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The intonational system of Wolof*

ANNIE RIALLAND and STÉPHANE ROBERT

Abstract

This paper presents an overview of the intonational system of Wolof (a non-tone language belonging to the Atlantic branch of Niger-Congo), based on the analysis of several recorded corpora. This system has several interesting typological features, including the absence of any intonational marking of focus. There is a particularly close relationship between the intonational system and the morphosyntax, manifested in complementary forms of marking. Part I describes the relevant morphosyntactic features of the language and the melodic contours of the simplest prosodic units (utterances without intonational subdivision). Owing to the absence of pitch accent and of intonational focus marking as well as to the optional nature of intonational subdivision, the basic intonational structure of statements consists of a completely flat low-pitched plateau ending in a boundary tone. The analytic model postulates L and H “pitch targets” allowing the intonation curve to be broken down into component structures. Utterance-level boundary tones and phrasal L tones and H tones mark utterance-level categories such as statements, several types of interrogatives and exclamations. Part II describes the prosodic structures that appear in discourse (prosodic divisions, downdrift, “preambles,” pauses, and continuative boundary tones). Part III provides a summary of the system as a whole.

INTRODUCTION AND PRELIMINARIES

There are now many studies of tone systems in African languages, the subject having been particularly in vogue during the 1970s and 1980s at the time of the development of autosegmental phonological theories. However, very little attention has been devoted to the study of nontonal African prosodic systems, such as that of Wolof. Wolof belongs to the Atlantic branch of the Niger-Congo family, which includes mostly non-

tonal languages.¹ The only earlier scholar to have shown interest in Wolof intonation is the ethnologist J. Irvine, who demonstrated how prosodic features such as rate of delivery, dynamics, and pitch range help to distinguish social classes linguistically, particularly in the case of nobles and griots² (Irvine 1973, 1980). The linguistics of Wolof intonation was thus a totally unexplored subject when we first approached it.³

The purpose of this paper is to provide an overview of intonation in Wolof, in its relationship with morphosyntax. We shall begin by discussing one of the more striking morphosyntactic features of Wolof, the use of verbal inflection to mark focus. A grasp of this feature is crucial to a proper understanding of intonation, which, as we shall see, is not used to indicate focus. Freed from this constraint, prosodic features can be used for other purposes. In the course of our discussion, we shall also bring out another characteristic feature of intonation in Wolof, viz. the optional nature of the division of sentences into intonation groups. We shall look first at declarative, interrogative, and other sentences with no subdivisions and then examine how these same sentences can, if desired, be subdivided by intonation. As we proceed, we shall also remark on the implications of the Wolof data for intonational modeling. We end our discussion by enumerating the full set of features of the Wolof intonational system and pointing out the remarkable extent of interdependency between intonation and morphosyntax in this language. In concluding, we emphasize the typological specificity of this system.

The results presented here are based on a study of sixteen native speakers who participated in different ways. Initially, we worked interactively with four informants,⁴ two male (L and B) and two female (N and F). This part of the study yielded the essentials of the system as described here. We then checked and expanded our findings by analyzing a variety of other sources, including portions of radio and television broadcasts, material from the Dakar Cultural Archives, the reading of a play (*Xët cig lëndëm*), and an exchange between a mother and her baby. Each example used below is referenced to its corpus of origin and is transcribed following the official spelling of Wolof in Senegal.⁵ The acoustic analyses were carried out at the Phonetics Laboratory of the research unit “Phonétique expérimentale et modélisation phonologique” (ESA 7018, CNRS/Université de Paris 3), using the UNICE speech analysis software.

1. Focus and thematization

We begin with a brief discussion of focus and its effects on word order and thematization, without which there can be no proper grasp of the organization of the intonational system as a whole.

1.1. *Focus and the verb*

One of the characteristic features of Wolof grammar is the expression of information structure in the verbal morphology. The Wolof verbal constituent is composed of two parts: an invariant lexical item, and an inflectional marker conveying the grammatical modifications of the verb (person, number, tense/aspect,⁶ mood) as well as the information structure of the sentence. The inflectional marker is preposed, postposed, or suffixed to the lexical item and organizes the verb system into ten paradigms or “conjugations”: perfect, presentative, aorist, verb emphatic, subject emphatic, complement emphatic, negative, emphatic negative, obligative, and imperative.

In the affirmative indicative mood, there are three nonfocusing conjugations (perfect, presentative, and aorist) and three focusing conjugations that are called “emphatic.”⁷ The latter vary according to the syntactic status of the focused constituent: subject, verb, or complement (in the wide sense of any constituent that is neither subject nor main verb).

Thus, for *dem* ‘go,leave’, *foofu* ‘there, over there’, see Table 1.

In the following examples, the first sentence (perfect), which does not contain a focused constituent, contrasts with the subsequent ones where one or another constituent is in focus.

- (1) a. Perfect
Peer lekk *na*.
Peer eat PFT3SG
‘Peer has eaten.’
- b. Verb emphatic
Peer *dafa* lekk.
Peer VBEMPH3SG eat
‘Peer did eat.’

Table 1. *Indicative affirmative conjugations in Wolof*

	Perfect	Present	Aorist	Verb E.	Subj. E.	Compl. E.
1SG	<i>dem naa</i>	<i>maa ngi dem</i>	<i>ma dem</i>	<i>dama dem</i>	<i>maa dem</i>	<i>foofu laa dem</i>
2	<i>dem nga</i>	<i>yaa ngi dem</i>	<i>nga dem</i>	<i>danga dem</i>	<i>yaa dem</i>	<i>foofu nga dem</i>
3	<i>dem na</i>	<i>mu ngi dem</i>	<i>mu dem</i>	<i>da(fa) dem</i>	<i>moo dem</i>	<i>foofu la dem</i>
1PL	<i>dem nanu</i>	<i>nu ngi dem</i>	<i>nu dem</i>	<i>danu dem</i>	<i>noo dem</i>	<i>foofu lanu dem</i>
2	<i>dem ngeen</i>	<i>yeena ngi dem</i>	<i>ngeen dem</i>	<i>dangeen dem</i>	<i>yeena dem</i>	<i>foofu ngeen dem</i>
3	<i>dem nañu</i>	<i>ñu ngi dem</i>	<i>ñu dem</i>	<i>dañu dem</i>	<i>ñoo dem</i>	<i>foofu lañu dem</i>

- c. Subject emphatic (3sg)
Peer *moo* ko lekk.
Peer SUBJEMPH3SG OPR eat
'It was Peer who ate it.'
- d. Subject emphatic (3pl)
Peer ak Sàmba *ñoo* ko lekk.
Peer and Samba SUBJEMPH3PL OPR eat
'It was Peer and Samba who ate it.'
- e. Complement emphatic (1sg)
Mburu *laa* lekk.
bread COMPEMPH1SG eat
'It was bread I ate.'
- f. Complement emphatic (3pl)
Mburu *lañu* lekk.
bread COMPEMPH3PL eat
'It was bread they ate.'

The verbal constituent (the lexical verb and its inflectional modifier) constitutes the predicative *nexus*, into which only clitic object pronouns (such as *ko* in [1c] and [1d]) can be inserted. The particularly complex structure of the complement-emphatic conjugation should be noted ([1e], [1f]). The focused complement must appear initially in the sentence and hence be shifted from its unmarked position after the verbal constituent. It is followed by the inflectional complement-emphatic marker, then by the rest of the predicate phrase. This means that the complement-emphatic marker is situated between the extracted complement (the focus) and the lexical verb. This marker thus indicates that the preceding term carries the focus, even though it bears pronominal (subject agreement) and tense/aspect morphology that modifies the following term. The structure of the sentence is thus the following:

Complement	Complement emphatic marker	Predicate phrase
	– focuses the complement	
	– is inflected to agree with the subject of the predicate phrase	
	– bears the tense–aspect marking of the verb	

The nature of the extracted term is variable. It can be a noun, a noun phrase, a tonic pronoun, an adverb, a verb, or even a subordinate clause. In the following examples, focus is indicated by bracketing and the complement-emphatic marker is in italics.

- (2) [Dém] *la* Musaa dem.
 yesterday COMPEMPH3SG Musa go
 ‘It was [yesterday] that Musa left.’
- (3) Lekkuma mburu mi. [ceeb bi] *laa* lekk.
 eat+NEG1SG bread the, [rice the] COMPEMPH3SG eat
 ‘I didn’t eat the bread, it was [the rice] I ate.’
- (4) [Bi ma nekkee xale te ma doon bey
 [when AOR1SG be+ANTER child and AOR1SG *d*+PAST farm
 sama toolu baay] *laa* gis gaynde.
 my field-CON father] COMPEMPH1SG see lion
 ‘It was [when I was young and farming my father’s field] that I
 saw the lion.’

The grammaticalization of focus marking in the verbal inflection is essential for the explanation of some of the intonational features of Wolof to be described below, in particular, the lack of any specific intonation for utterances containing a focus.

1.2. *Thematization and word order*

The morphosyntax of focused clauses also determines other features connected with thematization in Wolof.

The basic order in Wolof is <subject verbal-nexus object>. An inflectional subject marker of the verb must always agree with the lexical subject.⁸ Thematization can be introduced into this sequence by prosodic means. Thus any lexical subject will either simply stand in initial position (cf. [5a]) or be marked as well for thematization by a pause (indicated by the sign |, cf. [5b]) and/or a melodic substructure to be described below (see sections 7–8, and in particular section 8.3, for a detailed study of pauses), whatever the conjugation.⁹

- (5) a. Peer mu-ngi lekk. [no pause]
 Peer 3SGPRESENT eat
 ‘Peer is eating.’
- b. Peer | mu-ngi lekk. [pause: thematization]
 Peer (PAUSE) 3SGPRESENT eat
 ‘(As for the) Peer (you speak of), he is eating.’

Marked thematization seems, however, to be obligatory in two cases: for a lexical subject used in a clause containing the complement emphatic, and for a lexical object moved into initial position without being focused. In the first case, due to the structure of the complement focus, there are two terms preceding the verbal constituent, each with a different syntactic

role (subject and focused complement): they are not allowed to follow each other directly without an intervening pause, (5d).

- (5) c. *Peer mburu mi la lekk.
 d. Peer | mburu mi la
 Peer (PAUSE) bread the COMPEMPH3SG
 lekk. [pause: prosodically marked thematization]
 eat
 ‘As for Peer, it was bread he ate.’

In the second case, when a thematized object is moved from postverbal, (6a), to initial position, (6b), there will always be both a pause and an anaphoric (pronominal) object.¹⁰

- (6) a. lekk na mburu mi.
 eat PFT3SG bread the
 ‘He ate the bread.’
 b. mburu mi | lekk na ko.
 bread the eat PFT3SG OPR
 ‘That bread, he ate it.’ [initial object: obligatory pause]

Finally, let us point out that in Wolof, there can be no cataphoric pronominal reference to a following thematized term (antitopic), as in the French *mais je ne l’ai pas pris, ton stylo*, lit. ‘but I didn’t take it, your pen’.

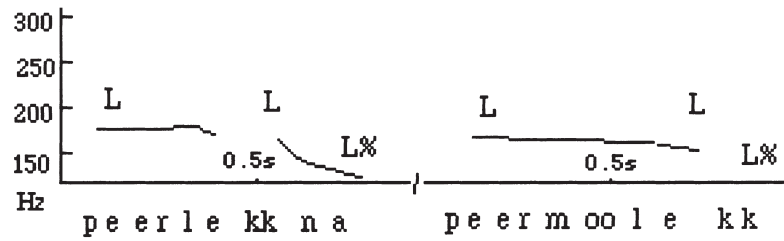
Our description of the intonational system of Wolof will now begin with a consideration of what we may call “zero-degree” intonation, that is, completely flat, low-pitched intonation contours.

1. SENTENCES WITHOUT SUBSTRUCTURING

2. Minimal declarative intonation: completely flat, low-pitched intonation contours

One of the most striking features of Wolof is its use of flat intonation contours with no fluctuations attributable to any factors such as intonational substructuring or emphasis. Utterances with this type of intonation may consist of ordinary declarative sentences of any length (see examples [8]–[10] below) and are far from uncommon; some speakers produce many such utterances when reading or speaking.

Let us look at the pitch contours of two short examples of this kind and a spectrogram of one of them, as pronounced by one of our female speakers, N (for details on informants and corpora, see Appendix A).



- (7) a. Peer lekk na.¹¹ (N) b. Peer moo lekk. (N)
 Peer eat PFT3SG Peer SUBJEMPH3SG eat
 'Peer ate.' 'It was Peer who ate.'

The spectrogram in Figure 1 is provided solely for comparison with the one appearing below (cf. section 4.1) and will be discussed subsequently.

These two examples were chosen because one, (7b), contains a focus, while the other, (7a), does not. The first point to note is that focus has no effect on the melodic contour of the sentences. Both are equally flat. Other examples presented below ([37a] and [37b]) will allow us to show that focus has no effect on rhythm either. The complete absence of intonational marking of focus, though foreseeable given the morphosyntax of the language, is nonetheless remarkable in a non-tone language and seems quite rare from a typological point of view.¹²

The second point of note is that there is no melodic marking of accents. Higher pitch (or even lower pitch, as would appear in a language like Danish) is nowhere used to mark accent. Wolof is nevertheless typologically a language with stress.¹³ The basic stress-placement rule is as follows:

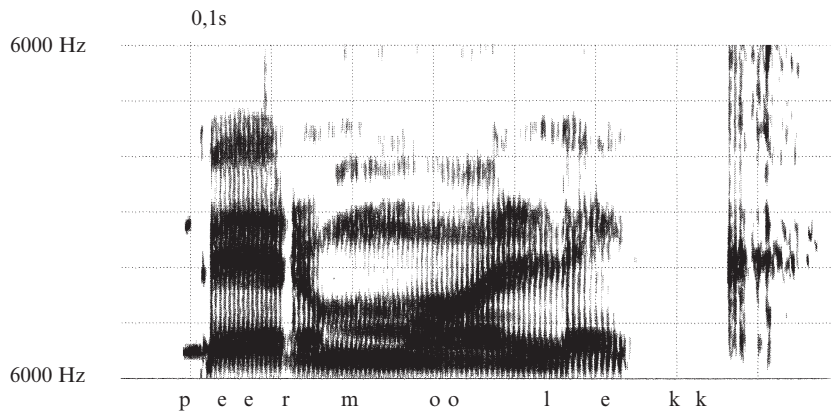


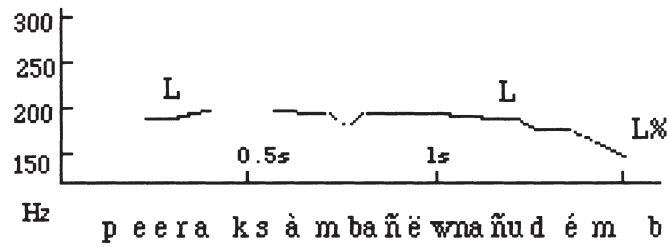
Figure 1. Spectrogram of Peer moo lekk (N) 'It was Peer who ate'

stress falls on the first syllable of lexemes unless the second syllable is long, in which case it falls on the latter (Sauvageot 1965: 41–44; Njie 1982: 53; Ka 1988: 219–242, 1994). The two short examples (7a) and (7b), each of which contains two stresses (one on the subject *Peer* and the other on the verb *lekk*),¹⁴ already suffice to show that pitch height is not linked to stress. This observation will be confirmed time and again.

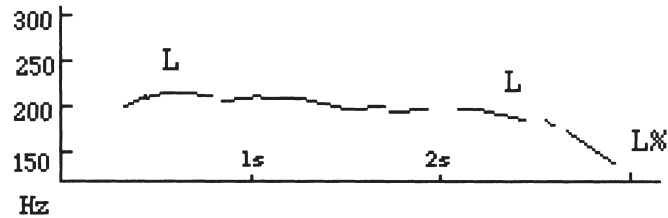
There are thus two factors explaining why it is that absolutely flat intonation contours are possible in Wolof. The first is the presence of a system of morphosyntactic focus marking, making intonational marking of focus unnecessary, and the second is its absence of pitch accent. As we shall see, flat intonation contours turn out to provide a foundation on which more complex intonational structures can be built.

Let us now look more closely at this flat, low-pitched intonation pattern terminating with a drop. A graph of this structure can be generated by postulating a small number of targets: a low-pitched target (L) at the beginning of the plateau, a second low target (L) toward the end, and an even lower (infralow) target at the end of the utterance (L%). It can be simply accounted for by positing two edge L tones at the edges of the prosodic phrase (cf. Ladd 1996 and Grice et al. 2000 for surveys of edge tones in various languages), and an utterance-final boundary tone (L%). The low and infralow targets are mapped into constant pitch values. Thus, for example, under laboratory conditions female speaker N regularly produces contours of this type at between 180 and 210 Hz, excluding the final syllable. Her utterance-final infralow target (L%) ends at a constant pitch of between 120 and 130 Hz, which turns out to coincide with the bottom of her range. In our spontaneous corpora as well, we found that speakers who produced completely flat utterances tended to use constant pitch values, and that final boundary targets all tended to fall at the bottom of their range, whatever the intonational structure of the sentence. The L% boundary tone is cross-linguistically widespread and has been found to drop consistently in this way to an infralow level in a range of languages. It has been subject to particularly detailed scrutiny in many varieties of English (see Maeda 1976; Menn and Boyce 1982; Anderson and Cooper 1986, *inter alia*). Other intonational languages also have a low reference pitch value, different from the infralow one (see Pierrehumbert 1980; Arvaniti and Ladd 1995; Ladd 1996; Ladd and Terken 1995; Patterson and Ladd 1999, *inter alia*). This low pitch in Wolof provides a basic reference value (a “floor”) with respect to which high targets can be set (cf. sections 4 and 5, and part II).

Let us now consider the longer sentences (8) and (9).



- (8) Peer ak Samba ñew nañu démb.¹⁵ (N)
Peer and Samba come PFT3PL yesterday
'Peer and Samba came yesterday.'



- (9) Naruma toog di leen seetaan ngeen di yàq li ma jota liggéy. (N)
'I don't intend to stand around and watch you ruin everything I've managed to do.'

In these sentences, the pitch remains at low level for most of the duration and then drops to the bottom of the speaker's range at the end. These longer utterances show even more clearly both that stress in no way correlates with pitch, and that intonational subdivision is not obligatory.

This kind of simple, flat, affirmative contour appears in a wide range of discourse types. There were many of them in our recorded readings, but they were also frequent in the televised debate and the radio play we analyzed. In the debate, on the topic of traditional medicine, the people interviewed generally told their stories with relatively flat intonation. One of them even used flat, low-pitched intonation throughout the entire interview. The play (*Jamonoy Tey*) also provided us with examples of particularly long sequences on exclusively low pitch. One case involved the following text, which was delivered (admittedly with pauses) entirely on low pitch with no intonational excursions except for a very slight rise on the first word, *deglul* 'listen'.

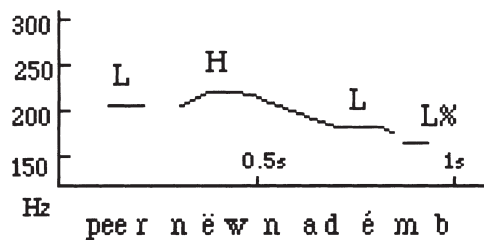
- (10) Deglul ma wax la, li ma lay wax, dafa barewul, Sëriñ Baabu, li

ma lay xamal, feek ñi ngi gor garab yii, feek ñi ngi gor garab yii,
dëkk bi — naat doo ko dégg mukk. (J)

‘Listen to me, what I have to say will only take a few words, Sërin Baabu, what I want you to understand is that, as long as they keep chopping down those trees, as long as they keep chopping down those trees, there will never be any fertility in this village.’
lit. ‘the village, fertility, you will never hear speak of it.’

3. Utterances with no subdivisions and an initial peak

Declarative sentences without intonational subdivisions in our corpora are practically all delivered with the flat intonation described above. We nevertheless observed some less flat intonation contours, with an initial peak generally located on the second syllable, such as the following:



- (11) Peer ñew na démb. (N)
Peer come PFT3SG yesterday
‘Peer came yesterday.’

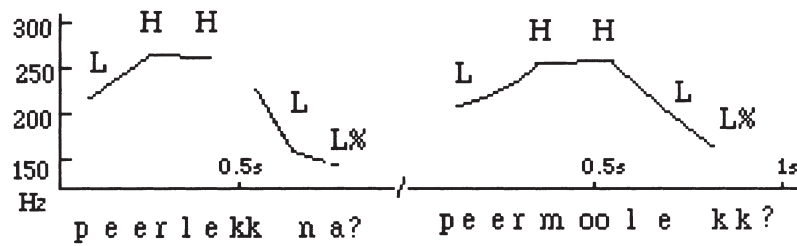
The speaker begins this sentence at a low point (L) slightly above her floor, moves to an initial target (H), then drops back to her low reference value (L), and ends with an infralow final target (L%). The L targets correspond again to phrasal-edge L tones, while the H target, located on the second syllable, realizes a H demarcative tone. In this example, the H target is rather high but is often less so in other instances. Actually, there is a scale of possibilities ranging from completely flat contours to contours generated by H targets of varying heights, but lower than high targets in interrogative sentences (see section 4 below). The pitch difference between H targets in statements and questions can be attributed to the pitch range, which is smaller in statements than in questions, as in many other languages¹⁶ (see section 4).

4. Questions: melodic plateaus and high targets

While declarative sentences without subdivisions only rarely contain a high target, which is always optional, high targets are always present in questions and vary in kind according to distinctions in grammatical structure. This section considers (1) simple questions, (2) questions with an interrogative word, and (3) questions introduced by *du*.

4.1. Simple questions

Simple questions (that is, questions without an interrogative word) display a melodic plateau defined by two high targets (H). Let us look first at the pitch contours of two short utterances, and a spectrogram of one of these.



- (12) a. Peer lekk na? (N) b. Peer moo lekk? (N)
 Peer eat PFT3SG Peer SUBJEMPH3SG eat
 'Did Peer eat?' 'Was it Peer who ate?'

Comparing these two sentences, only the second of which contains a focus, we again see that the focused term receives no specific intonation; thus, both questions have the same intonation. The speaker starts at her low reference level (L), moves to an initial high target (H) at over 250 Hz, to a second high target (H), roughly at the same pitch level, returns to the L level, and ends with a final infralow target (L%) at the bottom of her range. It will be observed that the phrasal-edge L tones as well as the L% boundary tone are present here, just as they are in statements. These interrogatives differ from the corresponding declarative sentences (Figure 1) in having a melodic plateau (HH) scaled well above the low reference level and a larger pitch range. This high plateau can be accounted for by positing two H tones at its edges. Furthermore, comparison of the spectrogram in Figure 2 with the one in Figure 1 shows, interestingly enough, that segment duration is constant in interrogative and declarative sentences, despite the differences in intonation. The quite

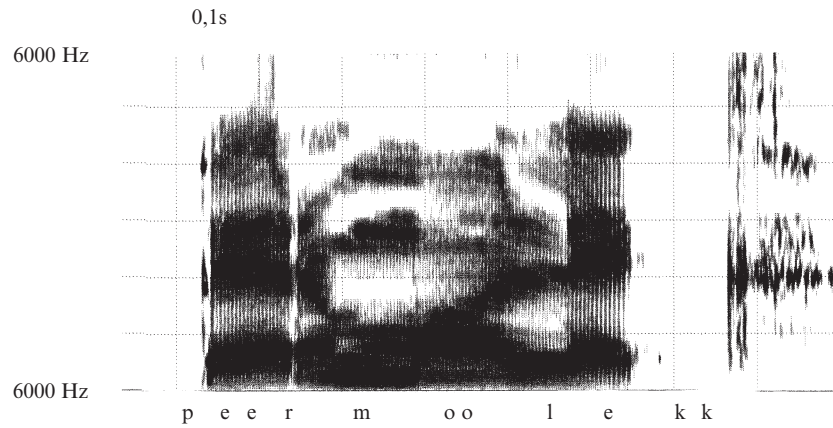
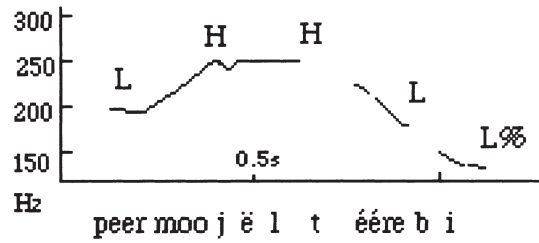


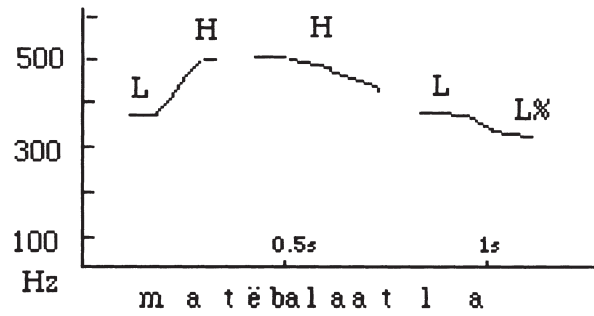
Figure 2. *Spectrogram of Peer moo lekk? (N) 'Was it Peer who ate?'*

uncomplicated melodic movement in these questions thus has no effect on segment length. This resistance of these structures to temporal deformation can be explained by the need to maintain C/CC and V/VV contrasts. This is a major constraint in the Wolof intonational system, as will become clearer once we have a better overview of the system as a whole.

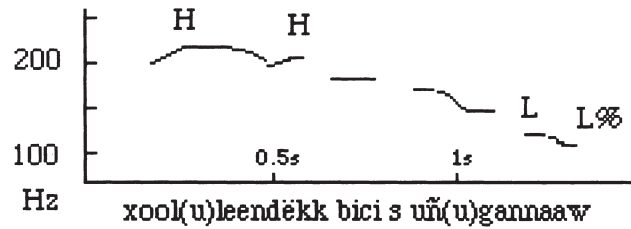
Let us now turn to longer utterances.



- (13) Peer moo j ë l t é é r e b i? (N)
Peer SUBJEMPH3SG take book the
'Was it Peer who took the book?'



- (14) Ma tēbalaat la? (M)¹⁷
 AOR1SG jump+FACT+ITER you
 ‘Should I make you hop again?’



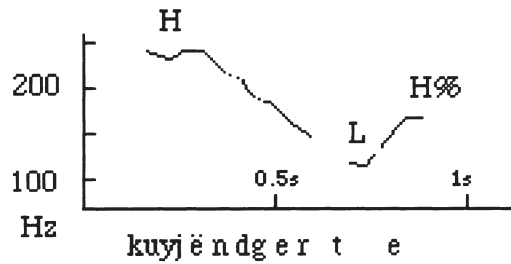
- (15) Xooluleen dëkk bi ci suñ(u) gannaaw? (J. sp. 3)
 see-NEG2PL village the at your back
 ‘Didn’t you see the village behind you?’

These examples confirm that the plateau defined by the double high target (HH) does not stretch over the whole utterance. Rather, it affects only the beginning portion, starting after the initial L edge tone.¹⁸ Thereafter, the voice falls gradually back to floor level before dropping to the final infralow target L%, starting. The double high target (with the resulting pitch-range increase) is thus what distinguishes simple questions without interrogative words from declarative sentences.

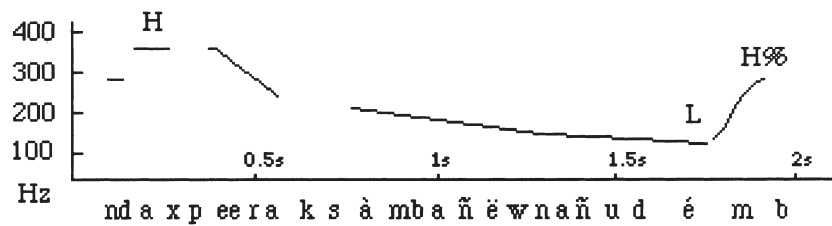
4.2. Questions with an interrogative word

The intonational organization of such questions, which include both yes-or-no questions and *wh* questions, is unlike that of simple questions. Rather than a high plateau (HH), they have a high target (H) on the initial interrogative word, which can also raise (or extend onto) the second syllable, and then a gradual fall back to floor level, which is only reached on the last syllable (L). Last and most importantly, questions

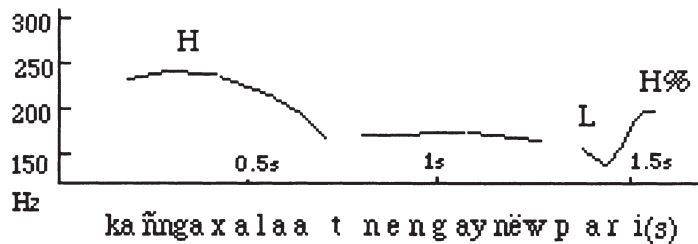
with an interrogative word end with a rise on the last syllable (H%). Here are some examples:



- (16) Kuy jënd gerte? (XCL)
 who + IMPERF buy groundnut
 'Who will buy groundnuts [from me]?'



- (17) Ndax Peer ak Sàmba ñëw nañu démb? (F)
 whether Peer and Samba come PFT3PL yesterday
 'Is it so that Peer et Samba came yesterday?'

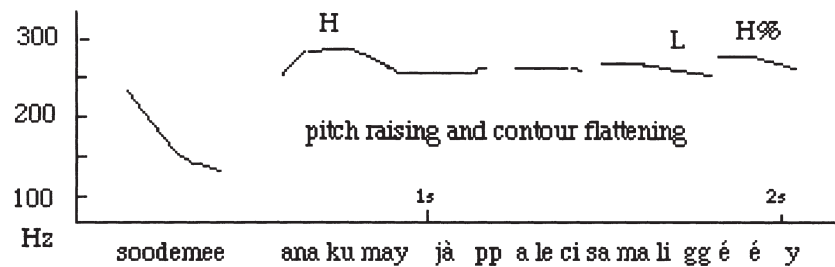


- (18) Kañ nga xalaat ne ngay ñëw Paris? (N)
 when COMPEMPH2SG think that AOR2SG come Paris
 'When do you think you'll come to Paris?'

Intonationally speaking, then, wh questions and yes-or-no questions with interrogative words differ from simple questions in having only one high initial target (H) representing a H edge tone, and a H utterance-final boundary tone (H%). Note that they cannot be subdivided into smaller

intonational phrases:¹⁹ no melodic substructuring is allowed between the initial interrogative word and the final boundary tone. This prohibition is further proof of the link between morphosyntax and intonation in Wolof. Indeed, question words are also used in Wolof as subordinating elements. Thus, the “yes-or-no” interrogative *ndax* ‘is it the case that’ is also used as a causal or final conjunction (“because”, “so that”),²⁰ and interrogative pronouns are also used as relative pronouns (Robert 1998). As interrogatives, these morphemes stand in initial position and take the entire sentence in their scope, which then receives its interrogative interpretation precisely from the intonational structure defined by the initial high target (H) and final boundary high target (H%). This contour cannot be interrupted by substructuring, since it marks the fact that the scope of the introductory interrogative word is the sentence as a whole.

There is a further type of rhetorical question that has the same overall contour as other questions, except that it is higher pitched:



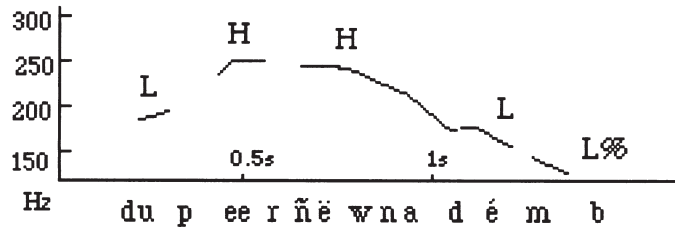
- (19) Soo demee, ana ku may
 if + AOR2SG go + ANTER, where he-who me + IMPERF
 jàppale ci sama liggééy? (B)
 help in my work
 ‘(But) if you leave, where is the one who will help me with
 my work?’

Coming after the subordinate clause (*soo demee*), the interrogative clause shows the same overall contour as questions with an initial interrogative word, that is, there is an initial H target, a fall toward L level, and a H% boundary target at the end, here showing only a slight rise within a 250–300 Hz band. These values are particularly high for this male speaker (compare the first part of the sentence, produced at the speaker’s ordinary level), the result being a flattening of the contour. This high-pitched intonation signifies that the speech act involved is of a different kind: this sentence is not so much a request for information (“where is there someone to help me?”) as an earnest attempt by the speaker to convince the listener not to leave. The pitch rise confers intensity on the sentence

(see section 5) and strengthens the solicitation of the listener already implied by the question form.

4.3. Questions beginning with *du*

There is a further type of question introduced by *du*, which has the intonation of a simple question (see section 4.1).



- (20) Du Peer ñew na démb? (N)
du Peer come PFT3SG yesterday
 ‘Didn’t Peer come yesterday?’

In fact, *du* is not an interrogative word, but the third person singular form of the negative emphatic conjugation, which expresses general negation.²¹ This form usually precedes the main verb. In its interrogative use, however, *du* introduces a complete clause and is followed by a subject and a verb (here in the perfect), forming a periphrastic negative interrogative form with the sense ‘is it not the case that ...’. It is therefore not surprising to find that these sentences have the same contour as simple questions, despite the initial *du*.

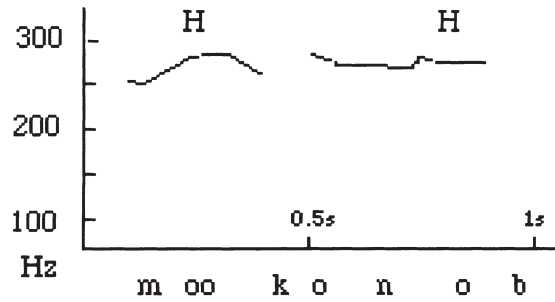
5. Intensive intonation

We use the term “intensive intonation” to refer to several intonation types that have a semantic value of “intensiveness.” They involve different kinds of marking, but all use high targets. Their features include high plateaus (HH) sometimes ending in a glottal stop (section 5.1), a supra-high (H+) final boundary tone (section 5.2), and a H peak expressing local emphasis (section 5.3). We found no contours indicative of “baby-talk” in our short extract from an exchange between a mother and her baby, but we did notice a general raising of the pitch range. We also observed a very high proportion of sentences with intensive intonation, marked by high or supra-high targets.

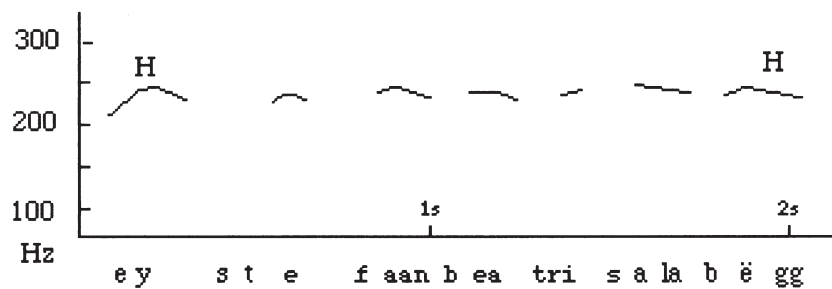
5.1. *High plateaus*

High plateaus extending over most or all of the sentence convey an intensification of the speech act and have modal import; they indicate exclamation, a pressing demand on the listener, or an expression of surprise. They terminate in a glottal stop when the sentence ends with the particle *de*, marking strong interaction.

5.1.1. *Continuous high plateaus.* Some exclamatory utterances show a characteristic intonation marked by a high plateau from start to finish; for example,



- (21) moo ko nob! (B)
 SUBJEMPH3SG him love
 'He really loves him!'



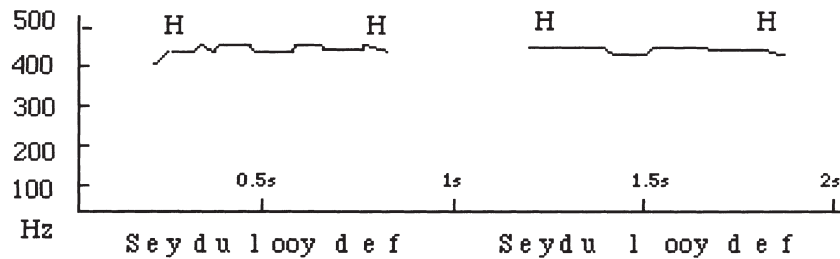
- (22) Ey Stefaan Beatrisa la bëgg! (B)
 hey Stéphane Béatrice + FOC²² you like
 'Hey Stéphane, Béatrice really likes you!'

These exclamatory plateaus can be accounted for by positing two H edge tones, with no utterance-final boundary tone.

These two utterances deserve particular mention since they show the subject-emphatic conjugation interacting in a peculiar way with intona-

tion. The subject-emphatic conjugation normally focuses the subject, as several examples have already shown (*Peer moo lekk* ‘it was Peer who ate it’). But in the present examples, it expresses intensity of the verb process (*he likes him so much* rather than *he is the one who likes him*). Out of context, then, the choice of intonation pattern distinguishes these two uses of the subject emphatic: the normal declarative or interrogative pattern gives subject focus (*he is the one who likes him, is he the one who likes him?*), while the pattern with a continuous high plateau yields an intensive, exclamatory sense (*he likes him so much!*). Semantically, the verb must not be agentive and must be scalable (as verbs expressing a property usually are). Given these two features, a “high degree” of the verb process can be expressed by the intensive pattern (for a detailed analysis, see Robert 1991: 134–136). The plateau in the intonation contour would thus seem to provide an indication that the scope of the initial focusing morpheme is the sentence (implying intensification of the verb process), rather than the subject alone (as in subject focus). It should also be remarked that this intonation pattern has no final low declarative boundary tone.²³ Another point of interest is that intensive sentences of this type have an alternative intonational form with local emphasis on the verb (cf. section 5.3).

A further example is taken from the exchange between mother and baby:



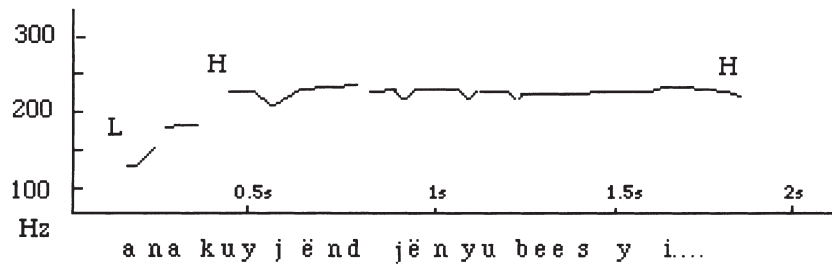
- (23) a. Seydu looy def?
 Seydou what + AOR2SG + IMPERF do
 ‘Seydou, what are you doing?!’
- b. Seydu looy def? (M)
 Seydou what + AOR2SG + IMPERF do
 ‘Seydou, what are you doing?!’

5.1.2. High plateaus ending with a glottal stop.

When the sentence ends in *de* (an emphatic particle with the sense ‘certainly, indeed’), it is produced with a continuous high plateau terminating with a glottal stop.²⁴ Thus:

- (24) Tey sedd na de[ʔ]. (N)
 today be-cold PFT3SG PARTIC
 'It certainly is cold today!'
- (25) Man de damay bayi
 I PARTIC EMPH1SG + IMPERF farm + ALL
 de [ʔ]. (J3)
 PARTIC
 'As for me, I can tell you, I'm going off to farm!'

5.1.3. *Interrogative utterances with high plateaus.* Interrogative sentences can also be associated with the use of a high plateau, in which case they have an exhortatory sense (contrast [23] with [16] displaying the normal contour of questions with interrogative word). In this pattern, the high plateau does not cover the whole utterance but starts on the second or third syllable. The last syllable is lengthened.

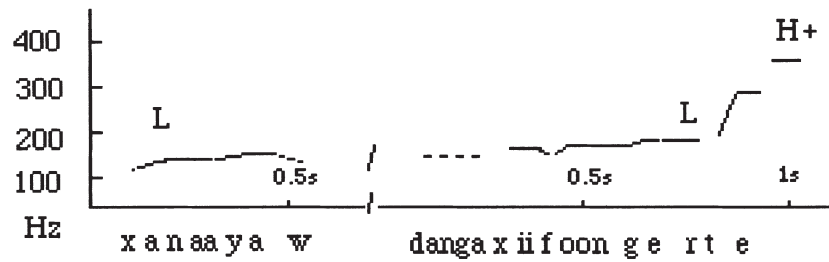


- (26) Ana kuy jënd jën yu bees yii? (B)
 where who + IMPERF buy fish which be-fresh these
 '(Come now,) who will buy my fresh fish?'
 lit. 'where is the one who will buy these fresh fish?'

This type of contour can be explained with three edge tones: a L at the beginning, a H on the second or third syllable and a H at the end.

5.2. *The supra-high utterance-final boundary tone*

Questions as well as statements may end with a supra-high tone (H+), often produced in falsetto, when they bear an expressive charge of surprise, disbelief, determination, and so on.

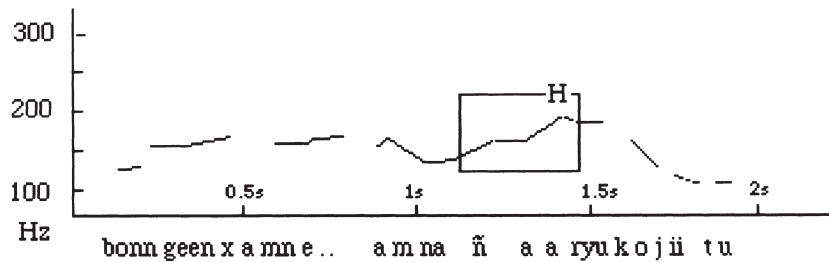


- (27) Xanaa yaw, danga xiifoon
 PARTICNEG you, VBEMPH2SG be-hungry + PAST
 gerte!? (XCL)
 groundnut
 ‘You were really hungry for groundnuts, weren’t you!’
 lit. ‘It would seem, wouldn’t it (=xanaa), [that] you were hungry
 for groundnuts.’

A statement with a supra-high tone is also illustrated in example (31).

5.3. Local emphasis

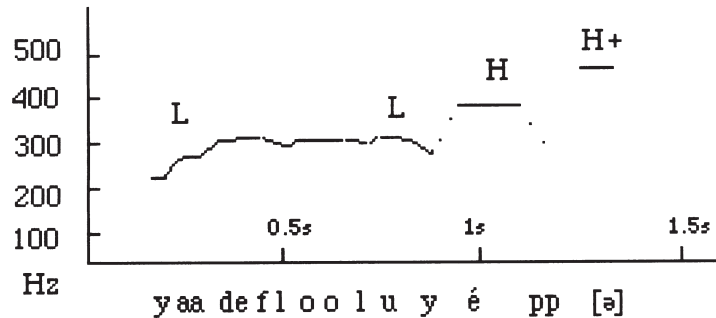
There are instances of local emphasis that differ from the phenomena described thus far in that they involve the lengthening of a syllable and the insertion of a single melodic peak that does not otherwise affect the shape of the contour. Notice that the H tone triggering this peak is the only one in the Wolof system that is not a phrasal edge tone or an utterance boundary tone. Like pitch accent, it is associated with lengthening, but of course it is not lexical in origin. These prominent peaks express emphasis (setting off a term in the sentence) rather than focus (rheme marking). They were relatively scarce in our corpus.



- (28) Bon ngeen xam ne am na ñaaryu ko
 thus AOR2PL know that be-there PFT3SG two which it

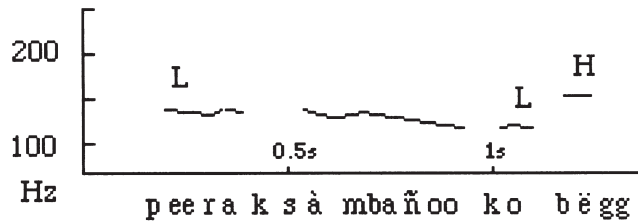
- jiitu. (H host)
go-before
'You know, then, that there are *two* of them that come first.'
- (29) mu nekk fi ëmb lu bari ci dëkk
AOR3SG be-present here enclose that be-many in country
bi. (J, 3)
the
'There happen to be *many* things in this country that are kept under wraps.'
- (30) Lépp li ko waral yépp, gor gi donṅ
all which it cause all, logging the only
la! (J, 3)
COMPEMPH3SG
'The only reason for everything is the logging alone.'

Remarkably, in these examples and in almost all the others in our corpus, local emphasis affects quantifiers (in these examples, the number 'two', the verb 'be much, many', the particle 'just, only'). These peaks would thus seem to be "intensifiers" stressing the amount involved. They also appear in the mother-and-baby exchange. In the example below, there is a high target of around 400 Hz on the syllable *yépp*, which is lengthened, followed by a supra-high final target (H+) on an epenthetic vowel. Notice again how much the pitch range of the mother addressing her baby is raised (see also the examples in [23]).

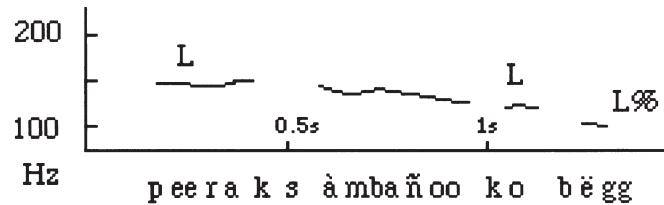


- (31) Yaa def loolu yépp(ë)! (M)
SUBJEMPH3SG do that all
'You're the one who did all that!'

Just as in the case of the high plateau described above, a peak of local emphasis renders a verb semantically intensive in the subject-emphatic conjugation. This is clear in the following two segmentally identical sentences, one, (32), having and the other, (33), not having local emphasis on the verb *bëgg*.



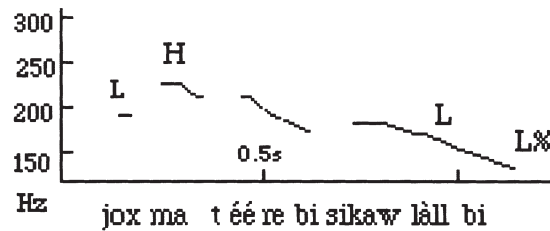
- (32) Peer ak Sàmba ñoo ko bëgg! (L)
Peer and Samba SUBJEMPH3PL it like
'Peer and Samba really do like it!'



- (33) Peer ak Sàmba, ñoo ko bëgg! (L)
Peer and Samba SUBJEMPH3PL it like
'Peer and Samba, they're the ones who like it.'

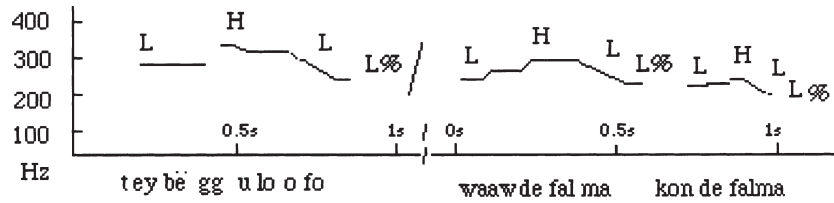
6. Commands and vocatives

In Wolof, as in many other languages, there seems to be no specific intonation for commands. Commands may have the same intonation as statements, though the use of an initial high target (section 3), as in (34) below, is more frequent.



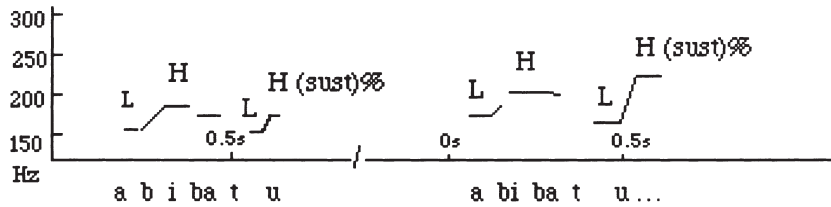
- (34) Jox ma tééré bi si kaw làll bi. (N)
give (IMPERS2G=∅) me book the in top bed the
'Give me the book (which is) on the bed!'

The following utterance contains a statement and two imperatives, both of which have the same bell-shaped curve.



- (35) Tey bëgguloo fo. Waaw defal ma,
 today want + NEG2SG play yes do + (IMPER) + BENEf me,
 kon defal ma! (M)
 then do + (IMPER) + BENEf me
 ‘You don’t want to play today. OK, do it for me, go ahead, do it for me!’

Direct address does, however, have its own peculiar features, a lengthening of the last syllable associated with a sustained final high peak, H(sust). These characteristics are quite common cross-linguistically (Ladd 1996). Furthermore, when the vocative is also a command, the pitch range of this contour is enlarged. The examples in (36) show both kinds of address. The first is the ordinary vocative use of a woman’s name, while the second, illustrating the enlarged pitch range, is a threatening one intended to stop the addressee from doing what she is about to do.



- (36) a. Abibatu! (N) b. Abibatu! (N)
 Abibatu! Abibatu!

II. SENTENCE SUBDIVISION AND HIERARCHICAL ORDERING

7. Subdivision

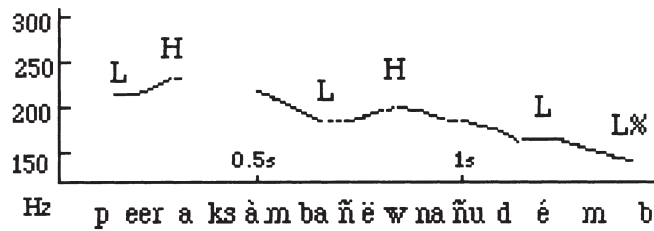
7.1. Division of declarative sentences into intonation groups

Let us first of all recall that even a very long sentence can have a completely flat intonation pattern, and hence no intonational substructur-

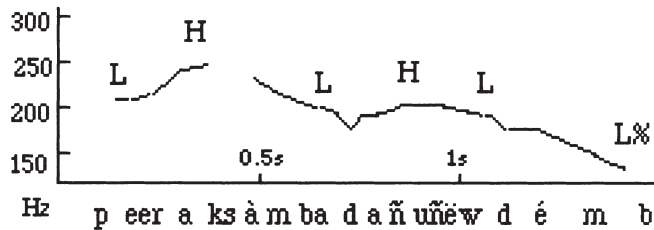
ing, this being one of the primary features of the Wolof prosodic system (section 2). Sentences can, however, be optionally subdivided into intonation groups marked by bell-shaped contours. Flat and substructured utterances are in free variation for any speaker; no gender correlations have been observed.

When there is prosodic substructuring, a dominance relationship can be established between groups in either of two ways. In the more frequent case, successive intonation groups are subject to “downdrift” (section 7.1.1). Less often, two groups may stand in a “preamble/main part” relationship to each other, with the first one realized low and flat (section 7.1.2.).

7.1.1. *Downdrifting bell-shaped intonation contours.* Complex contours with downdrifting bell-shaped (LHL) components are well attested.



- (37) a. (Peer ak Sàmba) (ñĕw nañu démb) (N)
 (Peer and Samba) (come PFT3PL yesterday)
 ‘Peer and Samba came yesterday.’



- (37) b. (Peer ak Sàmba) (dañu ñĕw démb) (N)
 (Peer and Samba) (VBEMPH3PL come yesterday)
 ‘It was Peer and Samba who came yesterday.’

These sentences are divided into two intonation groups, the first containing the complex subject (or theme, see section 1.2), and the second the predicative nexus. Let us recall that these sentences need not be subdivided, and that we have recorded other versions of them with completely

flat low-pitched intonation (see example [8]). Though example (37b) involves focus while (37a) does not, both are divided into two prosodic groups. Thus, just as focus has no effect on the contour of intonationally simple sentences, it plays no role in prosodic subdivision. In this respect, Wolof differs from many other languages such as Korean, Japanese, English, and French.

The graphs show that the melodic contours of these two sentences, which were recorded in different sessions, are nearly superposable. The intonation groups are of equal length despite morphosyntactic differences. Focus thus has no effect on rhythm, which remains remarkably constant. The equal duration of these two sentences, which were chosen so as to minimize segmental differences, can be explained in terms of the constraints on the realization of length contrasts in consonants and vowels.

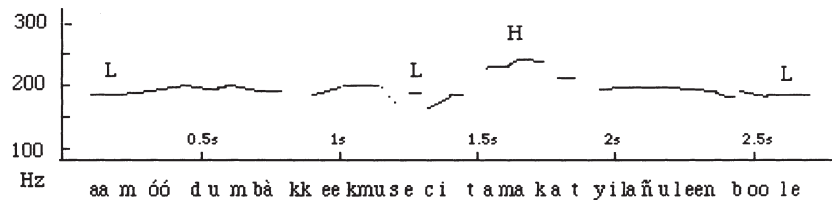
Returning to the shape of the melodic contour, we can see that, in contrast to the corresponding undivided declarative sentences, each bell-shaped curve culminates in a high target. Thus each “bell” constitutes a unit that begins at a low target (L), rises to a high target (H), and falls back to terminate on a low target (L). Note that the junction of the two groups is definable in terms of just one L target rather than two, one ending the first group and another beginning the second group. All the low targets (L) correspond to L edge tones, occurring at phrase edges. The H target is located on the second or third syllable of the unit and is unrelated to any stress phenomena. Thus, the peak in the first intonation group in each sentence, *Peer ak Samba* falls on *ak* ‘and’ which is an unstressed syllable. This high target is a realization of a H edge tone, whose placement is determined in function of the edge of the phrase (second or third syllable). We saw earlier in section 2 that pitch height is unrelated to stress. This fact is evident here as well, where stress fails to attract melodic peaks marking intonation groups. Furthermore, the two groups display downdrift, the second being lower-pitched than the first. Downdrift is widely used for statements, both in tone languages (see, among others, Lindau 1986 for Hausa; Rialland 1988, 1997 for Gulmancema, Ncam, and Bambara) and in nontonal languages (see Thorsen 1985 for Danish; Hirst and Di Cristo 1984 for French, etc.). It also marks continuity, that is, the lack of any hiatus, highlighting, or downplaying within the utterance. This phenomenon is thus a form of utterance-level downslope associated with declarative sentences.

Let us now look at longer sentences containing more than two prosodic groups.

- (38) (Njariñ li nag), (dinañu ko séddoo) (ca na mu
 (profits the regarding), (FUT3PL it share) (in as AOR3SG
 ware). (N)
 ought)
 ‘(As for the profits), (they’ll be shared out) (as they should be).’

tion 7.1.2), and following that, more complex structures with a greater number of hierarchical levels.

7.1.2. *Division into intonation groups with a “preamble.”* We have noted several cases of sentences that are substructured by a division between a low, flat “preamble” and an intonation group with a high target on the second or third syllable. The theme is what is being distinguished in these cases, and the second group corresponds to the predicative nexus in the broad sense. The theme is thus converted by intonation into a sort of preamble to the core of the sentence.

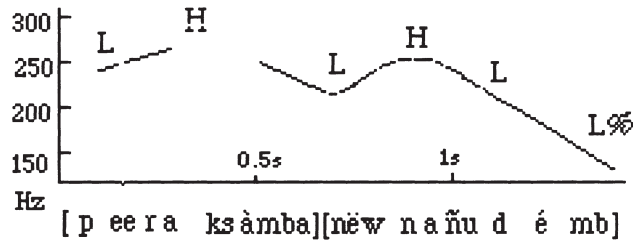


- (43) (Aa! Moodu Mbàkkeek Muse) (ci tamakat yi lañu leen boole waayé ... (AC sp. 1)
 ‘(Ah! Moodu Mbakke and Mosse) (people say they’re like tama players but ...’
 lit. ‘(Ah! Moodu Mbakke and Mosse), (it’s among tama players that people put them, but ...’
- (44) ... (te jaam bi) | (fu mu tollu rekk | war na ñaan yàlla.) ...
 ‘... (and a man) | (anytime anywhere | should pray to God) ...’

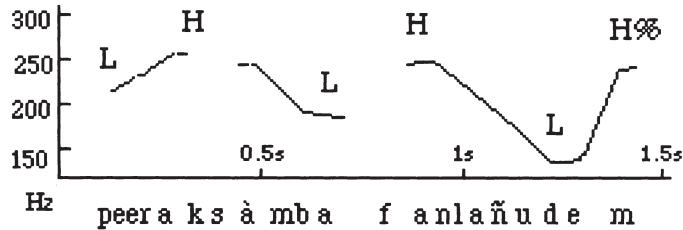
Themes may thus constitute an intonation group under a bell contour as in (37) and (38) or may be an intonational preamble as in (43) and (44).

7.2. *Subdivision of interrogative sentences and the suspension of downdrift*

Interrogative sentences are very often substructured to reflect *thematization*. The theme, whether subject or object, is preposed to the interrogative clause and assigned a bell-shaped contour setting it apart from the rest of the sentence. Downdrift is then suspended between the two parts of the sentence, as in the following examples.



- (45) (Peer ak Sàmba) (ñew nañu démb?) (N)
 (Peer and Samba) (come PFT3PL yesterday)
 '(Peer and Samba,) (did they come yesterday?)'



- (46) (Peer ak Sàmba) (fan lañu dem?) (N)
 (Peer and Samba) (where COMPEMPH3PL go)
 '(Peer and Samba,) (where did they go?)'

Marking a question by suspending downdrift is not peculiar to Wolof. It is found in a variety of languages, both tonal and nontonal, including Hausa (a tone language; Lindau 1986) and Danish (a nontonal language; Thorsen 1985).

In interrogative sentences, thematization, and hence intonational substructuring, are optional most of the time, as shown in the examples in (47), just as they are in statements (compare [8] and [37a]):

- (47) a. (Peer lekk na?) (N) b. (Peer) (lekk na?) (F)
 (Peer eat PFT3SG) (Peer) (eat PFT3SG)
 '(Did Peer eat?)' '(Peer,) (did he eat?)'

However, they are obligatory in two cases:

– in questions containing an interrogative word ending in *-an* (wh questions). These question words require the subject or complement emphatic conjugations (see [46]); in order to have the question word immediately followed by the emphatic conjugation and to avoid a destructuring of the clause pattern (see [48]), the lexical subject must be extracted and thematized,²⁵ no matter how long the thematized constituent may be (cf., for example, *Peer, fan la dem?* 'Peer, where did he go?');

– in any questions (unlike statements) with a long theme,²⁶ as in (49) following.

- (48) *Fan lañu Peer ak Samba dem?
 where COMPEMPH3PL Peer and Samba go
 Peer ak Samba, fan lañu dem?
 Peer and Samba, where COMPEMPH3PL go
 ‘Peer and Samba, where did they go?’
- (49) (Peer ak ñi fi ñëwoon démb) (ñoo ko wax?) (L)
 ‘(Peer and the others who came yesterday,) (are they the ones who said it?)’

While intonational subdivision is obligatory in some questions in Wolof, it cannot, as we have seen in section 4.2, split the constituent that runs from the question word to the end of the sentence, however long it may be. Thus, the following sentence, though long, is not divided into intonation groups.

- (50) (Ndax xalaat nga ñëw Paris soo ko mënee?) (L)
 ‘(Do you think that you will come to Paris if you can?)’

We interpret the absence of any subdivision here as an indication of the scope of the polyvalent initial term, *ndax*, which has an interrogative sense in this construction under the corresponding intonation (see section 4.2). The subdivision of questions into intonation groups thus seems to be more closely tied to morphosyntax than it is in declarative sentences, owing to the fact that it serves to mark thematization and, particularly, to indicate the scope of certain morphemes.

8. Intonational structure and the hierarchical structuring of the text

We have thus far dealt with simple sentences containing no subdivisions, and others that are divided into intonation groups. We now turn to complex sentences and larger units of discourse organization. We shall examine (1) downdrift in texts, (2) continuative boundary tones, (3) pauses and lengthenings, and (4) changes of tempo.

8.1. Downdrift in texts

We saw in section 7.1.1 that downdrift is the commonest way of establishing hierarchical relationships between intonation groups. It is also used for the hierarchical ordering of text sequences, some of which are particu-

larly long, as in example (51) spoken by the host of the “Jamonoy Tey” radio program. Pauses are marked by |. Numbers refer to groups obtained by dividing the text according to major pauses, that is, those marked by boundary tones (either continuative H% [see the next section] or utterance-final L%), exclusive of hesitations and minor pauses.

- (51) Jërëjéf El Hadj Abdulaay Sekk H% (1) | mbokki auditeurs yi H% (2) | Moodi Kamara ci cabine technique bi H% (3) | seen mbokk Muxammadu Ja ci micro bi H% (4) | ñu dellusiwaat ak yéén ci seen émission “Jamonoy tey” L% (5) |. Bala maa door émission bi nak H% (6) | xam naa ne mbokk yi jaaxle nañu, ndax gëj nañu maa dégg H% (7) | waaye du dara yit, lu dul yitte àddina yi H% (8), te jaam bi fu mu tollu rekk | [hesitation] war na ñaan Yälla L% (9) | [hesitation] Yälla di ko jox lu muy def wälla di ko xañ ag jot, ndax jot baaxul ci doomu Aadama L% (10). (J, host)
 ‘Thank you, Hadj Abdoulaye Seck (1) | dear listeners (2) | Mody Kamara in the sound booth (3) |, your friend Mouhamadou Dia here at the microphone (4) |, we’re back again for another “Jamonoy Tey” (5) |. But before the program begins (6) | I know some of our friends are a little worried because they’ve heard nothing from me for so long (7) | nothing wrong though, only all the things to be done in life (8) |, and a man, wherever he may be | [hesitation] should always pray to God (9) | [hesitation] (for) God always (to) give him something to do or make him short of time, since idleness is harmful to the son of Adam (10).’

Let us look first at the melodic contour of the first part of this text, as far as “Jamonoy Tey.” Each group has a fairly simple intonational structure. There is a peak at the outset, a fall to the final syllable, and a final boundary tone (either a high continuation boundary tone, H%, or a low declarative boundary tone, L%). Group 1, where the speaker is thanking someone, has to do with earlier events. Group 2, where the outset pitch is higher (229 Hz) than in part 1 (211 Hz), marks the actual start of the host’s remarks to his listeners. The following groups (3, 4, and 5) downdrift thereafter.

Figure 4 is a schematic representation showing only the essential melodic features of the remainder of this text (differences in the lengths of the groups are not represented). The first three groups, 6, 7, and 8, all show downdrift.²⁷ The pitch is then reset to 182 Hz in group 9. This group contains a substructure of its own with a low part (146–148 Hz) making the theme (“a man”) into a preamble. The last group drifts downward throughout with no further intonational subdivision despite its length. This example shows that downdrift (and substructuring) can

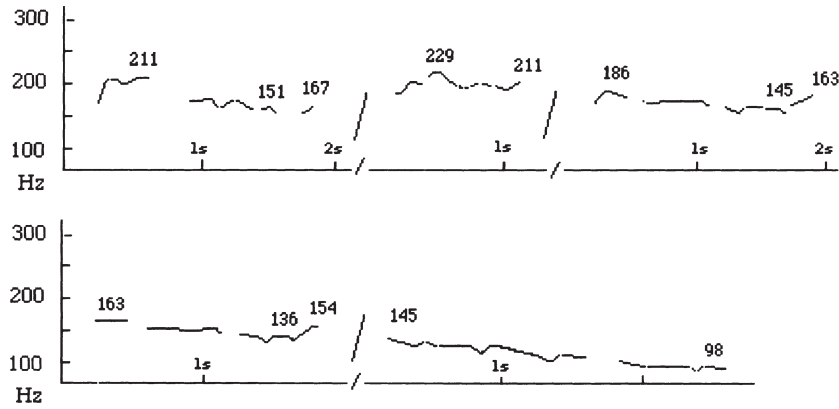


Figure 3. *Melodic contour of the first paragraph of the "Jamonoj Tey" corpus*

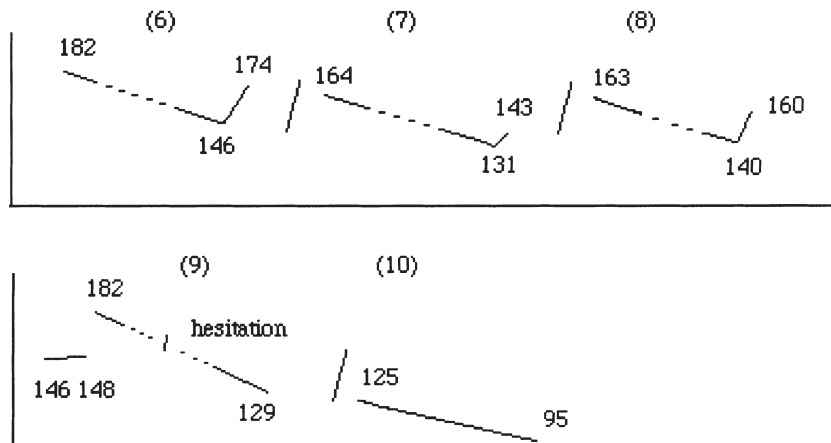
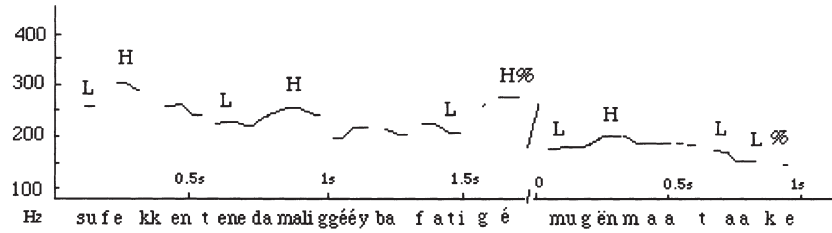


Figure 4. *Schematic melodic profile of the second paragraph of "Jamonoj Tey" corpus*

operate over a very long text. Again, we may note that substructuring does not depend on the length of the groups, which may be short or long (cf. group 10 of the text). Generally speaking, there is no further subdivision of each group into smaller prosodic subgroups, unlike what happens in many other languages (English, French, Danish, Dutch, etc.). The prosodic system of Wolof favors the marking of larger syntactic constituents only.

There are nevertheless some instances of two hierarchically organized levels of downdrifting structure. We have already noted the pitch resetting in group 9. Instances of downdrift between larger constituents of a

sentence in addition to downdrift between smaller constituents can also be found, as in (52) below.



- (52) (su fekkente) (ne dama liggéey ba
 (when + (∅) be-present) (that VBEMPH1SG work until
 “fatiguée”) | mu gën maa “ataaké” ... (H, sp. 3)
 be-tired) | AOR3SG come-out me-CONJ “attack”
 ‘When it happens that I work until I get tired, it (the disease) hits
 me even harder ...’

The first clause of the sentence, ending in a continuative H% boundary tone, contains two intonation phrases defined by bell curves, *su fekkente* and *ne dama liggéey ba* “*fatiguée*”, which exhibit lower-tier downdrift. The second clause, set off by a pause, is lower still and thus reflects downdrift. This use of double-tiered downdrift to mark text organization is not peculiar to Wolof. It is found in many languages, both tonal (e.g. Ncam and Baasaar, Rialland 1988; and Yoruba, Laniran 1992) and nontonal (e.g. English, Ladd 1993, among others). There are, however, two points to be made concerning Wolof. First, this sort of two-tiered structuring is quite rare; and second, it is only attested when there is a pause between the two larger constituents.

8.2. Continuative boundary tones

Continuative boundary tones have appeared in several of the examples already presented. They take the form of a pitch rise on the last syllable of the part of the utterance involved and are always followed by pause. The pitch immediately thereafter is determined by dominance considerations (downdrift or pitch resetting). Continuative boundary tones (H%) appear at major syntactic junctures in sentences. Thus in (52), the continuative boundary tone appears at the end of the complex subordinate clause preceding the main clause.

- (52) Su fekkente ne dama liggéey ba fatiguée H%, mu gën maa ataaké ...

‘When I work until I get tired H%, it (the disease) hits me even harder ...’

(there follows: *di métti, ba tax sama jëkkër daf(a) ma wutël ñaari mbindaan* ‘[it] makes (me) suffer, which is why my husband got me two housemaids’)

Continuative boundary tones may also appear at other higher-level syntactic boundaries, for example, at the end of the first of two main clauses in a compound sentence, as in (53).

- (53) Keroog gi ñu ma joxe garab gi, ma
 day which AOR3PL me give+SUFF remedy the AOR1SG
 commencer ko naan H%, keroog la génn
 begin it drink, that-day COMPEMPH3SG come-out
 nii.
 thus
 ‘The day they gave me the remedy, I started to drink it H%, that was the day it appeared like that.’ (H, sp. 2)

Likewise, text (51), examined during our discussion of the hierarchical ordering of intonation units in the preceding section, has several continuative boundary tones (H%) at crucial junctures. They appear first of all after the opening remarks (acknowledgments and introductions), then in a long complex sentence where the boundary tones and associated pauses mark off higher-level syntactic boundaries, then again before the coordinating marker *waaye* ‘but’, which links the first complex main clause with the (also complex) second one, and finally before the coordinating marker *te* ‘and’ joining the second main clause and a third complex clause having only a loose syntactic relationship to what precedes.

8.3. Pauses

This section will distinguish (1) silent pauses, which may be either “major” or “minor,” and (2) loud pauses, marked by vowel lengthening.

8.3.1. “Minor” and “major” silent pauses. Pauses are never obligatory. When present, they may be associated with boundary tones, especially continuative tones. We shall use the expression “minor pause” (mp) to designate pauses which are NOT associated with boundary tones, for two complementary reasons: (1) such pauses do not generally change the melodic shape of the sentence, and (2) they tend to mark lower-level syntactic breaks. Conversely, the pauses we call “major” (MP) follow boundary tones (usually continuative boundary tones) that mark higher-

level syntactic boundaries. Major pauses furthermore involve the lengthening of the syllable bearing the continuative boundary tone (such lengthening is only irregularly attested in the case of minor pauses). Another important fact to note is that we have never observed double-tiered intonational ranking (by downdrift or pitch resetting, as discussed in sections 8.1 and 8.2) without an associated major pause.

The pauses during the first six minutes of our recorded corpus H (containing the host's introduction) were subjected to systematic scrutiny. While it is not a large corpus, it nevertheless shows a coherent distribution of pauses. First, there are no pauses:

- within the predicate nexus, consisting of
- (54) + inflection²⁸ ± clitic object pronoun + verb ± suffix conjunctive verb -a
- within a subordinate clause, unless one of its terms is thematized;
 - in reported speech, except that *ak* 'and' can be preceded by a pause;
 - before a subordinate temporal apodosis;
 - between an indefinite relative and its antecedent.

There are thus no pauses within syntactic structures that are so basic to the sentence that a pause within them might hinder understanding; that is, within the predicate phrase itself, or between a relative and its antecedent, or between a main clause and any following temporal modifiers.

In contrast, pauses are attested:

- at boundaries of information structure:
 - after a vocative (MP):
- (55) mbokki seetaankat yi |, lii moo nara doon sunu waxtaanu tey ... (1.1)
 'Dear spectators |, this is what we plan to discuss today ...'
- between a thematized constituent (which might be a tonic pronoun or a definite noun ± relative clause or noun complement) and the rest of the clause (mp, or pitch resetting):
- (56) ponk boobu | [short pause] ñu yeggalewulwoon | muy ... (1.12)
 That question, | [short pause] which we hadn't finished with, | (and) which is ...'
- within clauses (pm)
 - between a noun and an apposition:
- (57) Ibrayma Joob | élève professeur
 'Ibrahima Diop, | "élève professeur" [student teacher]'

– after the first term in a coordinate construction of the form *X | and Y* (*X | ak Y*):

- (58) *feebaar yi | ak garab yi*
 ‘diseases | and remedies’

– before the second object of a verb in a *SVO₁ | O₂* construction:

- (59) *ñu jagleel ko | ponk boobu* (1.2)
 ‘We devoted it | to this subject’

– before a final predicate expansion (prepositional phrase):

- (60) *daf(a) ñuy gërëm | ci émission bi* (1.25)
 ‘He thanks us | for the program’

– between two clauses, *p | q* (usually but not always major pauses, MP):

– between two successive simple or complex independent clauses:

- (61) *bi ma ñëwe | [short pause] mu seet ma | ub na benn liibër ...* (1.37)
 ‘When I came, | [short pause] he checked me, | he opened a book ...’

– before dependent predicates introduced by *di ... di ...*:

- (62) *ub na benn liibër, | di ko seet, di ko seet, | di ko seet ba yagg ...*
 (1.38)
 ‘He opened a book, | he looked at it, looked at it, | looked at it for a long time ...’

– between a hypothetical or temporal protasis and the main clause:

- (63) *ba mu ma dale noonu | dama yendoo woccu keroog ...* (1.43)
 ‘When it hit me, | I spent the whole day vomiting ...’

– before a subordinate apodosis introduced by *ngir* ‘so that’ or *ndax* ‘because’, or a completive clause with no introductory marker:

- (64) *mu ngi ñuy xamal njariñul émission bi | ngir yee nit ñi* (1.18)
 ‘She lets us know how useful this program is | for alerting people’

– optionally, after *ne* introducing a completive clause:²⁹

- (65) *xam nga ne | wax ji ...* (1.10)
 ‘you know that | the discussion ...’

– before reported speech:

- (66) *ponk mu njëkk bii moo donoon | “fajkati cosaan yi ñooy ñan”*
 (1.8)
 ‘the first point was, | “who are today’s medicine men?”’

This distribution shows that continuative boundary tones, and hence major pauses, mark higher levels of syntactic structure than minor pauses, which tend to be used only within clauses. It also shows that, generally speaking, a pause sets off a syntactic satellite from a more basic structure, and consequently that the two constituents belong to different hierarchical levels, one being part of the basic sentence structure, the other consisting of an expansion. In the two configurations shown in the following diagram, pauses (|) occur after the units appearing above the central line and before the ones appearing below it.

theme (\pm relative)			
vocative			
<div style="display: flex; justify-content: space-around;"> SUBJECT N₁ VERB OBJECT₁ </div>			
		dependent	Object ₂
	and	predicate ₂	predicate
	N ₂		expansion
	apposition		
Likewise, at clause level,			
Hypothetical			
Temporal			
<div style="display: flex; justify-content: center;"> MAIN CLAUSE₁ (simple or complex) </div>			
			independent clause
			subordinate clause
			reported speech

Pauses thus play a role in establishing a syntactic hierarchy. Once again, they coincide with syntactic boundaries. They mark the fact that a given constituent belongs to a lower structural level and depends on another term that is itself part of the basic sentence structure. The two types of pause (those occurring within and between clauses) can occur concurrently. The first constituent (the one preceding the pause) is usually the dominant one: typically, the first (direct) object, the first term of a coordination,³⁰ the first predicate containing the inflectional marking, the first independent clause, or the main clause.³¹ Only vocatives, thematized constituents, and subordinate hypothetical and temporal protases are exceptions in that the following constituent is dominant; but these are precisely the cases in which the constituent preceding the pause is a “preamble.” It is hence no surprise that hypothetical clauses, whose thematic role is well known, should be found in the same class as themes.

The recorded corpus we have been discussing involved two speakers, the first of whom, the program host, used many more pauses (and continuative boundary tones) than the other. This is probably attributable to the professional's desire to use particularly clear, hence highly structured, elocution. The second speaker, on the other hand, used very flat intonation and marked hardly any of the minor divisions. (Let us recall that substructuring is in any case optional in declarative sentences.)

8.3.2. *"Loud" pauses.* Vowel lengthening to mark delay, hesitation, or expectation is also attested in the corpus we used to study major and minor pauses. This occurs particularly:

– on the demonstratives *lii*, *ñii*:

(67) *liii moo nara doon sunu waxtaanu tey ak ñiiii ... (1.1)*
 'thiiis, this is what our discussion will be about today with theeese ...'

– on connecting particles such as the completive *ne* 'that', *ba* [bə ...] 'until', or the connective suffix *-u*:

(68) *bon ngeen xam neee am na ñaar yu ko jiitu (4)*
 'so keep in mind thaaat there were two of them before'

– on the 3sg complement-emphatic morpheme *la* in anticipation of the immediately following subject:

(69) *loolu laaa Mari Dañel dëkk ... (23)*
 'it waaas Marie Daniel who lives ...'

It should be noted again that "loud pauses" occur at syntactic junctures.

8.4. *Remarks on rhythm*

Wolof is a language in which length is contrastive in both vowels and consonants. Rhythm is therefore heavily constrained by the need to preserve these length contrasts; there is very little freedom for rhythmic variation. Sock (1983) studied vowel and consonant contrasts in short words at varied speeds of delivery and showed that these contrasts were maintained when tempo increased, even though their phonetic indicators underwent reorganization. His work lays the groundwork for a yet-to-be-realized study of rhythmic variation in longer constituents (clauses and sentences). Our intention in this section is to take only the first step in this direction by reviewing a few observations based on our own corpora. The pertinent facts are these:

– No rhythmic changes are entailed by substructuring into intonation groups. We have shown this by comparing sentences without a substructure with others that are divided into intonation groups. Thus examples (8) and (37a) in section 7.1 show a rhythm unaffected by changes in intonation. Our illustrations have included a comparison of declarative and interrogative sentences (particularly in section 4), and sentences with and without focus (section 2).

– Lengthening is associated with pauses. As we have seen in section 8, major sentence-internal pauses usually involve lengthening of the preceding syllable. Minor pauses may or may not be associated with such lengthening.

– When a declarative sentence with a final L% boundary tone ends in a vowel, this vowel tends to be shortened and devoiced. If it ends in a consonant, this consonant is released and there is no change in the length of the final syllable.

We have thus found that ten occurrences of the verb root *lekk* ‘eat’, uttered by the same speaker, showed practically no difference in length, whether in medial position (0.28 ms on average) or final (0.30 ms on average).

A more elaborate, quantified study of rhythm would require recording new corpora designed especially to provide suitable material. In particular, there would have to be restrictions on the number of syllables and the number of segments in these syllables. This is a subject that must be treated in its own right, one to which we intend to return in a subsequent phase of our research.

III. REVIEW OF THE FEATURES OF THE WOLOF INTONATIONAL SYSTEM

9. Structure of the system

The structure of the Wolof intonational system can be apprehended with relative ease owing to its lack of intonational marking of focus and stress, and to the optional nature of intonational subdivision. Broader intonational structures are thus unobscured by more local phenomena (such as marking of emphasis, focus, or stress). Our corpus, which is representative of Wolof in this respect, thus contained many sentences, some very long, whose intonation was completely flat up to the final boundary tone. Entirely high-pitched exclamatory utterances are also possible and, indeed, typical. This simplicity of intonation, even over long sentences,

is noteworthy. We are not aware of any other language that has this property to such an extent.

Ordinary declarative sentences, low-pitched and completely flat except for the final boundary tone, provide us with an unmarked or “zero-degree” intonation pattern. Even in longer or more complicated intonational structures, the voice tends to start from and to return to this same low value at the edges of intonation phrases. These low starting and ending points correspond to L targets referring to phrasal-edge L tones.

The introduction of H targets corresponding to H tones allows a variety of melodic contours to be defined (bell curves, plateaus, local peaks). One of the central typological features of Wolof intonation is that these H tones are not anchored to an accent (or stress) but are placed at the boundaries of intonation phrases, or in respect to them (two or three syllables away). Thus Wolof, while having lexical stress, has no pitch accent, due to the fact that stress does not attract intonation contours as in other languages such as English, Dutch, or Bengali (for the latter, see Hayes and Lahiri 1991, *inter alia*). These H tones mark subdivisions or utterance-level properties, such as interrogation or exclamation. Some of the resulting melodic patterns, such as long high plateaus, are typologically infrequent. On the other hand, the relationships among H points (downdrift, downdrift suspension, pitch resetting) that structure single sentences and longer texts are typologically frequent and are found in both intonational and tonal languages. Rare cases were also found in which a H tone associated with vowel lengthening indicates local emphasis. Finally, the system includes a set of clause- and utterance-final boundary tones, most of which can be found in other intonation languages.

Based on this analysis, the paradigm of Wolof intonation patterns that we have studied can be listed as follows:

(a) Utterances with one intonation group:

statements

$[\sigma \sigma \dots \sigma \sigma]$ or $[\sigma \sigma \dots \sigma \sigma]$
 L L L% L H L L%

simple questions

$[\sigma \sigma \sigma \dots \sigma]$
 L H H L L%

questions with morpheme

$[\sigma \sigma \dots \sigma \sigma]$
 H L H%

exclamations

$[\sigma \sigma \dots \sigma \sigma]$ (high plateau)
 H H

exhortations

[σ σ ... σ σ] (high plateau with a low beginning)
 L H H

surprise in a statement

[σ σ ... σ σ]
 L L H H+ (falsetto)%

local emphasis

[σ σ ... σ σ] (prominence on a syllable)
 H

direct address

[σ σ ... σ σ ..]
 L H L H (sust)%

(b) Utterances with two intonation groups (bell curves):

statements

[σ σ ... σ σ] [σ σ ... σ σ] (with downdrift)
 L H L H L L%

statements with a preamble

[σ σ ... σ σ] [σ σ ... σ σ]
 L L H L L%

simple questions

[σ σ ... σ σ] [σ σ ... σ σ] (with no downdrift)
 L H L H L L%

questions with a morpheme

[σ σ ... σ σ] [σ σ ... σ σ] (with no downdrift)
 L H L H L L%

Syllables without H or L specifications receive their pitch specification by interpolation from neighboring targets. Rhythm remains relatively constant, whatever the intonation. Phonological length contrasts leave little leeway for the prosodic use of length variation.

10. Linkage of morphosyntax and intonation

We have noted several important correlations between prosody and syntax. The structural coherence of Wolof in this regard is remarkable.

The prosodic system of Wolof has an unusual typological feature: focus is not marked by intonation, entails no change in the melodic contour of the utterance, and has no role in its prosodic substructuring. This situation can be explained by a morphosyntactic feature of the language, the expression of focus by a special set of conjugations. Focus is thus grammaticalized, and morphologically expressed in the verb inflection; it therefore does not require a further suprasegmental marking.

The morphosyntax of focused sentences also accounts for another characteristic feature of Wolof discourse strategy, namely, the extensive use of thematization. The grammaticalization of focus converts the predicate nexus into an indivisible prosodic group, while preposed lexical subjects, excluded from the predicative nexus, tend to be thematized and marked as such by a special melodic substructure.

Since intonational high targets (H) are not used to mark focus, they become available for other functions, either for the modal marking of simple sentences (questions, ordinary and rhetorical, exclamation, surprise, and so on), or for the substructuring of complex sentences. Additionally, there are rare instances of an intonation peak being used to mark emphasis (rather than focus). The emphatic peaks in our corpus were generally located on quantifiers, but they are also used on occasion to signify a change in the scope of certain morphemes. With a specific intonation (an emphatic peak on the verb), the subject-emphatic conjugation, which normally expresses subject focus, can thus express verb-process intensity in certain contexts.

Likewise in questions, prosody is used to determine the function and scope of the morphemes involved. All interrogative words have another use as subordinators: *ndax* 'is it the case that?' or 'because, in order that' *fu* interrogative or relative 'where', *ku* interrogative or relative 'who', etc. An intonational contour combining a high target on the sentence-initial interrogative word and a final H% interrogative boundary tone is what confers an interrogative sense on such sentences, distinguishing questions from statements (which have a final low L% boundary tone).

The linkage of morphosyntax and intonation is also apparent from the fact that no intonational substructuring can split the constituent extending from the interrogative word to the end of the sentence, whatever its length, since the final boundary tone confers an interrogative sense on the initial morpheme, and the contour as a whole shows that the scope of this morpheme is the entire sentence.

Last, the placement of intonation targets is also conditioned by morphosyntax. As we have shown, all pitch targets, high or low, are placed at the boundaries of syntactic constituents, or relatively to such boundaries (at two or three syllables' distance). Furthermore, all intonational substructures (bell curves, pauses, continuative boundary tones, pitch resettings) always occur at syntactic boundaries. Prosodically marked subdivisions extend over fairly long, higher-level syntactic units (theme/rheme, clauses).

Pauses are also conditioned by syntax: for the reasons mentioned above, they cannot occur between the constituents of the (S)VO₁ predicative constituent. In Wolof, pauses have a role in marking the syntactic

hierarchy: they indicate that a given constituent belongs to a secondary structural level (expansions, coordinate or subordinate constituents) and depends on another term that is itself part of basic sentence structure.

Finally, as a general rule, the prosodic system of Wolof tends to favor marking longer constituents and higher-level syntactic junctures.

11. Conclusion

This, the first global study of Wolof intonation ever conducted, has aimed to describe the basic features of the system as a whole. Throughout this article, the architecture of Wolof intonation has been progressively explored, beginning from the simplest case, a form of null intonation, and ending with the complex structure of a text. All of the intonation patterns have been studied in their relationship with syntax, and a remarkable coherence between the intonational system and morphosyntax has been shown.

Wolof appears to have a typologically original prosodic system in that it has no lexical tone, no tonal accent, and no pitch accent (all tones, except for one type of H, being introduced at intonation unit boundaries, or in function of these boundaries), and furthermore in that it is free of focus marking, thanks to a complex morphological system indicating focus as well as other components of information structure by means of segmental morphemes. In various respects, it is a “minimal intonational system.”

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Appendix A. Corpora and informants

Informants

L, B, N, and F: corpora from four informants recorded in Paris, mostly at the Phonetic Laboratory of the ESA 7018 research group in Paris.

N: a 25-year-old female doctoral student

F: a 32-year-old seamstress with no higher education

L: a 52-year-old researcher

D: a 42-year-old male university professor

Recordings of radio and television programs and conversations

AC: Cultural Archives corpus 1972 (“Comments on horses” in Kajoor-Kajoor Wolof from the Thiès region, reference b.o. 72012.16)

H: Television debate on the subject of traditional healers (*Feebar yi ak garab yi*) on Armand Faye’s “Horizon” show, broadcast by the ORTS on November 11, 1985 (host and two speakers, 2 and 3; only 3 was female)

J: “Jamonoy Tey” radio program recorded and broadcast by the ORTS on July 8, 1984 (two speakers, 1 and 2). This program contained a play, *Gañcax gi*, with two main actors (speakers 3 and 4).

M: an exchange between a mother and her four-month-old baby, originally recorded for a study conducted by Jacqueline Rabain-Jamin of the Laboratory of Developmental Psychology and Child Education (“LaPsyDee”) at the University of Paris V; Ms. Rabain-Jamin was kind enough to allow us access to these data.

XCL: A play entitled *Xët cig lëndëm*, which was read for us by a thirty-year-old male speaker; the manuscript was furnished by the company of the Daniel Sorano Theater in Dakar.

We take this opportunity to thank Ms. Jacqueline Rabain-Jamin, the company of the Daniel Sorano Theater, and the Office de Radiodiffusion-Télévision du Sénégal for their kindness in making the material cited above available to us.

Appendix B. Grammatical abbreviations

ALL	allative suffix
ANTER	anterior suffix <i>-ee</i>
AOR	aorist conjugation
BENEF	benefactive verb suffix <i>-al</i>
CONJ	conjunctive verb affix <i>-a</i>
CONN	connective suffix (singular <i>-u</i> /plural <i>-i</i>)
<i>di/d</i>	imperfective predicative nexus marker
COMPEMPH	complement-emphatic focusing conjugation
SUBJEMPH	subject-emphatic focusing conjugation
VBEMPH	verb-emphatic focusing conjugation
FACT	factive verb suffix <i>-al</i>
FOC	lexical-subject-focusing suffix <i>-a</i>
FUT	future conjugation formed with <i>di</i> + perfect inflection
IMPER	imperative conjugation
IMPERF	imperfective suffix <i>-y</i>
ITER	iterative verb suffix <i>-aat</i>
NEG	negative conjugation or negative suffix <i>-ul</i>

OPR	object pronoun
PARTIC	exclamatory particle
PAST	past suffix <i>-(w)oon</i>
PFT	perfect conjugation
PRED	imperfective predicative auxiliary (cf. <i>di</i>)
PRESENT	presentative conjugation (discontinuous inflection: inflectional morphemes ... + <i>ngi/a</i>)
SUFF	derivational verb suffix

Notes

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1. Wolof is spoken by approximately ten million speakers, mainly in Senegal, Mauritania, and Gambia, where Wolof has the status of an official language.
 2. “Griots” are ‘professional praise singers’.
 3. We have been told that an M.A. dissertation on the intonation of interrogative utterances was submitted in Dakar University, but we don’t yet have the exact reference and have been unable to obtain a copy.
 4. Details on our informants, our corpora, and the abbreviations used to designate them are provided in the appendixes.
 5. Except that the long vowels are transcribed with two identical parts: for example, *ée* instead of *éé* in the official orthography.
 6. Zero-marking of the present and perfective, contrasting with *-y/di/d-* marking of the imperfective and *-oon* suffix marking of the past.
 7. For a full description of the Wolof verbal system, see Robert (1991), and for the focusing conjugations in particular, Robert (2000).
 8. A few reduced forms of conjugations are exceptions in that they show no pronominal agreement. These include the alternative subject-emphatic form with *-a* suffixed to the lexical subject (*Peer-a ko lekk* ‘it was Peer who ate it’, which alternates with *Peer moo ko lekk*), and the alternative 3rd person singular aorist form marked by \emptyset (*Peer \emptyset leek ko* ‘Peer ate it’, which alternates with *Peer mu ko lekk*). In these cases, there can be no pause between the lexical subject and the verb, as both are included in the predicative nexus.
 9. Except once again for the reduced forms mentioned in the preceding note.
 10. In the aorist, a sentence with initial object is understood as a question: *mburu mi, mu lekk ko* ‘that bread, did he eat it?’
 11. It will be noted that consonants produced without vocal-cord vibration create breaks in the melodic contours. Thus the geminate *kk* entails a discontinuity in the curve for (7a) and cuts short the final L% boundary tone in (7b).

12. Actually, a search of the literature, including the Sprosig network, which connects researchers in prosody, provides us with very few candidates for languages of this type, and none of them stands up under further investigation. Thus Somali, which, like Wolof, has a rich system of focus marking and which has been described as having no intonational marking of focus, expresses focus with intonational features such as cancellation of downdrift between the focused term and preceding ones, as well as pitch-range compression of postfocused sequences (Le Gac 2001). It may prove difficult to find a language with tonal accents or pitch accents whose realizations are entirely independent of focus. As pointed out to us too by N. Grønnum, languages such as Danish allow an optional prosodic marking of focus (see Grønnum 1990). Compared to such languages, the originality of Wolof is that it has no prosodic marking of focus, even optionally. It is clear that further investigation of this topic is needed.
13. There exists no experimental study of stress realization in Wolof. Perceptibly, its main correlate appears to be vowel quality, in that stressed vowels are more clearly articulated than unstressed vowels. Consonants also appear to be “stronger” in stressed syllables.
14. Prior studies make no mention of a hierarchy between stresses belonging to different words or different phrases. We suspect that allowance should be made for several degrees of stress. We have nevertheless avoided a systematic study of this question, since as we have already noted, the main point we wish to make here is that there is no interaction between stress and intonation. Moreover, to our knowledge, no instrumental study has ever been carried out on stress in Wolof.
15. Note that the slight depressions in the melodic contour correspond to voiced consonants (here, the *b* in *Samba* and the *d* in *demb*). These depressions are regular correlates of the voicing feature of obstruents. This well-known phenomenon has no prosodic function.
16. One reviewer suggested that this pattern, with a high initial target, might be basic, and that the low flat contour might be a realization of the same pattern within an extremely reduced pitch range. Under this alternative, though, it would still have to be explained why such drastic pitch reduction is so frequent in Wolof speech.
17. This sentence is taken from the exchange between a mother and her baby. Note the higher pitch (cf. [19] above).
18. In some rare cases, as in (15), there is no initial L edge tone. The absence of this initial edge tone does not seem to introduce a difference in the interpretation of the contour.
19. Unless the topic is extracted, as in *Peer and Samba, where did they go?* Even in this case, however, there can be no subdivision between the interrogative word and the final edge L tone (cf. section 7.2).
20. On this point, see Robert (1996: 161).
21. The negative emphatic can negate either the process expressed by the verb or its habitual nature, unlike the ordinary negative, which negates the completion of the process (Robert 1991: 284–302).
22. The morpheme *-a* is a focusing suffix. It is a variant of the focusing marker occurring at the third person when there is a lexical subject. It is likely to have been involved historically in the formation of the conjugations.
23. This intonational feature is concordant with the semantic nature of “high degree,” which means that an adequate value is insufficient. Unless the context provides some other indication, the subject must be identified as an in(de)nitely adequate value with respect to all other possible values: “with respect to all those who may like him, he (the subject) stands out as the liking individual,” i.e. the one who likes him incomparably, whence the superlative sense “he likes him so much!”

24. Wolof has no phonemic glottal stop. A nonphonemic glottal stop occurs optionally before initial vowels.
25. In this construction with a *wh*-question particle followed by the complement-emphatic form, the lexical subject *Peer ak Samba* must be preposed if the subject agrees with the verb (*lañu*). Extraction of the subject can be avoided only if the complement-emphatic verb marker does not agree with it (*fan la Peer ak Samba dem?* 'Where is it that Peer and Samba went?').
26. Our corpus contains only one counterexample consisting of a preposed subject that does not form a separate intonation unit. It must be said, however, that this exception occurs in the speech of one of the interviewees on the "Horizon" program who used a particularly flat, monotonous intonation (H, 4).
27. The downdrift is irregular here, and much sharper between groups 6 and 7 than it is between groups 7 and 8. There are several conceivable explanations for this. For example, it is well known that downdrift in many languages tends to be asymptotic, and hence much more pronounced at the start of a text than toward the end.
28. Involving pronominal indices, markers of mood (including focus), tense, and aspect; cf. section 1.
29. Except when the completive is introduced by *yoo xam ne* 'which you know is ...', an invariant expression used to form complex relative clauses.
30. Pause occurs before the coordinating particle *ak*, which is proclitic to the following noun.
31. When the main clause takes a following completive clause introduced by *ne* 'that', pause occurs after the particle, showing the latter to be enclitic and prosodically dependent on the subordinating clause.

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