Tone in Saxwe

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5 Grammatical tone and intonational boundary tone

In this chapter, I look at tonal phenomena beyond the word level, which include two broad areas of study. The first is grammatical tone, or tone which, without the addition of a segmental component, serves to mark meaningful grammatical distinctions in Saxwe. The second is boundary tone that is generated at the level of the intonational phrase. The outline of this chapter is as follows. Section 5.1 examines the imperfective construction, which involves two morphemes, one of which is a preverbal floating M. In section 5.2, I discuss the fact that unmarked negation also has two morphemes, one of which is a clause-final L. Section 5.3 discusses the negation of present imperfective events as a means of providing context for the discussion in section 5.4 of the negation of future events, which involves a floating H marking irrealis modality. In section 5.5, I show that the prospective marker also includes the floating H marking irrealis. In section 5.6, I examine YNQ formation, which involves a clause-final L.

The next section, 5.7, begins a discussion of intonation by describing the way that fronted topics are marked by a floating L topic marker in addition to a right edge H% intonational boundary. In section 5.8, I describe the fact that certain IPs that include a syntactic gap have a H% intonational boundary rather than the default L% intonational boundary. Section 5.9 continues the discussion of intonational boundaries by looking at the correspondences between IPs and syntactic clauses. Finally, in section 5.10, I offer some conclusions regarding the two topics of grammatical tone and intonational boundaries in Saxwe.

5.1 Imperfective aspect

In Saxwe, the majority of TAM markers are preverbal auxiliaries. These auxiliaries normally consist of a segmental element that is linked underlyingly to H, M, or L tone.

The following are some examples of preverbal TAM markers in Saxwe. These include the future marker /nã̄/, the jussive marker /nɪ́/, and the anterior marker /ò/.

(313) /kájí nã̄ sɔ́̄/
[kájí nā́ ↓sɔ́̄]
Kayi FUT leave
Kayi will leave. sxw-L0416-auxiliaries-un.wav

(314) /kájí nḯ sɔ́/
[kájí nḯ sɔ́]
Kayi JUSS leave
Kayi should leave. sxw-L0419-auxiliaries-un.wav

(315) /kájí ò sɔ́/
[kájí ò sɔ́]
Kayi ANT leave
Kayi has left. sxw-L0414-auxiliaries-un.wav

The postlexical tone rules formalized in chapter 3 operate on these grammatical morphemes in the same way that they operate on nouns, verbs, or any other element in the language. The list of these tone rules is repeated here. I have also added lexical tone phenomena that are discussed in chapter 4.

(316) Operations that generate surface tone patterns in Saxwe

Lexical operations (unordered)
Default left M- floating tone on nouns without an initial vowel (section 4.3)
Generation of the right H_{ω} boundary (207)

Postlexical operations (ordered)
$L_{\%}$ association (94)
Nominal floating H deletion (151)
Contour simplification A (159) and B (160)
Grammatical tone docking A and B (102)[85]
Partial L spread (106)
Tonal spread (72)

Instead of taking the form of a single morpheme, imperfective aspect in Saxwe has bipartite marking which consists of two morphemes: a floating M tone in a preverbal position as well as the marker /nɔ̃/—which also has M tone—in a post-argument position in the clause. This marker /nɔ̃/ follows the verb and any argument of the verb in the clause, but it precedes an adjunct (section 5.3). Examples of these two markers are seen in (317), where forms marked in bold reveal the tonal changes triggered by the floating M.

[85] The ordering of Grammatical tone docking with respect to other postlexical rules is discussed in section 5.4.

(317) Imperfective aspect compared to the unmarked verb

a.	/sɔ́/ 'leave'	[é sɔ́]	He left.
		[é ↓sɔ́ nɔ̂]	He is leaving. sxw-L0109-auxiliaries-un
b.	/sē/ 'hear'	[é sê]	He heard.
		[é sé nɔ̂]	He is hearing. sxw-L0110-auxiliaries-un
c.	/ɲɔ́/ 'be good'	[é ɲɔ́]	He is good.
		[é ↓ɲɔ́ nɔ̂]	He is becoming good. sxw-L0111-auxiliaries-un
d.	/lɔ̄/ 'weave'	[é lɔ̂]	He wove.
		[é lɔ́ nɔ̂]	He is weaving. sxw-L0112-auxiliaries-un
e.	/vă/ 'come'	[é vá]	He came.
		[é và nɔ̄]	He is coming. sxw-L0115-auxiliaries-un
f.	/gbɔ̀/ 'return'	[é gbɔ̀]	He returned.
		[é gbɔ̀ nɔ̀]	He is returning. sxw-L0113-auxiliaries-un

As we see in (317), marking of the imperfective aspect includes the use of the marker /nɔ̄/ following the verb (as there is no object argument in these clauses). Since this marker has underlying M tone, its TBU is subject to having either H or L tone spread onto it, depending on whether there is H or L earlier in the utterance. In its post-argument position, the imperfective marker /nɔ̄/ ends with a final falling or downgliding pitch due to the association of the L% boundary.

We see also in (317) that between the subject and the verb in the imperfective aspect, there is evidence of a floating M tone which we find no corresponding evidence of between the subject and the verb in the unmarked case. This floating M causes downstep between the first two H surface tones in the two clauses [é ↓sɔ́ nɔ̂] 'he is leaving' of (317)a and [é ↓ɲɔ́ nɔ̂] 'he is becoming good' of (317)c—both of which have underlying Hs linked to both the subject and to the verb. Moreover, in [é và nɔ̄] 'he is coming' of (317)e, the underlying LH contour on /vă/ is simplified by delinking the H rather than by deleting the L. This differs from [é vá] 'he came', where the L is deleted. The floating M is the conditioning environment for both the triggering of non-automatic downstep and the type of Contour simplification observed.

The preverbal floating M is likely the vestige of a preverbal marker that had a segmental dimension at one time in the language's history. In several other Gbe languages, imperfective aspect is marked by a construction that involves SOV word order and two morphemes—one before the verb (and object if one is present), and one following the verb (Aboh, 2004).[86] For example, in Gen, the preverbal marker is [lè] and the postverbal marker is [ɔ̀] (p. 36).

[86] Some Gbe researchers label this as progressive aspect. In Saxwe, progressive aspect—which involves an added emphasis on the ongoing nature of a state or event—is marked by a

In (318), we see the floating M (symbolized as ^{M}) positioned between the subject and verb.

(318) /M- é M sɔ́ nɔ̄/
[é ↓sɔ́ nɔ̂]
3SG IPFV leave IPFV
He is leaving.
sxw-L0109-auxiliaries-un.wav

The following is the derivation of this utterance.

(319)

	IPFV		IPFV	
/M- é	M	sɔ́	nɔ̄/	Output from the lexical stage
é	M	sɔ́	nɔ̄	$L_{\%}$ association
--				Nominal floating H deletion
--				Contour simplification (A&B)
--				Grammatical tone docking (A&B)
--				Partial L spread
é	M	sɔ́	nɔ̂	Tonal spread
[é		↓sɔ́	nɔ̂]	Surface

The floating M which marks the imperfective triggers non-automatic downstep between the H of /é/ '3 SG' and the H of /sɔ́/ 'leave' during the phonetic implementation. Note that this floating M does not dock; only H or L floating grammatical tones dock during as a result of Grammatical tone docking operations (327).

In (320), we have the derivation of (317)e [é và nɔ̄] 'he is coming'.

(320)

	IPFV		IPFV	
/M- é	M	vă	nɔ̄/	Output from the lexical stage
M- é	M	vă	nɔ̄	$L_{\%}$ association
--				Nominal floating H deletion
M- é	M	và H	nɔ̄	Contour simplification (A&B)
--				Grammatical tone docking (A&B)
--				Partial L spread
--				Tonal spread
[é		và H	nɔ̄]	Surface

The floating M in (320) is responsible for the fact that during the application of the rules of Contour simplification, the underlying LH contour on the verb /vă/ 'come' is simplified by delinking the H rather than by delinking the L. Note

preverbal marker /ló/ in addition to the post-argument imperfective /nɔ̄/.

that this delinked H is not a grammatical tone and because of this, it does not dock to a TBU as a result of the operations of Grammatical tone docking. The floating H does, however, prevent the spread of L tone, with the result that the imperfective marker /nɔ̃/ here is realized on the surface with a ML fall.

As is seen in sections 5.3, 5.4, and 5.5, imperfective marking co-occurs with other types of TAM marking, including future negation. Before looking at these instances of TAM co-occurrence, however, I turn to the examination of default negation in Saxwe as it too involves a floating tonal morpheme.

5.2 Default negation

As with imperfective marking, default clausal negation involves two morphemes.[87] Unlike with imperfective aspect, in default negation it is the preverbal morpheme which has a segmental component and the clause-final morpheme which does not. The preverbal negation marker is /ɔ̀/ and the clause-final morpheme is a floating L tone.[88] These two morphemes are seen in (322).

(321) /ōló sɔ́/
[ōló sɔ́]
3SG leave
The crocodile left.
sxw-L0023-clause frames-un.wav

(322) /ōló ɔ̀ sɔ́ L /
[ōló ɔ̀ sɔ̂]
3SG NEG leave NEG
The crocodile did not leave.
sxw-L0013-Negation-un.wav

The L floating tone is likely the historical vestige of a marker that did at some point have a segmental component. This analysis is supported by the fact that in other Gbe languages, there is bipartite negation marking as well, with both parts having a segmental dimension. For example, in Gen, the marker [mú] appears preverbally and the marker [ò] appears clause-finally (Aboh, 2004, p. 47).

The following are examples of negation where the verb is followed by a direct object and the determiner [lá].

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[87] There are several kinds of negation in Saxwe, including additive negation, constituent negation, and negation in word-formation processes; this is the marking for default clausal negation.

[88] The prohibitive construction (which could alternatively be labeled as a negative imperative) also makes use of this clause-final floating L. In that construction, there is a preverbal prohibition marker /kâ/ and a clause-final floating L of negation.

(323) Negation—verb located clause-medially

a.	/kpɔ́/ 'see'	[ōlóɔ̀ kpɔ́ ó↓tɪ́ lâ]	The crocodile did not see the stick. sxw-L0219-Negation-un.wav
b.	/sē/ 'hear'	[ōlóɔ̀ sè òtɪ́ lâ]	The crocodile did not hear the stick. sxw-L0220-Negation-un.wav
c.	/wɛ̃́/ 'break'	[ōlóɔ̀ w̃ɛ̃́ ó↓tɪ́ lâ]	The crocodile did not break the stick. sxw-L0221-Negation-un.wav
d.	/ɖū/ 'eat'	[ōlóɔ̀ ɖù òtɪ́ lâ]	The crocodile did not eat the stick. sxw-L0222-Negation-un.wav
e.	/gbɛ̌/ 'refuse'	[ōlóɔ̀ gbɛ̌ ó↓tɪ́ lâ]	The crocodile did not refuse the stick. sxw-L0223-Negation-un.wav
f.	/ɦɔ̀/ 'pull up'	[ōlóɔ̀ ɦɔ̀ òtɪ́ lâ]	The crocodile did not pull up the stick. sxw-L0224-Negation-un.wav

In these examples in (323), we see that the morpheme /ɔ̀/ always appears before the verb, and the clause-final determiner [lá] ends with a surface [HL] contour in every utterance.

We can also look at examples of default negation in clauses that do not contain a direct object.

(324) Negation—verb located clause-finally

a.	/sɔ́/ 'leave'	[ōlóɔ̀ sɔ̂]	The crocodile did not leave. sxw-L0013-Negation-un.wav
b.	/sē/ 'hear'	[ōlóɔ̀ sè]	The crocodile did not hear. sxw-L0014-Negation-un.wav
c.	/ɲɔ́/ 'be good'	[ōlóɔ̀ ɲɔ̂]	A crocodile is not good. sxw-L0015-Negation-un.wav
d.	/lē/ 'be present'	[ōlóɔ̀ lè]	A crocodile is not present. sxw-L0016-Negation-un.wav
e.	/gbɛ̌/ 'refuse'	[ōlóɔ̀ gbɛ̂]	The crocodile did not refuse. sxw-L0017-Negation-un.wav
f.	/gbɔ̀/ 'return'	[ōlóɔ̀ gbɔ̀]	The crocodile did not return. sxw-L0018-Negation-un.wav

In (324), we see that the final syllable of every clause ends either with final L tone or as a surface [HL] contour.

Given what is summarized about tonal operations in (316), most of what is seen in (323) and (324) is straightforward. There are two utterances in these data that deserve further examination, and these are recopied below. Both have to do with

what happens when the negation marker /ɔ̀/ is followed by a verb that has a lexically assigned /LH/ tone pattern.

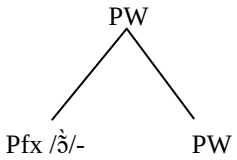
(325) Negation—verb with /LH/ tone pattern

a.	/gbɛ̌/ 'refuse'	[ōlóɔ̀ **gbɛ̌** ó↓tḯ lâ]	The crocodile did not refuse the stick. sxw-L0223-Negation-un.wav
b.	/gbɛ̌/ 'refuse'	[ōlóɔ̀ **gbɛ̂**]	The crocodile did not refuse. sxw-L0017-Negation-un.wav

In (325)a, the verb /gbɛ̌/ 'refuse' is realized with a surface LH contour. This is of note because in conformity with the rule of Contour simplification B (160), an underlying LH which follows a L would normally be simplified by delinking the H. Here, however, the H is not delinked.

The explanation for this observation is that the negation marker /ɔ̀/ is treated from a phonological point of view as a prefix to the verb. As such, it has the following prosodic structure.

(326) Prosodic structure involving negation marker /ɔ̀/



What this means is that there are nested right edge PW brackets in this structure (summarized as $]_{PW}]_{PW}$). As a result, the right H_{ω} PW boundary described in section 4.1.2 is generated at the right edge of this combination of /ɔ̀/ negation marker and verb, just as there is a H_{ω} PW boundary at the right edge of nouns derived through the affixation of a redupliction prefix to a verb (section 4.4.3).[89]

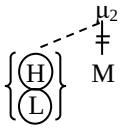
Returning to the form in (325)a, we see that an OCP-related constraint prevents the delinking of a H in the presence of this H_{ω} PW boundary. Therefore, there is no delinking of the H of the underlying LH contour on the verb /gbɛ̌/ 'refuse' in (325)a or b.

[89] There is an interesting aspect of interspeaker variability regarding the phonological prefixing of certain elements to the verb instead of treating them as separate PWs the way the habitual /nɔ̄/ and future /nā/ auxiliaries are treated. All speakers I consulted prefix the negation marker /ɔ̀/ to the verb. In addition, some also prefix the anterior marker /ò/ to the verb while others do not.

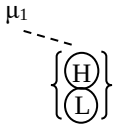
Bearing this H_{ω} boundary in mind, we can look at the derivations of several of the utterances from (323) and (324). Before doing so however, I review here the rules A and B of Grammatical tone docking, first seen in (102).

In Saxwe, grammatical floating tones which are H or L differ from grammatical floating tones which are M in that they dock to a TBU if they are able. The following describes Grammatical tone docking in Saxwe.

(327) Grammatical tone docking A



Grammatical tone docking B



These rules of grammatical docking are ordered, with rule A applying before rule B. These rules state that a grammatical floating H or L will first dock rightward to a TBU that bears M tone. If this does not occur (because the following TBU bears H or L, or because there is no following TBU), then a grammatical floating H or L will dock leftward if there is a TBU available. In the case of the L of negation, the floating tone docks leftward to the final TBU of the clause.

I take first the example of [ōlóɔ̀ w̃ɛ̃̌ ó↓tɪ́ lâ] 'the crocodile did not break the stick' from (323)c to show how the surface form of this utterance is obtained. In this derivation, we see the preverbal /ɔ̀/ as well as the clause-final floating L of negation (represented by the symbol ^{L}). The right H_{ω} boundary assigned during the lexical stage is also included.

(328)		NEG				NEG	
	/ōlóɔ̀	ɔ̀-	wɛ́ Hω	ōtɪ́	lá	L/	Output from the lexical stage
	--						L% association[90]
	--						Nominal floating H deletion
	--						Contour simplification (A&B)
	ōlóɔ̀	ɔ̀	wɛ́ Hω	ōtɪ́	lâ		Grammat. tone docking (A&B)
	ōlóɔ̀	ɔ̀	wɛ̌ Hω	ōtɪ́	lâ		Partial L spread
	ōlóɔ̀	ɔ̀	wɛ̌ Hω	ó M tɪ́	lâ		Tonal spread
	[ōlóɔ̀	ɔ̀	w̃ɛ̌	ó↓tɪ́	lâ]		Surface

Let us take now the example [ōlóɔ̀ gbɛ̌ ó↓tɪ́ lâ] 'the crocodile did not refuse the stick' from (325)a. The following is the derivation of this clause.

(329)		NEG				NEG	
	/ōlóɔ̀	ɔ̀-	gbɛ̌ Hω	ōtɪ́	lá	L/	Output from the lexical stage
	--						L% association
	--						Nominal floating H deletion
	--						Contour simplification (A&B)
	ōlóɔ̀	ɔ̀	gbɛ̌ Hω	ōtɪ́	lâ		Grammat. tone docking (A&B)
	--						Partial L spread
	ōlóɔ̀	ɔ̀	gbɛ̌ Hω	ó M tɪ́	lâ		Tonal spread
	[ōlóɔ̀	ɔ̀	gbɛ̌	ó↓tɪ́	lâ]		Surface

Here we see that the underlying LH contour of /gbɛ̌/ 'refuse' is not simplified during the application of the rules of Contour simplification. Simplification of the contour here would create a floating H in a context where there is already a H_{ω} boundary tone, a situation against which there is a constraint in keeping with the OCP (see also sections 4.1.2, 4.4.2, and 4.4.3).

I return now to the example from (325)b, [ōlóɔ̀ gbɛ̂] 'the crocodile did not refuse'. The surface HL contour on [gbɛ̂] 'refuse' is interesting, given that the underlying tone of /gbɛ̌/ is a LH sequence. The following is the derivation of this utterance.

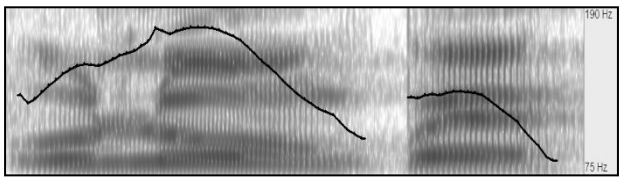
[90] In this and other derivations involving negation, it is unclear whether the $L_{\%}$ boundary associates to the final TBU as direct result of the presence of the floating L or not. Since $L_{\%}$ association is sensitive to the presence of nominal floating H tones as well as word-level H_{ω} boundaries, it would be consistent to imagine that it might be sensitive to the presence of floating Ls as well. It is unclear whether it really matters, since the L of negation will be associated to the final TBU in any case.

(330)

	NEG			NEG	
/ōlóɔ̀	--	gbɛ̌	Hω	L/	Output from the lexical stage
--					$L_{\%}$ association
--					Nominal floating H deletion
--					Contour simplification (A&B)
ōlóɔ̀		gbɛ̃			Grammatical tone docking (A&B)
--					Partial L spread
--					Tonal spread
[ōlóɔ̀		gbɛ̂]			Surface

Once again, the underlying contour of /gbɛ̌/ 'refuse' is not simplified during the application of the rules of Contour simplification. Because the TBU of this verb is the last one of the clause, the floating L of negation docks to it, creating a theoretical LHL sequence on the one TBU. However, we do not hear a LHL in the phonetic implementation; because of the relative difficulty of modulating pitch both up and down over the time span of a single mora, only the surface [HL] is heard.[91] As seen in the pitch trace of this utterance in (331), the surface HL contour on [gbɛ̂] maintains a brief stable H level, with perhaps a slight upward drift, before heading down towards a downgliding L pitch height.

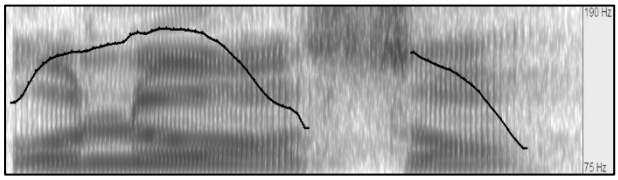
(331) [ōlóɔ̀ gbɛ̂]



ō- ló ɔ̀ gbɛ̂

A difference can be observed in the final [HL] surface contour of (331) and that of (332), which is a pitch trace of (324)a [ōlóɔ̀ sɔ̂] 'the crocodile did not leave'.

(332) [ōlóɔ̀ sɔ̂]



ō- ló ɔ̀ sɔ̂

[91] It is also possible that there is a constraint against having three tones linked to the same TBU, and that as a result, the leftmost tone is delinked just prior to phonetic implementation.

Here in (332), the drop in pitch begins immediately in the articulation of the vowel, although it is hard to know how much of this difference can be attributed to the difference of three tones *vs*. two tones linked to a TBU in the output from the phonology, and how much can be attributed to the surface effects of a voiced obstruent *vs*. a voiceless obstruent on tone.

So far we have seen examples of negation in grammatical constructions where no overt TAM marking is present. I turn in the next sections to negation in clauses where there is TAM marking.

5.3 Negation of present imperfective events

This section explores what happens when clauses that are in a present imperfective framework are marked for clausal negation. Imperfective marking, as described in section 5.1, is bipartite and involves a preverbal floating M as well as the post-argument marker /nɔ̄/. Clausal negation, as described in section 5.2, is also bipartite and involves the preverbal marker /ɔ̀/ as well as a clause-final floating L. In both cases of bipartite marking, there is an element before the verb and an element after the verb. The question then is how these markers are ordered relative to each other.

We see in this section and in section 5.4 that the imperfective morphemes are ordered closer to the verb (both in their positions before and after the verb) than the negation morphemes. The ordering of the morphemes that follow the verb can be seen in (333), where an adjunct appears between the imperfective marker and the clause-final L of negation.

(333) /$^{M\text{-}}$kōfí ɔ̀^{M} ḍū^{Hω} ōnú nɔ̄ fí^{L}/
[kōfí ɔ̀ ḍù nú nɔ́ ↓fî]
Kofi NEG IPFV eat thing IPFV now NEG
Kofi is not (still) eating now.
sxw-L0421-auxiliaries-un.wav

The following is the paradigm of verbs marked both for negation and for imperfective aspect.

(334) Negation of present imperfective events

a.	/sɔ́/ 'leave'	[ōló ɔ̀ sɔ́ nɔ̂]	The crocodile is not leaving.
			sxw-L0085-Negation-un.wav
b.	/sɛ̄/ 'hear'	[ōló ɔ̀ sè nɔ̀]	The crocodile is not hearing.
			sxw-L0086-Negation-un.wav
c.	/ɲɔ́/ 'be good'	[ōló ɔ̀ ɲɔ̌ nɔ̂]	The crocodile is not becoming good.
			sxw-L0087-Negation-un.wav
d.	/jī/ 'go'	[ōló ɔ̀ jì nɔ̀]	The crocodile is not going.
			sxw-L0088-Negation-un.wav
e.	/gbɛ̌/ 'refuse'	[ōló ɔ̀ gbɛ̌ nɔ̂]	The crocodile is not refusing.
			sxw-L0089-Negation-un.wav
f.	/gbɔ̀/ 'return'	[ōló ɔ̀ gbɔ̀ nɔ̀]	The crocodile is not returning.
			sxw-L0090-Negation-un.wav

Although the floating M of the imperfective is located between the negation marker /ɔ̀/ and the verb, these morphemes are still treated as though they comprise one PW; we can see evidence of the presence of the H_ω boundary tone to the right of the verb. The following is the example that provides the best evidence of this H_ω boundary, repeated from (334)e.

(335)

/ōló	ɔ̀	M	gbɛ̌ Hω	nɔ̄̂	L /	
[ōló	ɔ̀		gbɛ̌	nɔ̂	]	
crocodile	NEG	IPFV	refuse	IPFV	NEG	

The crocodile is not refusing.

sxw-L0089-Negation-un.wav

The H_ω boundary tone, together with the constraint that prevents the creation of a floating H adjacent to a H_ω boundary, is what explains the failure of the underlying LH contour on /gbɛ̌/ 'refuse' to be simplified in (335). The following is the derivation of that utterance.

(336)

	NEG	IPFV		IPFV	NEG	
/ōló	ɔ̀-	M	gbɛ̌ Hω	nɔ̄̂	L/	Output from the lexical stage
ōló	ɔ̀	M	gbɛ̌ Hω	nɔ̄̂	L	$L_{\%}$ association
--						Nominal floating H deletion
--						Contour simplification (A&B)
ōló	ɔ̀	M	gbɛ̌ Hω	nɔ̄̂		Grammat. tone docking (A&B)
--						Partial L spread
ōló	ɔ̀	M	gbɛ̌ Hω	nɔ̂		Tonal spread
[ōló	ɔ̀		gbɛ̌	nɔ̂]		Surface

The ordering of the preverbal markers for negation and for the imperfective becomes more evident as we examine the negation of future events. I move now to

that situation, which involves the addition of a fifth grammatical morpheme to the four discussed here.

5.4 Negation of future events with irrealis H tone

The negation of future events, just like the negation of present imperfective events, employs imperfective marking.[92] What distinguishes a future negative event from a present negative event is not the future marker /nã̄/, but rather a floating H tone that could be labeled as an irrealis marker.[93] This H tone is located between the negation marker [ɔ̀̃] and the verb. It docks rightward to a TBU that bears M tone. If this TBU is not M, the floating H will instead dock leftward.

The following are data which show the paradigm of verbs describing a negative future event.

(337) Negation of future events

a.	/fɔ́̃/ 'awaken'	[ōsɔ́ **ɔ̌̃** ↓**fɔ́̃** nɔ̂̃]	The horse will not awaken.
			sxw-L0145-Negation-un.wav
b.	/sē/ 'hear'	[ōsɔ́ **ɔ̀̃ sé** nɔ̂̃]	The horse will not hear.
			sxw-L0146-Negation-un.wav
c.	/ɲɔ́̃/ 'be good'	[ōsɔ́ **ɔ̌̃** ↓**ɲɔ́̃** nɔ̂̃]	The horse will not become good.
			sxw-L0147-Negation-un.wav
d.	/jī/ 'go'	[ōsɔ́ **ɔ̀̃ jí** nɔ̂̃]	The horse will not go.
			sxw-L0148-Negation-un.wav
e.	/gbɛ̌/ 'refuse'	[ōsɔ́ **ɔ̌̃ gbɛ̀** nɔ̄̃]	The horse will not refuse.
			sxw-L0149-Negation-un.wav
f.	/gbɔ̀̃/ 'return'	[ōsɔ́ **ɔ̌̃ gbɔ̀̃** nɔ̄̃]	The horse will not return.
			sxw-L0150-Negation-un.wav

This can be compared to utterances describing events that are negated in a present imperfective framework. The following examples are copied from section 5.3.

[92] The implication is that in the Saxwe TAM system, future negative events are perceived as unbounded (Comrie, 1976).

[93] For the moment, I use this label as a working hypothesis; whether this is the best label for this floating tone is yet to be determined.

(338) Negation of present imperfective events

a.	/sɔ́/ 'leave'	[ōlóɔ̀ **ɔ̀ sɔ́** nɔ̂]	The crocodile is not leaving.
			sxw-L0085-Negation-un.wav
b.	/sē/ 'hear'	[ōlóɔ̀ **ɔ̀ sè** nɔ̀]	The crocodile is not hearing.
			sxw-L0086-Negation-un.wav
c.	/ɲɔ́/ 'be good'	[ōlóɔ̀ **ɔ̀ ɲɔ̌** nɔ̂]	The crocodile is not becoming good.
			sxw-L0087-Negation-un.wav
d.	/jī/ 'go'	[ōlóɔ̀ **ɔ̀ jì** nɔ̀]	The crocodile is not going.
			sxw-L0088-Negation-un.wav
e.	/gbɛ̌/ 'refuse'	[ōlóɔ̀ **ɔ̀ gbɛ̌** nɔ̂]	The crocodile is not refusing.
			sxw-L0089-Negation-un.wav
f.	/gbɔ̀/ 'return'	[ōlóɔ̀ **ɔ̀ gbɔ̀** nɔ̀]	The crocodile is not returning.
			sxw-L0090-Negation-un.wav

The differences between the forms in (337) and (338) are two-fold. First, in the negative future clauses of (337), there is a floating H marking irrealis aspect. Second, there is no H_{ω} boundary at the right edge of the verb in the negative future.

The floating H marking irrealis aspect associates to a TBU in the manner described by the ordered rules of Grammatical tone docking A & B, given in (327). These rules of tone docking are ordered, stating that a grammatical floating H or L will first dock rightward to a TBU that bears M tone. If this does not occur (because the following TBU bears H or L, or because there is no following TBU), then a grammatical floating H or L will dock leftward if there is a TBU available.

The following is the derivation of (337)b, [ōsɔ́ ɔ̀ sé nɔ̂] 'the horse will not hear'. In this derivation, we see that the floating H of irrealis modality precedes the floating M of imperfective aspect in the output from the lexical stage, which in turn precedes a M verb.

(339)

	NEG	IRR	IPFV		IPFV	NEG	
/ōsɔ́	ɔ̀	H	M	sē	nɔ̄	L/	Output from the lexical stage
ōsɔ́	ɔ̀	H	M	sē	nɔ̄	L	L% association
--							Nominal floating H deletion
--							Contour simplific. (A&B)
ōsɔ́	ɔ̀		M	sé	nɔ̄		Grammat. tone dock. (A&B)
--							Partial L spread
ōsɔ́	ɔ̀		M	sé	nɔ̂		Tonal spread
[ōsɔ́	ɔ̀			sé	nɔ̂]		Surface

The floating H marking irrealis docks rightward to the available M TBU of the verb /sē/ 'hear'. This is possible despite the intervening presence of the floating M of the imperfective; there are no lines of association to be crossed. Once the H of irrealis is docked, it is spread rightward by the operation Tonal spread, giving the

surface form [ōsɔ́ ɔ̀̃ sé nɔ̂̃]. This, then, gives us some information about the ordering of rules. It is clear that Grammatical tone docking must be ordered before Tonal spread because the grammatical H tone must dock before it can spread rightward from the verb.

We turn now to cases where the TBU following the H of irrealis has either H or L tone assigned to it. In these cases, rightward docking is not possible (327). This being true, the floating H is associated leftward to the TBU of the negation marker /ɔ̀̃/. This is seen in the utterance below, [ōsɔ́ ɔ̌̃ ↓fɔ́̃ nɔ̂̃] 'the horse will not awaken'. Here, the H verb /fɔ́̃/ 'awaken' is preceded by the negation marker which is realized with a surface [LH] rise.

(340)

	NEG	IRR	IPFV		IPFV	NEG	
/ōsɔ́	ɔ̀̃	H	M	fɔ́̃	nɔ̄̃	L/	Output from lexical stage
ōsɔ́	ɔ̀̃	H	M	fɔ́̃	nɔ̄̃	L	$L_{\%}$ association
--							Nominal floating H deletion
--							Contour simplific. (A&B)
ōsɔ́	ɔ̌̃		M	fɔ́̃	nɔ̄̃		Grammat. tone dock. (A&B)
--							Partial L spread
ōsɔ́	ɔ̌̃		M	fɔ́̃	nɔ̂̃		Tonal spread
[ōsɔ́	ɔ̌̃			↓fɔ́̃	nɔ̂̃]		Surface

In (340), the floating H docks leftward to the negation marker /ɔ̀̃/.[94] In the output from the phonology, there is a floating M marking imperfective aspect between the H docked to the negation marker and the H of the verb. This floating M triggers non-automatic downstep and the verb is realized with a downstepped H. Here we see clearly that the floating M of imperfective marking is ordered closer to the verb than the negation marker /ɔ̀̃/.

We have already seen that the operations Grammatical tone docking A and B must be ordered before Tonal spread. In (340), we see that Grammatical tone docking A and B must be ordered after Contour simplification. Otherwise, the contour created because of the docking of the irrealis H tone would be simplified and yield an incorrect surface form. This is shown in (341), where the derivational operations are incorrectly ordered.

[94] The surface LH rising pitch on a form like [ɔ̌̃] which has a lexically-assigned L tone and a docked grammatical H tone is realized with some variation in the phonetic implementation depending on the tone which precedes. My general observation is that following a surface H, the H pitch of the LH rise is attained relatively late in the duration of the vowel, but that following a surface M or L, the H pitch of the LH rise is attained relatively early in the duration of the vowel. This is a topic that could be studied further.

(341)

	NEG	IRR	IPFV		IPFV	NEG	
/ōsɔ́	ɔ̀̃	H	M	fɔ́̃	nɔ̃̄	L/	Output from lexical stage
ōsɔ́	ɔ̀̃	H	M	fɔ́̃	nɔ̃̄	L	L% association
--							Nom. floating H deletion
ōsɔ́	ɔ̌̃		M	fɔ́̃	nɔ̃̄		Gramm. tone dock. (A&B)
ōsɔ́	ɔ́̃		M	fɔ́̃	nɔ̃̄		Contour simplific. (A&B)
--							Partial L spread
ōsɔ́	ɔ́̃		M	fɔ́̃	nɔ̂̃		Tonal spread
*[ōsɔ́	ɔ́̃			↓fɔ́̃	nɔ̂̃]		Surface

In addition to the presence of the floating H of irrealis, the second thing that distinguishes negative future events from negative present imperfective events is that in the former context, there is no evidence of a H_{ω} boundary on the right edge of the verb. This leads us to the conclusion that once the floating H of irrealis intervenes between the negation marker /ɔ̀̃/ and the verb, the negation marker is no longer able to be prefixed to the verb.[95]

In the absence of a H_{ω} boundary, the H of the underlying LH tone pattern of a verb such as /gbɛ̌/ 'refuse' is delinked when it follows the M tone of the imperfective. This is seen below.

(342) Negation of future events – no right H_{ω} boundary on verb

/gbɛ̌/ 'refuse' [ōsɔ́ ɔ̌̃ gbɛ̀ nɔ̃̄] The horse will not refuse.
sxw-L0149-Negation-un.wav

The following is the derivation of [ōsɔ́ ɔ̌̃ gbɛ̀ nɔ̃̄] 'the horse will not refuse'.

(343)

	NEG	IRR	IPFV		IPFV	NEG	
/ōsɔ́	ɔ̀̃	H	M	gbɛ̌	nɔ̃̄	L/	Output from lexical stage
ōsɔ́	ɔ̀̃	H	M	gbɛ̌	nɔ̃̄	L	L% association
--							Nom. floating H deletion
ōsɔ́	ɔ̀̃	H	M	gbɛ̀ H	nɔ̃̄		Contour simplific. (A&B)
ōsɔ́	ɔ̌̃		M	gbɛ̀ H	nɔ̃̄		Gramm. tone dock. (A&B)
--							Partial L spread
--							Tonal spread
[ōsɔ́	ɔ̌̃			gbɛ̀	nɔ̃̄]		Surface

In (343), the floating H docks leftward onto the negation marker /ɔ̀̃/ because the TBU to the right does not have M tone. Again we see in (343) that the rules of Contour simplification must be applied before the rules of Grammatical tone

[95] One might ask whether it is prefixed to the irrealis marker in this case. There is no way to answer this, as there is no way to detect a H_{ω} boundary adjacent to a surface H tone.

docking. Were this not the case, the rising contour on the negation marker created as a result of tone docking would not be realized as such at the surface level.

In addition, we see that the underlying contour of /gbɛ̌/ is simplified by delinking the H. This is due to the conditioning presence of the floating M tone of the imperfective. The delinked H from the verb /gbɛ̌/ is what prevents spread of L tone to the imperfective marker /nɔ̃̄/. As a result, this latter imperfective marker is realized utterance-finally with a surface ML falling tone.

Were there a H_{ω} boundary to the right of the verb, the H of /gbɛ̌/ would not be permitted to be delinked, as such an action would constitute a violation of the constraint against adjacent unattached Hs.

There are other morphemes that can appear between the negation marker /ɔ̀̃/ and the verb. For example, in (344), the additional preverbal marker that intervenes between the two is the repetitive marker /mɔ̀̃/ which marks an event that is (or is not in this case) re-occurring.

(344)

/M- é	ɔ̀̃	mɔ̀̃	H	M	gbɛ̌	nɔ̃̄	L/
[é	ɔ̀̃	mɔ̌̃			gbɛ̀	nɔ̃̄	]
3SG	NEG	REPET	IRR	IPFV	refuse	IPFV	NEG

He will not refuse again.

sxw-L0387-auxiliaries-un.wav

Here in (344), the repetitive marker comes between the negation marker and the floating H marking irrealis modality.[96]

There is also a morpheme that can appear between the floating H of irrealis modality and the floating M of imperfective aspect.[97] In (345) and (346), we see what I label as the outcome marker in this position. This marker, which has the form /dǒ/, marks an expected, achieved, or potential outcome (overlapping with the semantic notions of purpose and result).

(345)

/ M- jē H	ɔ̀̃	mɔ̀̃	H	dǒ	M	vă	nɔ̃̄	L/
[jē	ɔ̀̃	mɔ̌̃		dó		và	nɔ̃̄	]
3PL	NEG	REPET	IRR	OUTC	IPFV	come	IPFV	NEG

As a result, they will not come again.

sxw-L0412-auxiliaries-un.wav

[96] Another morpheme that appears in this position is /vă/, which literally means 'come' but functions in this position to mark an event that will eventually happen. When the floating H docks leftward onto this marker /vă/, it surfaces as [vá]. The repetitive marker /mɔ̀̃/ and the marker /vă/ can co-occur, in which case the repetitive marker is ordered first.

[97] There may be multiple morphemes that can appear in this position; I am aware of the one.

(346) /M- jē H ɔ̀ mɔ̌ H dǒ M kpɔ́ nɔ̄ L/
[jē ɔ̀ mɔ̌ dó ↓kpɔ́ nɔ̂]
3PL NEG REPET IRR OUTC IPFV see IPFV NEG
As a result, they will not see [it] again.
sxw-L0411-auxiliaries-un.wav

In both (345) and (346), the H of irrealis docks leftward onto the repetitive marker /mɔ̀/. The outcome morpheme /dǒ/ which follows the repetitive marker has its contour simplified by deleting the L. The verb /vă/ 'come' which follows /dǒ/ in (345) is simplified in a manner that is conditioned by the floating M of the imperfective. In (346), the floating M triggers non-automatic downstep on the H verb /kpɔ́/ 'see'.

These tonal alternations seen in clauses expressing future negation, and the underlying structures proposed to account for these alternations, are fairly complex. However, the complexity proposed in this analysis is borne out by the fact that there is another type of syntactic construction that mirrors many of the tonal structures and alternations seen in future negation. This structure is the topic of section 5.5.

5.5 The prospective

In Saxwe, there is a morpheme /kà/ which I label as the prospective. This is a marker of modality that is used to communicate either a desire or the imminent occurence of an event. For example, (347)a, [ōlǒ kă ↓sɔ́ nɔ̂]. could be glossed either as 'the crocodile wants to leave' or 'the crocodile is about to leave'.

The tonal alternations seen for the prospective mirror the tonal alternations seen for the future negative. The following are examples of this.

(347) Prospective events

a. /sɔ́/ 'leave' [ōsɔ́ **kă ↓sɔ́** nɔ̂] The horse wants to leave.
sxw-L0268-auxiliaries-un.wav

b. /sē/ 'hear' [ōsɔ́ **kà sé** nɔ̂] The horse wants to hear.
sxw-L0269-auxiliaries-un.wav

c. /ɲɔ́/ 'be good' [ōsɔ́ **kă ↓ɲɔ́** nɔ̂] The horse wants to become good.
sxw-L0270-auxiliaries-un.wav

d. /jī/ 'go' [ōsɔ́ **kà jí** nɔ̂] The horse wants to go.
sxw-L0271-auxiliaries-un.wav

e. /gbɛ̌/ 'refuse' [ōsɔ́ **kă gbɛ̀** nɔ̄] The horse wants to refuse.
sxw-L0272-auxiliaries-un.wav

f. /gbɔ̀/ 'return' [ōsɔ́ **kă gbɔ̀** nɔ̀] The horse wants to return.
sxw-L0272-auxiliaries-un.wav

In analyzing the prospective, we see that it too is accompanied by a floating grammatical H and bipartite imperfective marking.[98] I assume as a working hypothesis that the floating H in this case is the same morpheme that is used in the future negative construction—in both cases marking irrealis modality. Here again, we see that in keeping with the rules of Grammatical tone docking, this floating H associates rightward if the TBU which follows is M and leftward otherwise.

In (348) the floating H associates rightward and is then spread to the end of the utterance.

(348)	/ōsɔ́	kà	H	M	sē	nɔ̄/
	[ōsɔ́	kà			sé	nɔ̂]
	horse	PROSP	IRR	IPFV	hear	IPFV
	The horse wants to hear.					
	sxw-L0269-auxiliaries-un.wav					

In (349), the floating H associates leftward. The floating M triggers non-automatic downstep of the H tone of the verb /ɲɔ́/ 'be good'.

(349)	/ōsɔ́	kà	H	M	ɲɔ́	nɔ̄/
	[ōsɔ́	kǎ			ꜜɲɔ́	nɔ̂]
	horse	PROSP	IRR	IPFV	be.good	IPFV
	The horse wants to become good.					
	sxw-L0270-auxiliaries-un.wav					

In (350), the verb /gbɛ̌/ 'refuse' undergoes contour simplification in a manner which is conditioned by the floating M that precedes it. The floating H of the prospective docks leftward.

(350)	/ōsɔ́	kà	H	M	gbɛ̌	nɔ̄/
	[ōsɔ́	kǎ			gbɛ̀	nɔ̄]
	horse	PROSP	IRR	IPFV	refuse	IPFV
	The horse wants to refuse.					
	sxw-L0272-auxiliaries-un.wav					

The examples in this section demonstrate the parallels between the future negative and the prospective constructions. The areas of semantic overlap for these two constructions and the corresponding areas of overlap in tonal phenomena strengthen the case for claiming that both make use of a bipartite marking for imperfective aspect as well as a floating tone which marks irrealis modality.

[98] Like with negative future events, this implies that an event that is desired or about to occur is understood as unbounded.

5.6 Yes-no questions

Yes-no questions (YNQ) are marked in Saxwe by an IP-final L tone and a slight lengthening of the final syllable of the IP. In the following pairs, the first utterance is declarative and the second is a YNQ. In (351)b, the surface [HL] fall utterance-finally helps to distinguish the question from the declarative clause.

(351) a. /$^{M-}$ kōfí sɔ́/
[kōfí sɔ́]
Kofi leave
Kofi left.
sxw-L0075-YNquestions-un.wav

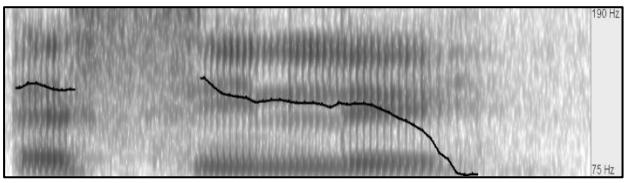
b. /$^{M-}$ kōfí sɔ́ ^{L}/
[kōfí sɔ̂ː]
Kofi leave YNQ
Did Kofi leave?
sxw-L0076-YNquestions-un.wav

(352) a. /ɛ̄sɪ̄ lē/
[ɛ̄sɪ̄ lè]
water be.present
There is water.
sxw-L0077-YNquestions-un.wav

b. /ɛ̄sɪ̄ lē ^{L}/
[ɛ̄sɪ̄ lèː]
water be.present YNQ
Is there water?
sxw-L0078-YNquestions-un.wav

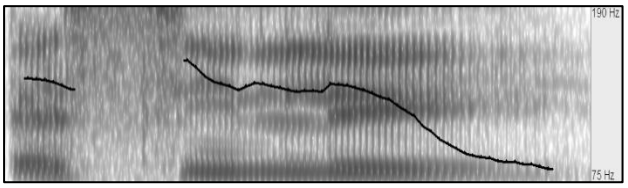
When a declarative clause ends with a surface fall to L or downgliding L because of the association of the right edge $L_{\%}$ IP boundary (section 3.5), the only auditory means by which its corresponding YNQ is differentiated from the declarative clause is by the lengthening of the last TBU of the YNQ, accompanied sometimes by a slight raising of pitch F_0 IP-initially. This is the case in (352)b. The following pitch traces from the utterances in (352) both cover a timespan of 0.70 seconds. The declarative clause is shown in (353), while the YNQ is shown in (354).

(353) Declarative – [ɛ̄sī̄ lɛ̄] 'there is water'



ɛ̄- sī̄ lɛ̄

(354) YNQ – [ɛ̄sī̄ lɛ̄:] 'is there water?'



ɛ̄- sī̄ lɛ̄:

The duration of the final vowel in the YNQ of (354) is longer than that of the corresponding declarative clause of (353).

We have seen in the analyses of imperfective aspect (section 5.1) and negation (section 5.2) that grammatical morphemes which in other Gbe languages have a segmental dimension are sometimes represented in Saxwe by a floating tone—a remnant on the tonal tier of a morpheme that historically had both segmental and tonal dimensions. This is again the case for the YNQ marker. In Fon, for example, the YNQ marker is an utterance-final [à] (Aboh, 2004, p. 30).

For YNQs in Saxwe, the marker is an IP-final floating L that docks leftward to the final TBU of the IP in accordance with rule B of Grammatical tone docking (327). The presence of this floating L does not explain why there is lengthening on the final vowel. This lengthening appears to be a concomitant prosodic characteristic of YNQs which is in addition to the L YNQ morpheme (just as other languages can have concomitant intonation and rhythm or tempo-related prosodic means of distinguishing a question).

There is some overlap in the marking of YNQs and the marking of negation in Saxwe. As discussed in section 5.2, the negative construction includes (as part of its bipartite marking) a L tone at the right edge of the negated clause. We have just seen that the YNQ marker is a L tone at the right edge of the IP. This situation can present potential confusion in distinguishing a clause marked for negation from a clause marked for negation and marked additionally as a YNQ.

There are two strategies used to distinguish the negative YNQ from the negative declarative clause. One possibility is that the floating L that normally serves as the YNQ marker can be preceded by /wɛ̄/, a focus marker that is otherwise used in marking constituent focus and clause-level focus. This is accompanied by a

slight lengthening of the last vowel—the prosodic marking of a YNQ. The following is an example of the use of the /wɛ̄/ morpheme.

(355) /[M-] kōfí ɔ̀̄ sɔ́ wɛ̄ [L] [L /]
[kōfí ɔ̀̄ sɔ́ wɛ̂ː]
Kofi NEG leave FOC NEG YNQ
Did Kofi not leave?
sxw-L0092-YNquestions-un.wav

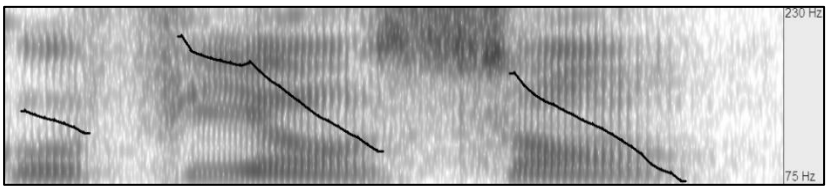
The other possibility is that for the negative YNQ, there are simply prosodic-level distinguishing factors, including a lengthening of the last vowel accompanied by a widening of the pitch F_0 range of the utterance—with pitch levels starting clause-initially at a slightly elevated F_0 compared to what is seen in the negative statement. The negative YNQ and negative declarative statement can be seen below.

(356) /[M-] kōfí ɔ̀̄ sɔ́ [L/]
[kōfí ɔ̀̄ sɔ̂]
Kofi NEG leave NEG
Kofi did not leave.
sxw-L0082-YNquestions-un.wav

(357) /[M-] kōfí ɔ̀̄ sɔ́ [L] [L /]
[kōfí ɔ̀̄ sɔ̂ː]
Kofi NEG leave NEG YNQ
Did Kofi not leave?
sxw-L0083-YNquestions-un.wav

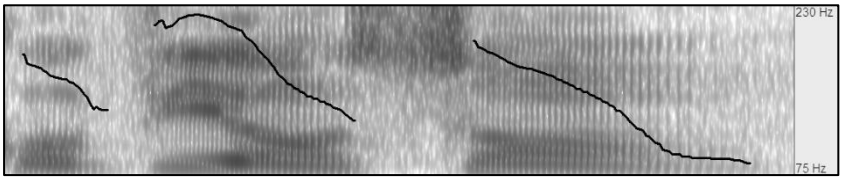
Both pitch traces shown below cover a time span of 0.80 seconds. The lengthening of the IP-final syllable can be seen in (359). In addition, we see that the H tone of this YNQ is raised quite a bit higher in F_0 than the H tone of the negative declarative clause.

(358) Negative declarative – [kōfí ɜ̀ sɔ̂] 'Kofi did not leave'



kō- fí ɜ̀ sɔ̂

(359) Negative YNQ – [kōfí ɜ̀ sɔ̂ː] 'Did Kofi not leave?'



kō- fí ɜ̀ sɔ̂ː

In many languages (particularly non-tonal languages), the pitch patterns associated specifically with YNQs can be attributed to intonational boundary tones. In this section, I have attributed the IP-final lowering seen in YNQs to a tonal morpheme accompanied by prosodic lengthening and a widening of the pitch range. The decision between what can be attributed to a tonal morpheme and what can be attributed to boundary tones is a topic that arises again in section 5.7, which looks at fronted topics.

5.7 Fronted topics

In Saxwe, there is a group of elements that appear in a fronted position before the subject and whose right boundaries are marked by a common distinctive pitch pattern. These include: pragmatic topics in fronted topicalization constructions, adverbs, temporal subordinate clauses, conditional clauses, and conjunctions. These are all categorized together under the general heading of 'topics' by Aboh (2004), who states that Gbe languages sometimes have specific morphemes—labeled as 'topic markers'—to mark the right edge of these topics. For example, Aboh identifies the topic marker in Gun as [yà]. He also notes that the presence of these topic markers is accompanied by 'comma intonation' (p. 51).

In Saxwe, there is no segmental morpheme which is a topic marker. Rather, there is a lowering and subsequent leveling or raising of pitch F_0 at the right edge of these fronted elements, as well as a pronounced lengthening of the rightmost syllable of the fronted element.

I analyze these pitch phenomena as being due to a right floating L topic marker followed by a $H_{\%}$ IP boundary. This combination of a lexically specified

tone and an edge tone associated to a boundary is suggested as a possibility in Ladd (1996, p. 151).

The utterance in (360) includes a fronted topic, which is /ōsɔ́/ 'horse'. This is realized with a lengthened second syllable and a surface [HLH] contour.

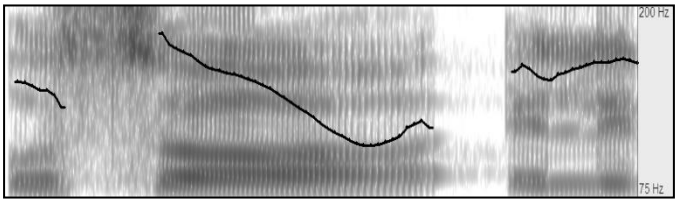
(360) /ōsɔ́ L H% /
[ōsɔ̃:]
horse TOP

/M- é lē ɖī ōɦṹ ɦá/
[é lé ɖí óɦṵ̀ ɦă]
3SG be resemble car approximate

/nā́ M- mī́ lē égbé/
[nā́ ↓mī́ lé ↓égbé]
to 1PL at this.day
The horse, it was like a car is to us today.
sxw-T0128-texts-un.wav

The pitch trace for the first three words of this utterance is shown in (361).

(361) Pitch trace: [ōsɔ̃: é lé...]



Note the length of the last syllable of [ōsɔ̃:] 'horse' (underlying form /ōsɔ́/). The vowel in this syllable is significantly longer than the other vowels shown. Note also the pitch modulation of [ōsɔ̃:]. The lowering and subsequent slight upglide of pitch that occurs on the last syllable of this word is distinctive and can be recognized as different from the lowering that might occur at the right edge of an utterance because of the association of the right L% IP boundary—an association which should not occur anyway in this environment, since /ōsɔ́/ ends with a H tone. This movement of pitch is attributed to the presence of a right floating L topic marker morpheme followed by a right H% IP boundary.

This analysis is based on two arguments. First, there is the fact that other Gbe languages have a segmentally-represented morpheme that marks topics; it makes sense that the L here would be the lexical cognate of those markers.

Second, there must be an explanation for the pitch modulation of the last syllable of these topicalization structures, which always involves a leveling or slight upglide of pitch on a final L pitch level within the IP. This leveling or slight upglide of pitch indicates that the default $L_{\%}$ boundary is not associated to the final TBU of these structures. Instead, there is a right $H_{\%}$ IP boundary on these topics.

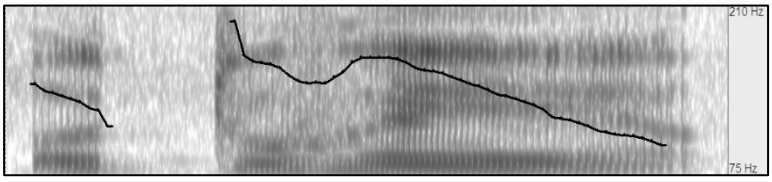
Cross-linguistically, a $H_{\%}$ IP boundary tends to be associated with non-finality or incompleteness, whereas a $L_{\%}$ IP boundary tends to be associated with completion (Ladd, 1996, p. 113). These fronted elements in a topicalized construction are obligatorily non-final within the utterance, so this presence of a $H_{\%}$ boundary in this position is consistent with this cross-linguistic tendency.

Upglide of pitch at this edge is not always seen following the L of the topic marker; more often, there is a pitch at the right edge of the fronted topic that is lowered initially and then simply levels off rather than falling to the bottom of a speaker's F_0 range as would be seen when a $L_{\%}$ IP boundary is linked to the final TBU. This is the 'comma intonation' referred to earlier (Aboh, 2004) and can be seen in (362) and (363), where the final F_0 ends at a frequency which is high enough above the speaker's lowest levels of pitch realization (just above 75 Hz) that the fronted topic sounds non-final.

(362) /ōtú xé $^{L\ H\%}$ /
[ōtú xêˑ:
gun DEM TOP

/ $^{M-}$ é=ɔ̀ ɲḯ ōtú àdǒdwě ^{L} /
[ɔ̂ ɲḯ ó$^{↓}$tú àdòdwê
3SG:NEG be car genuine NEG
This gun, it is not a genuine gun.
sxw-L0023-other clauses-un.wav

(363) Pitch trace: [ōtú xêˑ: ...]



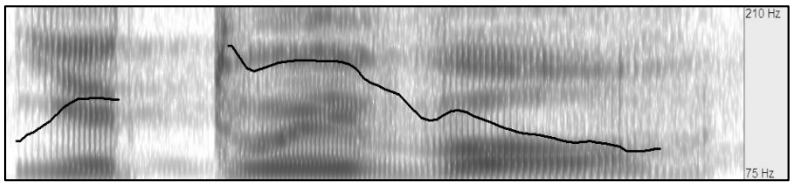
ō- tú xêˑ:

If the TBU of the last syllable of the topic bears L tone, the pitch F_0 will be leveled over a longer time period. This can be seen in (365), a pitch trace of the topicalized subordinate clause in (364).

(364) /M- jē H tó-V̄ vɔ̀ L H% /
[jē twé: vɔ̀°:]
3PL pound:3SG COMPL TOP

/M- jē H nā̄ fú-V̄/
[jē nā̄ fwî:]
3PL FUT winnow:3SG
When they have pounded it, they will winnow it.
sxw-T0027-texts-un.wav

(365) Pitch trace: [jē twé: vɔ̀°: ...]



jē twé: vɔ̀°:

What all of these cases have in common is that the final realization of pitch on the last syllable of the topicalized element is in the L pitch range and there is either a leveling or slight upglide of pitch F_0 observed for this L surface tone. This fact, as well as the pronounced lengthening, cues the listener to expect that the utterance will continue on this topic.

The $H_{\%}$ boundary can serve to make it clear that a clause that otherwise bears no indication of being a dependent clause is in fact a topic, and is therefore in a syntactically dependent relationship with the following clause. This can be seen in (366).

(366) / M- é nā̄ sō āwɔ̄-mɔ́ lá L H% /
[é nā́ só áw̃ɔ́-↓mɔ́ lâ°:]
3SG FUT bisect asphalt-path DEF TOP

/ M- é=ɔ̀̄ kpɔ́ ɖùsí/
[ɔ̂̄ kpɔ́ ɖùsí]
3SG:NEG see right

/ M- é=ɔ̀̄ kpɔ́ āmjɔ̄ H L /
[ɔ̂̄ kpɔ́ ámjɔ̂]
3SG:NEG see left NEG
When he was going to cross that paved road, he didn't look right and he didn't look left.
sxw-T0095-texts-un.wav, sxw-T0104-texts-un.wav, sxw-T0105-texts-un.wav

The dependent clause in (366) has no morpheme of subordination and, apart from the L topic marker and H% boundary, is grammatically acceptable as an independent clause. It is the L topic marker and H% boundary, along with the accompanying prosodic lengthening, that serves to indicate that from a semantic point of view, this clause is subordinate to the following one.

The L topic marker does not exist at the right edge of every syntactically fronted element in Saxwe. For example, a focused element in a focalization construction is not followed by this tonal morpheme, even though it too precedes the subject. In (367), the adverb /fífí/ 'now' is not immediately followed by any kind of tonal morpheme or tonal boundary.

(367) /fífí wɛ̄ M- jē H vǎ/
[fífí wɛ́ jé vàR]
now FOC 3PL come
They came [just] NOW.
sxw-L0017-NP boundary tests-un.wav

In (367), where there is no L topic marker or H% boundary, the H from the adverb /fífí/ 'now' spreads to the focus marker and then on to the following pronoun.

In Saxwe, IP boundaries limit the domain of Tonal spread (section 5.9). Where there is a H% boundary at the edge of a topic, there is no Tonal spread across this boundary. For example, in (368), where there is a H% boundary, we see that there is no L spread from the completive marker /vɔ̀/ to the following pronoun.

(368) /M- jē H tó-V̄ vɔ̀ L H% /
[jē twé: vɔ̀°:]
3PL pound:3SG COMPL TOP

/M- jē H nã̄ fú-V̄/
[jē nã̄ fwî:]
3PL FUT winnow:3SG
When they have pounded it, they will winnow it.
sxw-T0027-texts-un.wav

To the right of the H% boundary, the pitch realized for the following underlying M TBU is a surface M; there is no spread of L across this boundary.

In the Saxwe tone system, there are two right edge IP boundaries: the default right L% IP boundary (section 3.5) and the H% boundary discussed here which is associated with non-finality. Note that unlike the L% IP boundary, the H% IP boundary does not associate to a TBU, but is instead a mechanism to explain the fact that in certain syntactic contexts (like a topic-marking construction) which involve an element of non-finality, there is a failure of the final pitch F_0 to exhibit

the lowering or downglide that would be expected otherwise at the right edge of an IP. In section 5.9, I show another syntactic context where the $H_{\%}$ IP boundary exists.

5.8 $H_{\%}$ boundary and leftward syntactic displacement

In Saxwe, leftward syntactic displacement (often in the context of a relativization or focus strategy) may cause the final clause in an utterance to contain a syntactic gap. When this happens in the context of an assertion, a $H_{\%}$ boundary becomes assigned to the right edge of the IP.

This phenomenon is seen by comparing (369), where the utterance ends with the verb /lɛ̄/ 'be.present/be.at' and there is no syntactic gap, with (370) and (371), where there is a syntactic gap. In each case the utterance ends with the same verb; in (369) there is a surface [HL] fall of pitch F_0, but in (370) and (371) there is no such fall.

(369) /ōxá lá lɛ̄ $^{L\%}$ /
[ōxá lá lê]
broom DEF be.present
That broom is present [somewhere]. sxw-L0021-final fall tests-un.wav

(370) / $^{M-}$kōfí kpɔ́ $^{M-}$fí nǎ́ ōxá lá lɛ̄ Ø $^{H\%}$ /
[kōfí kpɔ́ $^{\downarrow}$fí nǎ́ ó$^{\downarrow}$xá lá lé]
Kofi see place REL broom DEF be.at
Kofi saw where the broom was. sxw-L0024-final fall tests-un.wav

(371) /blɛ́ $^{M-}$é lɛ̄ Ø $^{H\%}$ /
[blɛ́ $^{\downarrow}$é lé]
there 3SG be.at
There it is. sxw-L0021-left boundary tests-un.wav

The gaps in (370) and (371) are both due to the leftward displacement of a syntactic element. In (370), the gap is in the restricting clause of a relative clause construction. In (371), the adverb /blɛ́/ 'there' has been moved leftward from its normal position after the locative verb. Associated to the right edge of both of these IPs is a $H_{\%}$ IP boundary.

We see another example of the tonal effect of a syntactic gap in the comparison of (372) and (373). The latter utterance has a gap in the restricting clause of the relative clause construction, and this gap appears at the right edge of the utterance.

(372) /M- é sē L% /
[é sê]
3SG hear
He heard. sxw-L0014-final fall tests-un.wav

(373) /M- é jí ōwā́ nā́ ōnú nā́ M- é sē Ø H% /
[é jí ↓wā́ nā́ ↓nú nā́ ↓é sé]
3SG like (lit. receive odor) of thing REL 3SG hear
He liked the thing he heard. sxw-L0013-final fall tests-un.wav

In (372), there is a surface [HL] falling pitch as a result of L% association, and in (373), there is an absence of this surface falling pitch as a result of the presence of the alternative H% IP boundary. The syntactic gap at the right edge of the restricting clause in (373) conditions the presence of the H% boundary.

We see this same H% IP boundary in the contrastive focus construction in (374).

(374) /ōŋ̄ wɛ̄ M- é sē Ø H% /
[ōŋ̄ wɛ̄ é sé]
cow FOC 3SG hear
He heard a COW [not something else]. sxw-L0134-focus markers-un.wav

The syntactic gap need not be at the right edge of the utterance for the H% IP boundary to be observed. In (376), it is the subject which has been relativized and is absent in the restricting clause.

(375) /ōlā̄ xé L H% M- é ɲɔ̄ L% /
[ōlā̄ xê°: é ɲɔ̂]
meat DEM TOP 3SG be.rotten
This meat, it is rotten. sxw-L0039-final fall tests-un.wav

(376) /M- kō kpɔ́ ōlā̄ xéní Ø ɲɔ̄ H% /
[kō kpɔ́ ólā́ ↓xéní ɲɔ́]
1SG see meat REL be.rotten
I saw the meat that is rotten. sxw-L0040-final fall tests-un.wav

In (376) the syntactic gap is not at the right edge of the utterance, but there is still no final [HL] fall on the right edge of this utterance despite its underlying /M/ TBU. This is an indication that the syntactic gap of the relative clause has conditioned a H% boundary rather than a L% boundary.

We see this again in (377), where the imperfective marker /nɔ̄/ follows the syntactic gap in the relative clause.

(377) /M- kō ɲɔ́̃ ɛ̄mɛ̃́ nā́ M- jē H M kā̃ Ø nɔ̃̄ H% /
[kō ɲɔ́̃ ɛ́mɛ̃́ ↓nā́ jé kā́ nɔ́̃]
1SG know person REL 3PL IPFV look.for IPFV
I know the person they are looking for. sxw-L0038-final fall tests-un.wav

There is no surface [HL] fall at the end of the imperfective marker /nɔ̃̄/, as one would expect to see in a clause which has the default L% IP boundary at its right edge.

Interestingly, in focus constructions where the subject is in focus, we also see evidence of the H% boundary.

(378) / ōlā̃ mɛ̃̄ wɛ̄ Ø? ɲɔ̃̄ H% /
[ōlā̃ mɛ̃̄ wɛ̄ ɲɔ̃̄]
meat DEM FOC be.rotten
THAT MEAT [and not some other] is rotten. sxw-L0045-final fall tests-un.wav

Here the presence of the H% boundary seems to indicate that there is a syntactic gap in the rightmost clause. This raises a question of whether this is a focalization construction or rather a cleft construction (with the translation "It is THAT MEAT that is rotten").[99]

An analysis that posits the two possibilities of either a H% boundary or a L% boundary on IPs finds some support in other tonal studies, such as that of Kinande, which according to Hyman (1990) has two IP boundary tones. In that language, a L IP boundary tone marks a completed assertion; a noun in its citation form is a completed assertion, as is a simple clause. A question, however, is not a completed assertion and it gets the alternative H IP boundary tone.

This brings up the issue of what happens in Saxwe with questions. Interestingly, in Saxwe, a question has a L% boundary rather than a H% IP boundary associated to its right edge. This is true even when the rightmost clause of the question includes a syntactic gap. This means that the presence of a syntactic gap alone is not sufficient for predicting the absence of final pitch fall in Saxwe. Note the surface [HL] falling pitches at the right edge of the utterances in (379) and (380).[100]

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[99] Linguists studying the different Gbe variants are of differing opinions as to whether these are cleft constructions (comprised of two clauses) or focalization constructions (comprised of one single clause) (Ameka, 1992; Lefebvre & Brousseau, 2002).

[100] Unlike with yes-no questions, a WH question does not have a final floating L tone marker. For instance, we can take the case of the verb /sɔ́̃/ 'leave'. The question "where did he leave from" is [bɔ̄ lɛ́ ↓é sɔ́̃] with a final surface H—a realization one would not have if there were a final floating L, but one would expect from a final H TBU in the presence of a L% boundary

(379) /bɔ̄ lɛ́ M- é lē Ø L% /
[bɔ̄ lɛ́ ↓é lê]
where? FOC 3SG be.at
Where is it? sxw-L0006-questions-un.wav

(380) / M- lōbwé nɛ̄mṹ lɛ́ M- é xɔ̄ Ø L% /
[lōbwé nɛ́↓mṹ lɛ́ ↓é xɔ̂]
orange how.many? FOC 3SG buy
How many oranges did he buy? sxw-L0006-questions-un.wav

We can see the difference between the IP boundary tones assigned to the two following utterances, both of which have a syntactic gap in the object position.

(381) /ɛ̄-lɛ́ M- jē H bɔ̄ Ø L% /
[ɛ̄-lɛ́ jé bɔ̂
what?- FOC 3PL gather
What did they gather? sxw-L0051-final fall tests-un.wav

(382) /nɛ̃ké wɛ̄ M- jē H bɔ̄ Ø H% /
[nɛ̃ké wɛ́ jé bɔ́
firewood FOC 3PL gather
They gathered FIREWOOD [not something else]. sxw-L0052-final fall tests-un.wav

The difference between these two clauses is that a H% IP boundary is assigned to the assertion which contains a syntactic gap (382), while the default L% boundary is assigned to the question which contains a syntactic gap (381).

If we consider that the H% IP boundary is most commonly associated with non-finality or incompleteness (Ladd, 1996), this raises the issue of whether a question which has a syntactic gap is considered complete for the reason that the syntactic gap is a necessary and expected feature of WH questions. Conversely, in the context of an assertion, a syntactic gap flags a clause as incomplete. It is as if the H% IP boundary serves to highlight the relationship between the information in the incomplete clause and the element that has been displaced out of that clause and therefore comes earlier in the utterance.

Before closing, I note that there is some variation among speakers with regard to the H% IP boundary. All the speakers I observed have this boundary on assertions where the syntactic gap is on the far right edge of the utterance. However, the further away from the right edge of the utterance the gap is located, the more of a possibility that some speakers will employ the default L% boundary rather than the H% boundary. I have represented here the data obtained from my primary language

since L% association would be prevented by the presence of the H.

consultant. This is a topic that deserves further study. It would also be useful to do a comparison of what happens across Gbe languages in similar syntactic structures.

I turn now to another topic having to do with IP boundaries before summarizing the findings of this chapter.

5.9 Correspondences between IPs and syntactic structures

In section 3.5, I discuss the L% boundary tone which, by default, exists on the right edge of every IP. The rule of L% association states that the L% IP boundary tone will become associated to the final TBU of the IP if the final tone of the IP is a non-H tone (either M or L). In addition to being sensitive to tones that are lexically associated to a TBU, this operation of L% association is sensitive to floating tones and boundary tones.

I do not generally mark the default L% boundary in underlying forms because its presence is assumed unless noted otherwise and because its association to a TBU (when the environment is right for this to occur) is indicated during the application of the rule of L% association. Here in this section and the following, however, I mark its presence exhaustively because its presence is related to the topic of study.

In the prototypical case, the IP corresponds with a syntactic clause. However, there is not necessarily a one-to-one correspondence between the IP and the syntactic clause. This lack of one-to-one correspondence is the topic of this section.

The IP can be defined in different ways. Linguists focus on various criteria to define the IP, including the mapping of syntax to phonology, semantic considerations, prosodic cues, and tonal phenomena, particularly that which is boundary-related (Ladd, 2001).

In Saxwe, a phonologically-driven definition for the IP is that it is the domain in which tone will spread (section 3.2). This being the case, tonal spread can be a litmus test for determining where the boundaries of an IP lie. This definition is not, in the majority of cases, at odds with semantic and syntactic criteria; generally, tone spreads within predictable syntactic units and within domains of semantic interpretation. However, there are some IP boundaries that cannot be predicted based purely on syntactic and semantic considerations.

In an utterance composed of two fairly short coordinate clauses that share the same subject, the IP may encompass both clauses. This is seen in (383).

(383) /M- é fɔ́ bō sɔ́ ōnṹ lá L% /
[é fɔ́ bó ↓sɔ́ ó↓nṹ lá]
3SG awaken CONJ take thing DEF
He awoke and took the thing.
sxw-L0001-clause connectives-un.wav

The clearest indication that (383) represents a single IP is that H tone spreads from the verb /fɔ́/ 'awaken' to the following conjunction marker /bō/ and the M tone delinked from this conjunction marker triggers non-automatic downstep of the following H on the verb /sɔ́/ 'take'.

In an utterance that includes multiple independent syntactic clauses, the situation can be more complex. This is seen in the following utterance.

(384) /kòfí fɔ́ bō fṹ wṹmɛ̃̄ L% /
[kòfí fɔ́ bó ↓fṹ ŋ̍ʷmɛ̂̄]
Kofi awaken CONJ splash face

/bō dǒ ōgbè nã̀ ōtɔ́ L% /
[bō dò ògbè nã̀̄ òtɔ́]
CONJ put speech to father

/bō lɛ̄ ɛ̄sɪ̃̄ L% /
[bō lɛ̄ ɛ̄sɪ̃̀…]
CONJ sprinkle water
Kofi awoke, and splashed his face, and greeted his father, and showered...
sxw-L0001-multi-clause utterances-un.wav

In (384), we have four syntactic clauses and three IPs. The right edge of the first IP is found after the second syntactic clause rather than after the first. The evidence for this is in the fact that H tone is spread to the first conjunction /bō/ and it is realized H; otherwise the tone on /bō/ would be realized M.

At the end of the first IP (the second syntactic clause), there is a right edge L% boundary. This boundary tone associates to the final TBU of the IP, creating a surface [HL] falling contour.

At the beginning of the second IP (the third syntactic clause), the conjunction /bō/ is realized M; there is no tonal spread across the first IP's right boundary. At the right edge of the second IP, the L% boundary does not become associated to the final TBU because of the presence of a H tone on the final TBU of /ōtɔ́/. This being the case, there is no final falling pitch at the end of this IP. We can infer, however, that there is an IP boundary between [ōtɔ́] and the conjunction /bō/ of the third IP because we see that /bō/ (the first TBU of the third IP) is realized M rather than H.

So far, the examples given have been clauses in coordination that share a same subject. When two clauses in coordination have different subjects, the two clauses can no longer be encompassed by a single IP. An example of this is seen in (385), where the subject of the second clause is followed by the coordinating conjunction.[101]

(385) /$^{M-}$kōfí xɔ̄ ōtú $^{L\%}$/
[kòfí xɔ́ ó↓tú]
Kofi buy gun

/ōtɔ́ bō xɔ̄ ōlǐ̌ $^{L\%}$/
[ōtɔ́ bó xɔ́ ólì̌^{R}]
father CONJ buy hoe
Kofi bought a gun and his father bought a hoe.
sxw-L0024-other clauses-un.wav

Here, the right edge L% boundary of of the first IP does not associate to the final TBU of IP because of the presence of a H tone on this TBU. However, this boundary prevents Tonal spread, and the initial underlying M of the second IP is realized at the surface level as M rather than H.

Another example of this is given in (386), an excerpt from a procedural text about cultivating beans.

(386) /...$^{M-}$é bā xú $^{L\%}$/
[é bá ↓xú]
3SG CONJ[102] dry

/$^{M-}$jē ^{H} bā bé-V̄ $^{L\%}$/
[jē bā bê:]
3SG CONJ gather-3SG
... and it will dry, and they will gather it.
sxw-T0033-texts-un.wav

Here again we see that there is no H spread from the last TBU of the first IP to the initial TBU of the second IP.

We see in this section that the mapping of IPs to syntactic structures is not always a one-to-one affair. Prototypically, every syntactic clause is mapped as a separate IP, but it is possible that two coordinate clauses may be encompassed by a

[101] This same ordering of the subject and the coordinating conjuction is seen in Yoruba but not, to my knowledge, in the Gbe variants that have been documented thus far.
[102] The conjunction /bā/ is used only in a future or habitual framework where the subject of the clause is different from that of the previous clause.

single IP. This is most likely to be the case if: (1) the two clauses share the same subject; (2) the first clause does not contain a direct object; and (3) the second clause does not repeat the subject.

5.10 Conclusions

This chapter deals with a number of topics related to grammatical tone and intonational boundaries—both of which are observed at the clause and text levels rather than at the word level. While grammatical tone and intonational boundaries may seem at first glance to be quite distinct, we see that in Saxwe, the decision regarding which pitch-related phenomena to attribute to grammatical tone and which to attribute to an intonational boundary is not necessarily a simple one. In this study I adopt the explicitly phonological approach to intonation (Bruce, 1977; Ladd, 1996; Pierrehumbert, 1980; Pierrehumbert & Beckman, 1988) whereby intonational pitch across an utterance can be attributed to tones that are related either to local prominences (or lexically-assigned tone in the case of tonal languages) or to boundaries.

Assuming this phonological approach to intonation, an utterance-final grammatical floating tone will produce different surface realizations from a tonally identical intonational boundary only if its association to a TBU is governed differently. This means that a floating tonal morpheme on the edge of an IP can be difficult to distinguish from a intonational boundary tone. One guiding principle in this study is that a boundary tone tends to be structurally-driven and is therefore assigned in the presence of certain structural conditions (whether phonological or morphosyntactic) that are generalizable—such as the presence of a syntactic gap in the final clause of an assertion or the fronting of a constituent. This is different from a floating tone which marks a particular semantic distinction such as negation or irrealis modality. Yes-no questions present the hardest case for deciding whether they are represented by an intonational boundary tone or a tonal morpheme. In a selection of African tonal languages summarized by Downing and Rialland (2017b), pitch-lowering trends at the edge of the IP (combined with register raising or expansion in some cases) are seen to be commonly associated with yes-no questions, and this is most frequently labeled as intonational tone. There is some reason, however, to posit the notion of a floating L morpheme marking yes-no questions in Saxwe, and this is discussed below.

In sections 5.1 through 5.7, we see that Saxwe has a number of grammatical morphemes that are represented by a floating tone. Many of these grammatical floating tones have cognates in other Gbe languages that have a segmental component. The following is a summary of some of these cognates. The Saxwe and Aja data come from my own field notes and the rest come from Aboh (2004).

(387) Tonal morphemes in Saxwe compared to their Gbe cognates (Aboh, 2004, pp. 30, 34, 36, 43–47)

imperfective aspect	lè … ɔ̀	Gen	Note: for all languages except Saxwe, imperfective aspect involves SOV word order; the first of these markers precedes the object and the second follows the verb
	tò … / L /	Gun	
	ɖò … wɛ̀	Fon	
	lè … ḿ	Ewe	
	lè … kɔ̀	Aja	
	/ M / … nɔ̃̄	Saxwe	
clausal negation	má (preverbal)	Gun	
	má (preverbal) *or* ă (clause-final)	Fon	
	mú … ò	Gen	Note: for Gen, Ewe, Aja, and Saxwe, the first marker is preverbal and the second is clause-final
	mɛ̄ … ō	Ewe	
	dé … ò	Aja	
	ɔ̃̀ … / L /	Saxwe	
yes-no questions	à	Fon	Note: all of these markers are clause-final
	/ L /	Gun	
	/ L /	Adan	
	à	Aja	
	/ L /	Saxwe	
fronted topics	yà	Gun	Note: all of these markers follow the fronted topic
	lá	Ewe	
	ɔ̀	Aja	
	/ L /	Saxwe	

We see in this summary that the Gbe varieties differ along a spectrum as to whether all of their markers have a segmental dimension or whether there is a mix of those markers that have a segmental dimension plus those that are purely autosegmental.

If we consider that the differences between these Gbe varieties reflect historic sound changes, there are two ways of looking at the matter. If the direction of sound change is toward loss of segmental information, then Saxwe would be considered to be on the innovative end of the spectrum (with Gun perhaps next), because so many of these morphemes that have a segmental dimension in the other

Gbe varieties are simply autosegmental in Saxwe. On the other hand, if the direction of sound change is toward assigning segmental information to autosegmental morphemes, Saxwe would be considered to be on the conservative end of the spectrum.

A similar trend can be seen when we compare the marking of negative future events. As far as I am aware, Saxwe is the only Gbe variety that does not employ a combination of future and negation markers for this purpose, but instead has a floating H tone (marking irrealis modality) that distinguishes negative future events from negative present imperfective events (section 5.4).

In this chapter, we see that there are two possible IP boundaries: a default $L_{\%}$ IP boundary and an alternative $H_{\%}$ IP boundary. Section 5.8 describes the fact that an assertion which contains a syntactic gap in its final clause is assigned a $H_{\%}$ boundary. This $H_{\%}$ IP boundary is generally associated with non-finality or incompleteness and may serve to flag the connection between the incomplete information within the clause and the displaced element that precedes it in the utterance.

In this respect the $H_{\%}$ IP boundary bears some similarity to the H_{ω} PW boundary if we consider that the H_{ω} boundary may serve to flag the connection between a PW and a preceding element (such as a prefix or a noun in a noun compound) when the two function together in a nested structure of recursive PWs (section 4.1). We could say that the innermost right PW is no longer complete in itself, but is completed—yielding a new lexical sense—by the element that precedes. In both cases, then, there is an incompleteness about the rightmost unit (whether it is a clause or a PW), and the information missing in this rightmost unit is completed by an element that precedes it in the utterance. The H boundary alerts the listener to this reality.

This same $H_{\%}$ boundary is also assigned to a topic in a fronted topicalization construction (section 5.7). These topics are clearly non-final and it is perhaps because of this that they too are assigned the $H_{\%}$ boundary.

A $H_{\%}$ boundary co-occurring with a fronted constituent is not unusual in African tone languages (Downing & Rialland, 2017b). Here in Saxwe, the $H_{\%}$ IP boundary does not associate to a TBU, but prevents IP-final falling or downgliding pitch. This is slightly different from the default $L_{\%}$ IP boundary which does associate to a TBU if the final tone in the IP is non-high.

The correspondence between IPs and syntactic clauses is explored in section 5.9, where it is shown that there is some variability in the correspondence between IPs and syntactic clauses; it is not always a one-to-one relationship.

In this study of Saxwe tone, chapter 3 provides the groundwork for understanding the Saxwe tonal system, including: (1) an analysis of underlying tones in Saxwe; (2) monomorphemic noun and verb tone patterns; and (3) many of the postlexical tone rules. Chapter 4 looks at word-level tonal phenomena in Saxwe,

including the floating M- tone and the H_{ω} PW boundary. In that chapter, I also describe a number of ways in which tone is assigned in various word-formation or lexicon-building strategies in Saxwe. The present chapter rounds out the analysis of the Saxwe tonal system by looking further at tonal issues having largely to do with grammatical tone and tonal boundaries. These chapters together provide a general overview of Saxwe tone in its various roles and dimensions.

I turn now to chapter 6, which examines Saxwe tone system in light of a feature model of tone, before continuing with details regarding the phonetic implementation of tone in Saxwe followed by final conclusions.