ ^{H_ω}	oil+ bowl	[āmī-gbá] ⁷⁷	oil bowl
		<small>sxw-L0326-polymorphemic nouns-un.wav</small>		
c.	/āmā ^H / + /ògbá/ ^{H_ω}	leaf+ hat	[āmā-gbá]	leaf hat
		<small>sxw-L0327-polymorphemic nouns-un.wav</small>		
d.	/ògǎ/ + /ògbá/ ^{H_ω}	leader+ hat	[ògǎ-gbǎ]	leader's hat
		<small>sxw-L0328-polymorphemic nouns-un.wav</small>		
e.	/āhǎ/ + /àgbá/ ^{H_ω}	drink+ bowl	[āhǎ-gbǎ]	drink bowl
		<small>sxw-L0332-polymorphemic nouns-un.wav</small>		
f.	/òjè ^H / + /àdó/ ^{H_ω}	spider+ nest	[jè-dó]	spider web
		<small>sxw-L0211-polymorphemic nouns-un.wav</small>		
g.	/òdžú/ + /ògbá/ ^{H_ω}	rain+ hat	[òdžú-gbá]	rain hat
		<small>sxw-L0333-polymorphemic nouns-un.wav</small>		

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 /ònǎ ^H/ 'mother' with nouns that are derived by affixing the attributive suffix /-nǎ/ to a noun base. The attributive suffix /-nǎ/ 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 /-nǎ/

a.	/ēfī/	theft-ATTRIB	[ēfī-nǎ]	thief
			<small>sxw-L0009-polymorphemic nouns-un.wav</small>	
b.	/ājā/	suffering-ATTRIB	[ājā-nǎ]	sufferer, poor person
			<small>sxw-L0010-polymorphemic nouns-un.wav</small>	
c.	/òkpó/	mountain-ATTRIB	[òkpó-nǎ]	person with a humpback
			<small>sxw-L0014-polymorphemic nouns-un.wav</small>	
d.	/òfú/	fur-ATTRIB	[òfú-nǎ]	hairy person
			<small>sxw-L0015-polymorphemic nouns-un.wav</small>	

These derived nouns, unlike the noun-noun compounds seen in this section, clearly do not have a right edge H_ω 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

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

generate a H_{ω} boundary (represented as]_{PW}]P_W) 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 / $\bar{o}n\bar{\delta}^H$ / 'mother'

- | | | | | |
|----|---|---|---|-------------------|
| a. | / $\bar{\epsilon}m\bar{\epsilon}$ / + / $\bar{o}n\bar{\delta}^H$ / H_{ω} | person+mother | [$\bar{\epsilon}m\bar{\epsilon}-n\bar{\delta}^{\circ}$] | uterus |
| | | <small>sxw-L0086-polymorphemic nouns-un.wav</small> | | |
| b. | / $\bar{o}s\bar{i}$ H / + / $\bar{o}n\bar{\delta}^H$ / H_{ω} | wife+mother | [$\bar{o}s\bar{i}-n\bar{\delta}^{\circ}$] | mother-in-law |
| | | <small>sxw-L0150-polymorphemic nouns-un.wav</small> | | |
| c. | / $\bar{o}v\bar{i}$ / + / $\bar{o}n\bar{\delta}^H$ / H_{ω} | child+mother | [$\bar{o}v\bar{i}-n\bar{\delta}^{\circ}$] | mother of a child |
| | | <small>sxw-L0172-polymorphemic nouns-un.wav</small> | | |

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 / $\bar{o}n\bar{\delta}^H$ / 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 /- $n\bar{\delta}$ / is historically derived from the word 'mother' / $\bar{o}n\bar{\delta}^H$ /, there has been a tonal change made to accommodate or reflect the fact that the suffix /- $n\bar{\delta}$ / 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 / $\bar{o}n\bar{u}$ / 'thing' or / $\bar{\epsilon}m\bar{\epsilon}$ / '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.

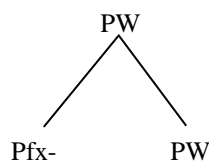
(272) a.	/lĩ/	[õnú <u>lí-lí</u>]	'grinding sth' or 'sth ground' <small>sxw-L0007-verb reduplication-un.wav</small>
b.	/gò/	[õnú <u>gì-gò</u> °]	'healing sth' or 'sth healed' <small>sxw-L0011-verb reduplication-un.wav</small>
c.	/tjĩ/	[õnú <u>tjĩ-tjĩ</u>]	'turning sth off', or 'sth turned off' <small>sxw-L0051-verb reduplication-un.wav</small>
d.	/gblě/	[õnú <u>gbí-gblé</u>]	'ruining sth' or 'sth ruined' <small>sxw-L0039-verb reduplication-un.wav</small>

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 [õnú 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 [õnú hũ-hũ°] 'opening something/something opened', derived from the verb /hũ/ '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 /kã/ 'search for' would give [õnú kí-kã] 'searching for something/something searched for'. Otherwise, the reduplicated form would be [õnú kí-kã̃]. 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 H₀ 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

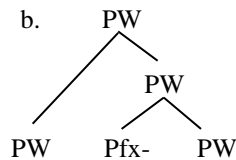
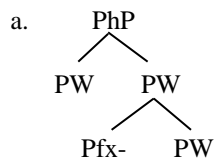


This prosodic structure has two adjacent PW boundaries at its right edge because of recursivity at the level of the PW. This is the environment in which a H₀ boundary is generated in Saxwe (see section 4.1.2). It is therefore consistent that any form (nominal or adjectival) derived through verbal reduplication should have a right H₀ 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



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 [ɔ́nú lí-lí] and [ɔ́nú gbí-gblé]

/ɔ́nú [C]i-lí/	/ɔ́nú [C]i-gblě/	Underlying
ɔ́nú lí-lí	ɔ́nú gbí-gblě	Copy initial C and tone to prefix
--	--	Word-internal vowel elision
--	--	Word-initial vowel elision (opt.)
--	--	Left M- floating tone
ɔ́nú lí-lí H_{ω}	ɔ́nú gbí-gblě H_{ω}	Right H_{ω} boundary assignment

TRANSITION FROM LEXICAL STAGE TO POSTLEXICAL STAGE

--	--	$L_{\%}$ association
--	--	Nominal floating H deletion
--	ɔ́nú gbí-gblé H_{ω}	Contour simplification
--	--	Partial L spread
ɔ́nú lí-lí H_{ω}	--	Tonal spread
[ɔ́nú lí-lí]	[ɔ́nú 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 -lí-lí ^{H₀} / | [é kpó lílí lá] | 'He saw the ground [one].' |
| | | [jē xō lílí lá] | 'They bought the ground [one].' |
| | | | <small>sxw-L0073-verb reduplication-un.wav</small> |
| | | | <small>sxw-L0074-verb reduplication-un.wav</small> |
| b. | / ^M -gì-gò ^{H₀} / | [é kpó gígò là°] | 'He saw the healing.' |
| | | [jē sē gígò là°] | 'They heard about the healing.' |
| | | | <small>sxw-L0071-verb reduplication-un.wav</small> |
| | | | <small>sxw-L0072-verb reduplication-un.wav</small> |
| c. | / ^M -tí-tá ^{H₀} / | [é kpó títá lá] | 'He saw the drawn [one].' |
| | | [jē xō títá lá] | 'They bought the drawn [one].' |
| | | | <small>sxw-L0077-verb reduplication-un.wav</small> |
| | | | <small>sxw-L0078-verb reduplication-un.wav</small> |
| d. | / ^M -zì-zǎ ^{H₀} / | [é kpó zìzǎ lá] | 'He saw the mistreating.' |
| | | [jē sē zìzǎ lá] | 'They heard about the mistreating.' |
| | | | <small>sxw-L0081-verb reduplication-un.wav</small> |
| | | | <small>sxw-L0082-verb reduplication-un.wav</small> |

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 kpó[̃] títá lá] and [é kpó[̃] zìzǎ lá]

/ ^{M-} é kpó [̃] [C]i-tá lá/	/ ^{M-} é kpó [̃] [C]i-zǎ lá/	Underlying
^{M-} é kpó [̃] tí-tá lá	^{M-} é kpó [̃] zì-zǎ lá	Copy initial C and tone to prefix
--	--	Word-internal vowel elision
--	--	Word-initial vowel elision (opt.)
^{M-} é kpó [̃] ^{M-} tí-tá lá	^{M-} é kpó [̃] ^{M-} zì-zǎ lá	Left M- floating tone on nouns
^{M-} é kpó [̃] ^{M-} tí-tá ^{H_ω} lá	^{M-} é kpó [̃] ^{M-} zì-zǎ ^{H_ω} lá	Right H _ω boundary assignment

TRANSITION FROM LEXICAL STAGE TO POSTLEXICAL STAGE

--	--	L _% association
--	--	Nominal floating H deletion
--	^{M-} é kpó [̃] ^{M-} zì-zǎ ^{H_ω} lá	Contour simplification
--	^{M-} é kpó [̃] ^{M-} zì-zǎ ^{H_ω} lá	Partial L spread
--	--	Tonal spread
[é kpó [̃] títá lá]	[é kpó [̃] 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 H_ω 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 through 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/ ^{H_ω}	[jī-jī [°]]	'going/travel'
		sxw-L0103-verb reduplication-un.wav	
b.	^{M-} /gbì-gbǎ/ ^{H_ω}	[gbì-gbǎ [°]]	'returning/return'
		sxw-L0104-verb reduplication-un.wav	
c.	^{M-} /sǐ-sǎ/ ^{H_ω}	[sǐ-sǎ]	'leaving/departure'
		sxw-L0105-verb reduplication-un.wav	
d.	^{M-} /vǐ-vǎ/ ^{H_ω}	[vǐ-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 H_ω 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.	/āg̀̀/	[jē s̄́ āg̀̀-āg̀̀]	sxw-L0020-alternate
	tardiness	they left very late	reduplication-un.wav
b.	/ōbú/	[ōnú bú- [↓] bú]	sxw-L0027-alternate
	that which is other	different things	reduplication-un.wav
c.	/āmú/	[ōnú mú- [↓] mú]	sxw-L0033-alternate
	that which is raw	a raw thing	reduplication-un.wav
d.	/dók̀̀pó/	[jē s̄́ dók̀̀pó- [↓] dók̀̀pó]	sxw-L0028-alternate
	one	they left one by one	reduplication-un.wav
e.	<i>etymology</i>	[ōnú tó- [↓] tó]	sxw-L0024-alternate
	<i>unknown</i>	an empty thing	reduplication-un.wav

f.	<i>etymology</i> <i>unknown</i>	[ɔ́nú má- ^l má] a naked thing	sw-L0031-alternate reduplication-un.wav
g.	<i>etymology</i> <i>unknown</i>	[jē sɔ́ kpó- ^l kpó] they left together	sw-L0035-alternate reduplication-un.wav
h.	/dāxó/ big	[ɔ́nú dā ^l xó-dā ^l xó] a very big thing	sw-L0023-alternate reduplication-un.wav
i.	/tēgbè/ always	[jē nɔ́ sɔ́ tēgbè-tēgbè] they (HAB) <u>always</u> leave	sw-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.	/wí/ → [é w̃jû:]	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.	/gbě/ → [é gbjô:]	he refused me	sxw-L0036-verb plus pronoun-un.wav
e.	/hě/ → [é hjô:]	he supported me	sxw-L0038-verb plus pronoun-un.wav
f.	/bú/ → [é bú:]	he lost me	sxw-L0040-verb plus pronoun-un.wav
g.	/zũ/ → [é zũ:]	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.	/sǎ/ → [é sǎ:]	he took me	sxw-L0046-verb plus pronoun-un.wav
j.	/kpǎ/ → [é kpǎ:]	he saw me	sxw-L0048-verb plus pronoun-un.wav
k.	/tá/ → [é tá:]	he drew me	sxw-L0052-verb plus pronoun-un.wav
l.	/fǎ/ → [é fǎ:]	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

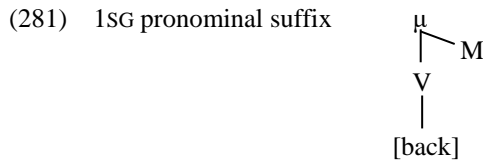
⁷⁸ In section 1.6, I discuss arguments for why [ɛ] is considered the completely underspecified vowel.

Table 5 - Saxwe vowel inventory (repeated)

			[back]			
		[nasal]		[nasal]	[round]	
						[nasal]
[high]	i	ĩ			u	ũ
[ATR]	e				o	
	ɛ	ẽ			ɔ	õ
[low]			a	ã		

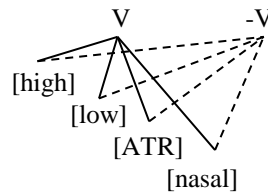
Note that the vowel [a] in Saxwe is specified as [back] in the lexicon and that not all [back] vowels are [round]. This is an important aspect of the distribution of Saxwe vowels that plays into the analysis of pronominal affixation to the verb.

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.



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)

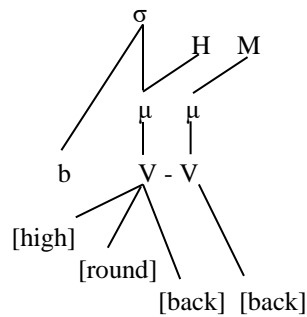


This rule states that the features [high], [low], [ATR], and [nasal] are spread rightward at the boundary between a vowel and a following affixed vowel.

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.

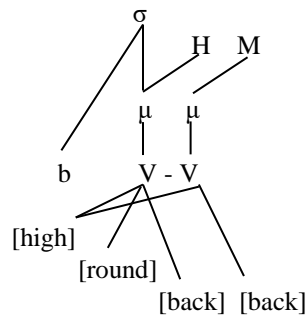
(283) Verb /bú/ + 1SG pronominal suffix \bar{V} [back] \rightarrow [bû:]

a.



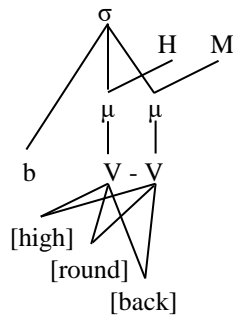
Input to lexical stage

b.



Feature spread

c.



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=ṽ[back]/
 [é bú:]
 3SG lose-1SG
 He lost me. *sxw-L0040-verb plus pronoun-un.wav*

(285) /^M- é bú=ṽ[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=ṽ[back]/
 [é kô:]
 3SG laugh.at-1SG
 He laughed at me. *sxw-L0044-verb plus pronoun-un.wav*

(287) /^M- é kó=ṽ[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_{ω} 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_{ω} boundary—adjacent right edge] ρ w] ρ w 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.

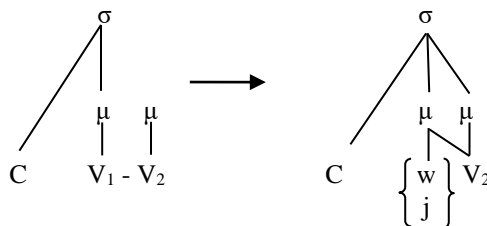
I return now to the data from (280), focusing on verb stems that have a vowel not specified for the feature [back]. For ease of reference, these are repeated in (288).

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

- | | | | |
|----|-------------------|-----------------|------------------------------------|
| a. | /sɪ/ → [é sɟú:] | he respected me | sxw-L0030-verb plus pronoun-un.wav |
| b. | /wĩ/ → [é ẁjũ:] | 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. | /gbě/ → [é gbjô:] | he refused me | sxw-L0036-verb plus pronoun-un.wav |
| e. | /hě/ → [é hjô:] | 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)



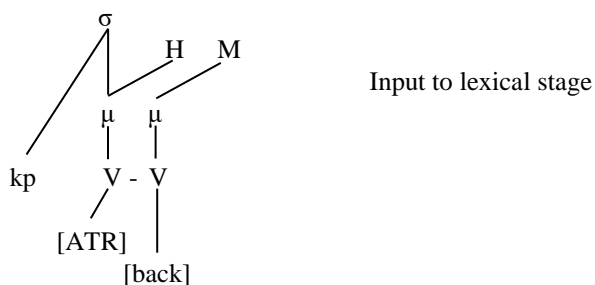
(if V_1 is [round] \supset glide is [w]; otherwise glide is [j])

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.

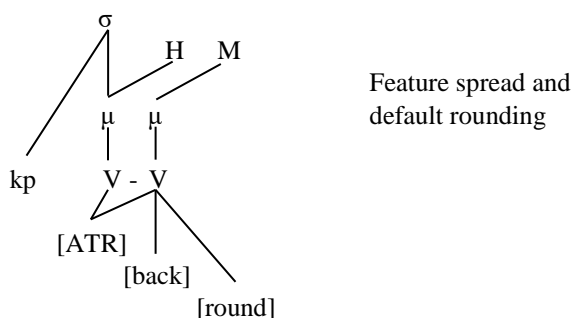
For illustration purposes, I show the lexical derivation of the combination of the verb /kpé/ 'meet' followed by the 1SG pronominal suffix.

(290) Verb /kpé/ + 1SG pronominal suffix \bar{V} [back] → [kpjô:]

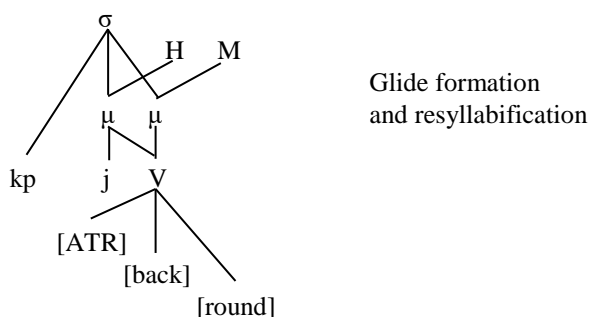
a.



b.



c.



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 polymorphic 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.	/tʃĩ/ → [é tʃĩ:]	he turned it off	sxw-L0001-verb plus pronoun-un.wav
b.	/wí/ → [é wí:]	he awakened it	sxw-L0003-verb plus pronoun-un.wav
c.	/flé/ → [é flé:]	he husked it	sxw-L0005-verb plus pronoun-un.wav
d.	/bé/ → [é bé:]	he gathered it	sxw-L0007-verb plus pronoun-un.wav
e.	/tlé/ → [é tlé:]	he ripped it	sxw-L0009-verb plus pronoun-un.wav
f.	/bú/ → [é bú:]	he lost it	sxw-L0013-verb plus pronoun-un.wav
g.	/tũ/ → [é twĩ:]	he untied it	sxw-L0015-verb plus pronoun-un.wav
h.	/tó/ → [é twé:]	he pounded it	sxw-L0018-verb plus pronoun-un.wav
i.	/só/ → [é swé:]	he took it	sxw-L0020-verb plus pronoun-un.wav
j.	/kpó/ → [é kpwé:]	he saw it	sxw-L0022-verb plus pronoun-un.wav
k.	/tá/ → [é tjé:]	he drew it	sxw-L0024-verb plus pronoun-un.wav
l.	/kpá/ → [é kpjé:]	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.

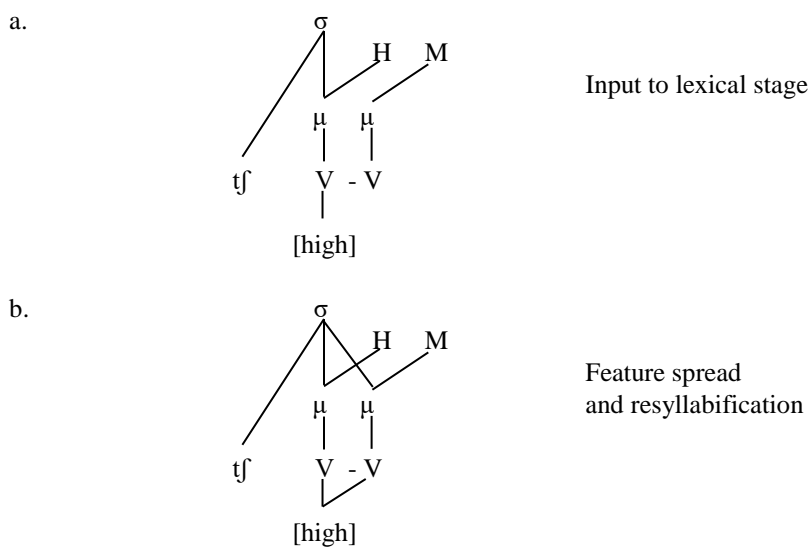
The 3SG suffix is a vowel completely unspecified for features which is associated to a mora that has M tone lexically assigned to it. This is seen in (292).

- (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 [tʃi:] 'turn off-3SG', derived from the verb /tʃi/ in (291)a, we have the following derivational structures.

- (293) Verb /tʃi/ + 3SG pronominal suffix \bar{V} → [tʃi:]



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

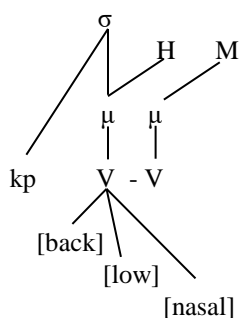
Feature spread. However, the spread of [low] would create a conflict, as there is no vowel in the Saxwe inventory which is [low] but not also [back].

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 [ε], 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 [kpjɛ̃:] 'carry on back-3SG', which comes from the affixation of the 3SG suffix to the verb [kpá] 'carry on the back'.

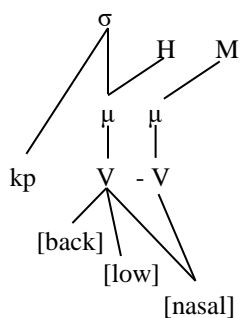
(294) Verb /kpá/ + 3SG pronominal suffix \bar{V} → [kpjɛ̃:]

a.



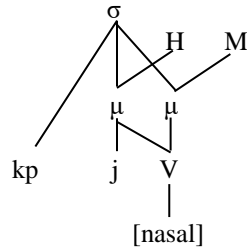
Input to the lexical stage

b.



Feature spread
([low] prohibited from
spreading)

c.



Glide formation
and resyllabification

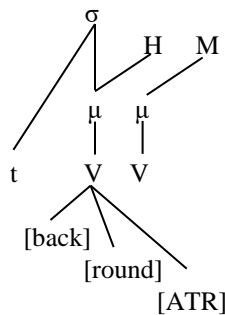
In (294)b, we see that the feature [low] is not permitted to spread because its spread would create a non-existent and unresolvable feature assignment. This being the case, the suffix vowel remains unspecified for all features but [nasal] (the one feature that does spread), and the vowel is realized [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 polymorphic form results from the affixation of the 3SG pronominal suffix to the verb [tó] 'pound'.

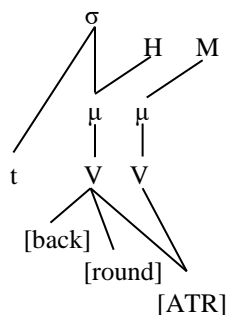
(295) Verb /tó/ + 3SG pronominal suffix \bar{V} → [twê:]

a.



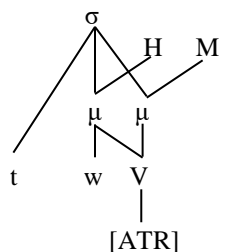
Input to the lexical stage

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.

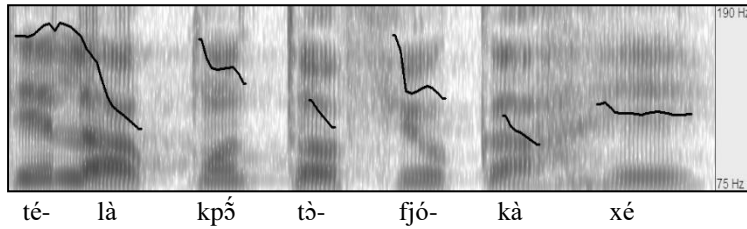
(296) Borrowed nouns—H on non-final syllable, L elsewhere

a.	/ ^M -bíjà/	[bíjà]	beer	sxw-L0008-borrowed words-un.wav
b.	/ ^M -bólù/	[bólù]	ball	sxw-L0010-borrowed words-un.wav
c.	/ ^M -kábità/	[kábità]	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 -hìlóbà/	[hìlóbà]	rubber, plastic	sxw-L0021-borrowed words-un.wav
h.	/ ^M -tʃédzì/	[tʃédzì]	change	sxw-L0022-borrowed words-un.wav
i.	/ ^M -sódzà/	[sódzà]	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 -sódǎ/	[sódǎ]	baking soda	sxw-L0040-borrowed words-un.wav
m.	/ ^M -bótà/	[bótà]	butter, margarine	sxw-L0030-borrowed words-un.wav
n.	/ ^M -káṭà/	[káṭà]	vending table (counter)	sxw-L0033-borrowed words-un.wav
o.	/ ^M -kàṭàpílà/	[kàṭàpílà]	bulldozer (Caterpillar)	sxw-L0006-borrowed words-un.wav
p.	/ ^M -kàṭàtá/	[kàṭàtá]	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-}téla kpó[́] ^{M-}tòfjókà xé/
 [téla kpó[́] tòfjókà xé]
 tailor see tapioca this
 A tailor found this tapioca. sxw-L0076-register tests-un.wav



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. [bólù là[°]] the ball sxw-L0104-borrowed words-un.wav
 c. [kábità 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 kpó[́] ^{M-}bíjà lá/ [é kpó[́] ↓bíjà là[°]] He saw the beer.
 sxw-L0059-borrowed words-un.wav
 b. /^{M-}é kpó[́] ^{M-}bólù lá/ [é kpó[́] ↓bólù là[°]] He saw the ball.
 sxw-L0061-borrowed words-un.wav
 c. /^{M-}é kpó[́] ^{M-}kábità lá/ [é kpó[́] ↓kábità 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 - tʃóʦfĩ/	[tʃóʦfĩ]	church	sxw-L0013-borrowed words-un.wav
b.	/ ^M - tʃítʃā/	[tʃítʃā]	teacher	sxw-L0004-borrowed words-un.wav
c.	/ ^M - ʔímáʔĩ/	[ʔímáʔĩ]	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 kpó ^M - tʃóʦfĩ lá/	[é kpó [↓] tʃóʦfĩ [↓] lá]	He saw the church.	sxw-L0064-borrowed words-un.wav
b.	/ ^M - é kpó ^M - tʃítʃā lá/	[é kpó [↓] tʃítʃā [↓] lá]	He saw the teacher.	sxw-L0055-borrowed words-un.wav
c.	/ ^M - é kpó ^M - ʔímáʔĩ lá/	[é kpó [↓] ʔímáʔĩ [↓] 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.

⁸¹ The word 'teacher' is realized by some speakers as [tʃítʃā], 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 /^M_o fláwā/ (surface form [fláwá]) 'flower', and /^M_o kplúlwí/ (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 H_o 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 - sùklú ^M / | [sùklù] | school | sxw-L0007-borrowed words-un.wav |
| b. | / ^M - sigá ^M / | [sigâ] | cigarette | sxw-L0014-borrowed words-un.wav |
| c. | / ^M - bènìglá ^M / | [bènìglâ] | cemetery
(burying ground) | sxw-L0018-borrowed words-un.wav |

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 - é kpó ^M sùklú ^M lá/ | [é kpó sùklú ^l lá] | He saw the school. | sxw-L0058-borrowed words-un.wav |
| b. | / ^M - é kpó ^M sigá ^M lá/ | [é kpó sigá ^l lá] | He saw the cigarette. | sxw-L0065-borrowed words-un.wav |
| c. | / ^M - é kpó ^M bènìglá ^M lá/ | [é kpó bènìglá ^l 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

⁸³ The exceptions I am aware of are: /^M₀ klèzí/ (surface form [klèzĩ]) from 'kerosene' and /^M₀ májũgó/ (surface form [máj^lgó]) 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_{ω} boundary (section 4.1.2), and all postlexical operations will operate on the word as usual. For example, 'puffy sleeve' is $/^M\text{-p}^{\circ}\text{f}^{\circ}\text{u}\text{-b}^{\circ}\text{H}_{\omega}/$, which is a compounding of $/^M\text{-p}^{\circ}\text{f}^{\circ}\text{u}/$ 'puff' and $/\text{a}^{\circ}\text{b}^{\circ}/$ 'arm'. Partial L spread (183) causes the surface realization of this compound to be $[\text{p}^{\circ}\text{f}^{\circ}\text{u}\text{-b}^{\circ}]$.

Another interesting example is a noun derived through reduplication from the borrowed verb $/\text{k}^{\circ}\text{i}\text{s}^{\circ}/$ 'kiss'. The reduplication prefix is employed to derive the nominal form $/^M\text{-k}^{\circ}\text{i}\text{-k}^{\circ}\text{i}\text{s}^{\circ}\text{H}_{\omega}/$, with the surface output $[\text{k}^{\circ}\text{i}\text{-k}^{\circ}\text{i}\text{s}^{\circ}]$ '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 $[\text{l}^{\circ}]$ and the relativizer $[\text{n}^{\circ}]$

The determiner $[\text{l}^{\circ}]$ and the relativizer $[\text{n}^{\circ}]$ 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 $[\text{l}^{\circ}]$ and the relativizer $[\text{n}^{\circ}]$ each have four possible surface realizations: (1) non-falling $[\text{L}^{\circ}]$ 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 $[\text{l}^{\circ}]$ and the tonal behavior of the verb $/\text{n}^{\circ}\text{d}^{\circ}/$ 'be good' can be seen in (304) where the points of divergence in surface realizations are marked in bold.

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

/M.H/	/òsɔ́/	[òsɔ́ pǎ́]	[òsɔ́ lá]
	horse	sxw-L0028-clause frames-un.wav	sxw-L0113-noun phrases-un.wav
/M.M/	/òxɛ́/	[òxɛ́ pǎ́]	[òxɛ́ lá]
	bird	sxw-L0010-clause frames-un.wav	sxw-L0005-noun phrases-un.wav
/M.M ^H /	/òsī ^H /	[òsī pǎ́]	[òsī lá]
	wife	sxw-L0088-clause frames-un.wav	sxw-L0089-noun phrases-un.wav
/M.H ^M /	/òklá ^M /	[òklá [↓] pǎ́]	[òklá [↓] lá]
	soul	sxw-L0130-clause frames-un.wav	sxw-L0105-noun phrases-un.wav
/M.LH/	/ògbɔ́/	[ògbɔ́ pǎ́]	[ògbɔ́ lá]
	goat	sxw-L0058-clause frames-un.wav	sxw-L0017-noun phrases-un.wav
/M.L/	/òdǎ́/	[òdǎ́ pǎ́]	[òdǎ́ lá[°]]
	snake	sxw-L0052-clause frames-un.wav	sxw-L0029-noun phrases-un.wav
/M.L ^H /	/òfhwè ^H /	[òfhwè pǎ́]	[òfhwè lá[°]]
	fish	sxw-L0094-clause frames-un.wav	sxw-L0077-noun phrases-un.wav
/L.H/	/òdzú/	[òdzú pǎ́]	[òdzú lá]
	rain	sxw-L0112-clause frames-un.wav	sxw-L0121-noun phrases-un.wav

When the determiner [lá] and the verb /pǎ́/ 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 /pǎ́/, which is realized with a surface [LH] rise following an underlying L TBU because of Partial L spread (106).

Here in (305), the relativizer [nǎ́] 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 [ná]

		/... wé ɔ́nú/ '...'s thing' ... AM thing	/... ná^M kò kpó/ '...that I saw' ... REL 1SG see
/M.H/	/ɔ́ló/ crocodile	[ɔ́ló wé ɔ́nú] sxw-L0003-associative construction-un.wav sxw-L0070-low spread tests-un.wav	[ɔ́ló ná kò ɔ́kpó]
/M.M/	/ɔ́nǎ/ cow	[ɔ́nǎ wé ɔ́nú] sxw-L0004-associative construction-un.wav sxw-L0052-low spread tests-un.wav	[ɔ́nǎ ná kò ɔ́kpó]
/M.M ^H /	/ɔ́nǎ ^H / wife	[ɔ́nǎ wé ɔ́nú] sxw-L0075-low spread tests-un.wav sxw-L0071-low spread tests-un.wav	[ɔ́nǎ ná kò ɔ́kpó]
/M.H ^M /	/ɔ́klá ^M / soul	[ɔ́klá wé ɔ́nú] sxw-L0076-low spread tests-un.wav sxw-L0072-low spread tests-un.wav	[ɔ́klá ná kò ɔ́kpó]
/M.LH/	/ɔ́vǎ/ dog	[ɔ́vǎ wé ɔ́nú] sxw-L0002-associative construction-un.wav sxw-L0048-low spread tests-un.wav	[ɔ́vǎ ná kò ɔ́kpó]
/M.L/	/ɔ́dǎ/ snake	[ɔ́dǎ wé ɔ́nú] sxw-L0001-associative construction-un.wav sxw-L0047-low spread tests-un.wav	[ɔ́dǎ ná kò kpó]
/M.L ^H /	/ɔ́fwè ^H / fish	[ɔ́fwè wé ɔ́nú] sxw-L0077-low spread tests-un.wav sxw-L0073-low spread tests-un.wav	[ɔ́fwè ná kò kpó]
/L.H/	/òdzú/ rain	[òdzú wé ɔ́nú] sxw-L0078-low spread tests-un.wav sxw-L0074-low spread tests-un.wav	[òdzú ná kò ɔ́kpó]

Like the determiner [lá], the relativizer [ná] 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] after 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 [ná], 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/

			1 st - copy tone to clitic	2 nd - floating H association
/M.H/	horse	/ōsó=la ^H /	ōsó=lá	--
/M.M/	bird	/ōxē=la ^H /	ōxē=lā ^H	ōxē=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	/ōgbǔ=la ^H /	ōgbǔ=lá	--
/M.L/	snake	/ōdǎ=la ^H /	ōdǎ=lā^H	--
/M.L ^H /	fish	/ōfhwè ^H =la ^H /	ōfhwè^H=lā^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) /ōṅĩ́ xéńĩ́ sṵ=la^H/
 [ōṅĩ́ xéńĩ́ sṵ́ lǎ́/
 cow REL leave DET
 the cow that left sxw-L0079-low spread tests-un.wav

(308) /ōṅĩ́ xéńĩ́ gbḵ=la^H/
 [ōṅĩ́ xéńĩ́ gbḵ́ lǎ°/
 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

⁸⁴ As a side remark, it is possible that the determiner [lá], which marks discourse specificity (see section 1.8.1) and the relativizer [ná] 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.	/pé-pé-pé/	exactly	sxw-L0010-Ideophones-un.wav
g.	/péé/	exactly	sxw-L0017-Ideophones-un.wav
h.	/tǔǔ-tǔǔ-tǔǔ/	silently	sxw-L0011-Ideophones-un.wav
i.	/kétǔǔ-kétǔǔ/	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.	/bléwú/	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.	/flìdì-dì/	with heaviness	sxw-L0009-Ideophones-un.wav
b.	/jèè/	unintelligent	sxw-L0015-Ideophones-un.wav
c.	/tègbèè/	always	sxw-L0018-Ideophones-un.wav
d.	/tègbèè-tègbèè/	always, forever	sxw-L0019-Ideophones-un.wav
e.	/blèwùù/	slowly	sxw-L0023-Ideophones-un.wav
f.	/dǎ-dǎ-dǎ/	necessarily	sxw-L0029-Ideophones-un.wav
g.	/gbèdè/	never	sxw-L0030-Ideophones-un.wav
h.	/dǔì-dǔì/	slowly	sxw-L0031-Ideophones-un.wav
i.	/gbòkòò/	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 /jèè/ '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.	/bléwù/	quickly	sxw-L0024-Ideophones-un.wav
	/blèwùù/	slowly	sxw-L0023-Ideophones-un.wav
b.	/tróló/	now, just recently, fast	sxw-L0007-Ideophones-un.wav
	/tègbèè/	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-} gèké/	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_{ω} 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).