Vowel Duration Issue in Civili*

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Abstract

The main goal of this article is to define the problem of vowel duration in Civili (H12a). It shows that the so-called Civili vowel-length desperately needs to be re-examined, because previous works on the sound system of this language hardly explain a number of phonological phenomena, such as vowel lengthening, on the basis of data at hand. Demonstrating the problem in question, the author first reviews previous works that all identify a vowel lengthening in Civili. From different analyses the complexity of the phenomenon is found out by observing differences from an analysis to another, and by regarding difficulties the different phonologists came up against. Then, the problem is also seen through the weakness of each analysis results. This eventually shows more aspects of the vowel duration issue, and leads the author to make a clear distinction between vowel length and vowel lengthening that can be all regarded as only vowel duration. Finally, the article shares a possible way for a solution through an experimental approach of the Civili sound system.

Abbreviations and conventions

The following abbreviations and conventions are used in this article:

Lg: Long

Sh: Short

P-PID: Phonetics-Phonology Interface Debate

SPE: Sound Pattern of English

E.g.: Example (s)

NC: Cluster Nasal + Consonant

CG: Sequence Consonant + Glide

[y] is the IAI and ASG common transcription of the IPA sign [j][1].

Introduction

Civili is a Bantu language spoken in Gabon, in the Republic of Congo, in the whole enclave of Cabinda, in the Democratic Republic of Congo. Some varieties of the language are also found in Angola (the so-called **fiote** or **fioti**). The dialect that is concerned in this paper is spoken in Mayumba (3°23'S, 10°38'E), one of the Civili towns in the southwestern coast of Gabon. In his classification of Bantu languages Guthrie (1948) includes Civili in zone H like languages close to it: Bembe (H.11), Kiyoombi (H.12b), Kunyi (H.13a), Kikongo (H.16c), etc. It forms with those languages the Bantu-languages group called Kongo group. The Civili reference is **H.12a**.

The main goal of this article is to define the problem of the vowel duration in that language. Previous studies (Marichelle, 1902; Ndamba, 1977; Blanchon, 1990; Mabika-Mbokou, 1999 and Ndinga-Koumba-Binza, 2000) focused on the phonology of the language entirely on the basis of impressionistic phonetic data. In Ndinga-Koumba-Binza's work (2000), it was extremely difficult to explain a number of phonological phenomena, such as the vowel lengthening, on the basis of the data at hand. The Civili vowel lengthening desperately needs to be re-examined. But, before any scientific analysis at various levels such as experimental phonology, various aspects of the problematic process must be clearly identified.

With the view to demonstrating the Civili vowel-duration issue it might be better to look back at the previous studies on the language, how did they analyze the vowel lengthening? From different analyses the complexity of the phenomenon will be found out by observing differences from an analysis to another, and by regarding difficulties the different authors came up against. Then, we can also see the problem through the weakness of each analysis results. This might show us more aspects of the problem. Finally, this paper will share a possible way for a solution through an experimental approach of the Civili sounds system.

Survey of Civili Vowel Sounds Studies

Four phonological outlines on Civili sound system can be quoted, Ndamba (1977), Blanchon (1990), Mabika-Mbokou (1999) and Ndinga-Koumba-Binza (2000). These studies focus first only on some articulatory phonetic aspects of the language sounds as proper means to enable secondly phonological analyses (vowels, consonants,

syllables, etc.). Each of these works analyzes differently the vowel lengthening somewhat observed in Civili, i.e. different people with different analyses on vowel lengthening. It shall also be noted that in these studies vowel features of the language are not specifically and deeply studied. Therefore, I can say the vowel system of Civili has not been specially the subject of a deeper systematic research. It is noticeable that the Civili sound system is still non-explored completely.

The study always mentioned as the first about the Civili phonology is from Josué Ndamba, a Congolese researcher who presented in 1977 a doctoral dissertation about the nominal groups and noun phrases in Civili of Pointe-Noire in the Republic of Congo-Brazzaville. For his purpose he starts by an outline in the phonological aspects of the Civili he is studying. We will see later Ndamba's view on vowel lengthening.

The second study found on the phonology of Civili is a brief paper of Blanchon presented during the *Séminaire sur l'alphabet scientifique des langues du Gabon*[2]. It is important to precise that the purpose of Blanchon was to contribute into the Gabonese-languages alphabet and orthography. His work shows briefly the phonological system of Civili by merely listing consonants, vowels and tones he found from his data. And he is not enough accurate in his findings and phonological rules and decisions. For he only gives the results of his analyses. Blanchon's view on vowel lengthening is mentioned in following sections below.

Mabika-Mbokou presented a Master thesis on Civili in 1999. She focused on the mechanisms of analogy in Civili phonological and morphological domains. She briefly tackles the phonological and morphological systems of the language before analyzing the analogical phenomena. In her phonological outline she does an interesting approach of the vowel system of Civili, particularly long vowels aspects. We will see later what her view on vowel lengthening is all about.

A year later, Ndinga-Koumba-Binza also did a Master thesis on Civili. He tried to be accurate in exploring the phonological system on the basis of impressionistic data and analyzing a number of phonological processes, especially in the vowel system. He begins his thesis by an outline on the phonetic aspects of the language. It is necessary to note that this work is the only study of Civili, which comes within the framework of generative and autosegmental phonologies. The previous others are either from functionalist or from structuralist frameworks.

According to a classical conception, the notion of phoneme is based on the pertinence criterion. A segment is said pertinent when within a minimal context its commutation with another segment brings the word meaning to change. More accurately,

> "*Most traditions of phonological analysis establish, for any given language, a set of contrasting sound types which distinguish one word from another. This set is usually designated as the phonemes or the underlying segments of the language*" (Maddieson, 1992: 193).

This principle retained the agreement of researchers to determine the Civili vowel system.

In application of this principle called *distinctive opposition* or *contrast*, the above-mentioned authors on the Civili vowel-system acknowledge five short vowel phonemes in the language, in the one hand. In the other hand, five long vowel phonemes are observed in distinctive contrast to the short vowels. There are seen in the following table.

	Articulation					
	Front		**Central**		**Back**	
	Sh	**Lg**	**Sh**	**Lg**	**Sh**	**Lg**
1st degree	**i**	**i:**			**u**	**u:**
2nd degree	**e**	**e:**			**o**	**o:**
3rd degree			**a**	**a:**		

Table 1: ***Phonemic vowels of Civili***

The phonemic identity of all of these vowels is observed within the framework of the following minimal pairs phonologically transcribed[3].

(1)	/i/ vs /i:/	/mítì/	"*Trees*"
		/mí:tì/	"*I say that*"
	/e/ vs /e:/	/kúbèlà/	"*To be wrong, to get guilty*"
		/kúbè:là/	"*To be ill*"
	/a/ vs /a:/	/mbásì/	"*Tomorrow*"
		/mbá:sì/	"*Friend*"
	/o/ vs /o:/	/lósù/	"*Dirtiness, obscenity*"
		/ló:sù/	"*Rice*"
	/u/ vs /u:/	/mbùsà/	"*Back*"
		/mbù:sà/	"*Net*"

Finally, researchers on Civili might agree that the vowel system of this language contains ten vowels at the phonological level in consideration of the contrastive oppositions, five short /i, e, a, o, u/ and five long /i:, e:, a:, o:, u:/.

Going To The Problem

The main question in the vowel system of Civili appears like that, is the vowel length predictable or distinctive in Civili? In other words, is length a structural feature of certain vowels or phonological process? This question makes divergence among those who have worked on Civili.

The vowel length feature is testified into Civili as in many languages of the world. However there is no unanimity as for the analysis of this length. Clearing the distinctiveness of the vowel duration, as in a linear approach and such as mentioned above in **(1)**, might bring unanimously researchers into agreement but it is not enough to solve the analysis problems that pose.

One of the problems is to determine the structural character of the vowel duration in the studied language. It indeed seems inadequate and simplistic to highlight only the distinctiveness of long vowels and to claim their phonological status.

According to Denis Creissels (1994: 37), linear phonology faces the following alternative,

> "*ou bien la longueur est considérée comme un trait constitutif de certains segments, ou bien les voyelles longues sont considérées comme représentant deux segments vocaliques identiques*".

That is to say that in a linear analysis the researcher would come up against the choice to regard the vowel length as a constitutive feature of certain segments or to regard the long vowels as a sequence of two identical vowels.

However, since there is no theoretical evidence that helps to choose between regarding vowel duration as intrinsic pattern of certain vowels, and regarding vowel duration as a mere succession of two identical vowels, it is left to the discretion of the researcher to decide (subjectively) claims of his work.

Ndamba (1977) regarded the vowel length in Civili as constitutive in the vocalic system. He established the pertinence of the phenomena by the way of contrast as observed in **(1)** above. Blanchon (1990) who did not explain how he analyzed the

vowel length significance mentioned in his proposed Civili orthography a succession of two identical segments in contexts where it is possible to hear a vowel lengthening.

So that Civili words such as the following with vowel length phonetically heard will orthographically be written differently according to the two authors above.

(2)	***Ndamba***	***Blanchon***	
	mama	maama	"*Mum*"
	tata	taata	"*Dad*"
	saku	saaku	"*Bag*"

But what Blanchon did, as Creissels (1994: 37) adds, might simply and purely assimilate long vowels to sequences of two distinct syllabic nuclei, i.e. two syllables. Therefore, that could pose some theoretical problems as well as practical difficulties in the languages description. In the other hand, Ndamba's view does not show the vowel length if it is applied into an orthographical alphabet.

As for Mabika-Mbokou (1999: 27-32), she observed that vowel length is both predictable in the one hand, and pertinent according to minimal pairs in the other hand. All the phonetic vowels of Civili (except the vowel [ə][4]), she says, can be lengthened under different circumstances. She agrees with the phonological analysis that shows a system containing five long vowels, which oppose to short vowels as presented above in **Table 1**. She also clearly mentions the predictability of the vowel lengthening saying, (Mabika-Mbokou, 1999: 31)

> "*Bien que la longueur vocalique soit phonologique en Civili, nous avons rencontré des cas où cette dernière était prévisible. En effet, dans cette langue, toutes voyelles qui précèdent une séquence nasale-consonne (-NC) est automatiquement longue. De même, toute voyelle qui suit une séquence consonne semi-voyelle (CS) est automatiquement longue*."

That is to say, phonetically a normal short vowel becomes automatically long when it precedes a cluster Nasal + Consonant (NC) or follows a sequence Consonant + Glide (CG). For Mabika-Mbokou such kind of length is predictable. She regarded it as a phonetic rule she illustrated with the following examples.

(3) /ŋgándù/ [ŋgá:ndù] "*Caiman*"

/myókù/	[myó:kù]	"*Arms*"
/ɲénzì/	[ɲé:nzì]	"*Joy*"

According to her, here is a predictable vowel lengthening because it is phonetically conditioned. However, Mabika-Mbokou did not mention what could be the conditioning factors. The conditions could have been the cluster NC or the sequence CG, but another question will remain: Why do the cluster NC and the sequence CG cause a vowel to lengthen?

Finally, it may be understood from Mabika-Mbokou that vowel duration is viewed within two senses, i.e. vowel lengthening when duration is predictable and vowel length when it is not. Meanwhile, Mabika-Mbokou's analysis does not give any answer to the questions such as:

(i) Physically distinguishing between length and lengthening and;

(ii) Distinguishing between length and sequence of two adjacent identical vowels.

Ndinga-Koumba-Binza (2000) did not regard the Civili vowel-length as structural. That is to say the vocalic length was not seen as an underlying feature of certain vowels. Following an autosegmental framework, he escaped the alternative mentioned by Creissels above. For he (Creissels, 1994: 37) says again,

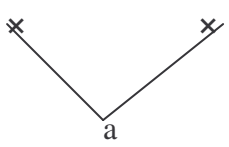
> "*dans une phonologie qui distingue les segments des fonctions syllabiques qu'ils assument, l'analyse des voyelles comme segments uniques associés à deux positions successives dans une syllabe à noyau <<branchant>> (c'est-à-dire dans une syllabe dont le <<noyau>> englobe deux positions squelettales) permet d'échapper à cette alternative*".

Therefore, Creissels formulated that a vowel is long when it occupies two timing units on the skeletal tier. This way is indeed advocated for every autosegmental analysis, as Goldsmith (1990: 48) says,

> "*Long vowels consist of a single vowel segment itself associated with two positions on a facing tier...*"

It is configurationally represented as in the following representations.

(4)



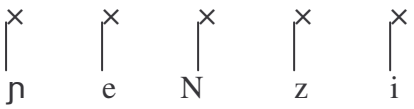
[a:]

[a]

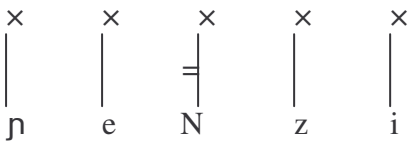
For this reason the long vowels produced in Civili were theoretically regarded as a result of a lengthening process. The predictable length seen by Mabika-Mbokou was eventually explained through an autosegmental analysis as a compensatory lengthening rule that stems from phonological processes, namely prenasalization and semivocalization[6]. The configurations below explain the different processes.

(5) ***From the prenasalization process***

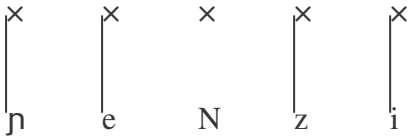
The process of prenasalization is stated as the systematic association of the indeterminate nasal segment N with the timing position of the adjacent oral consonant C. It finally forms a prenasal complex segment NC heard phonetically. That makes the adjacent vowel to spread to the skeletal position left vacant due to the prenasalization process. This is seen in the following configurations.

a. 

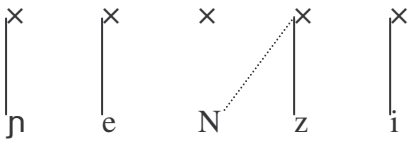
(Underlying form)

b. 

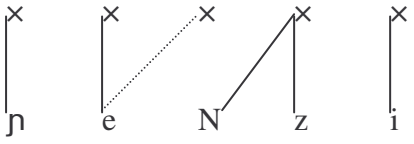
(Disassociation of N from its ×)

c. 

(Fluttering of N)

d. 

(Prenasalization)

e. 

(Lengthening of e)

(Other processes)

[ɲé:nzì] "*Joy*" (phonetic output)

(6) ***From the semivocalization process***

Semivocalization or glides' formation is the phenomena by which a close vowel in Civili, /i/ or /u/, turns into a glide, respectively [y] or [w]. Indeed, in Civili these glides derivate from respective underlying vowels /i/ and /u/, and for that reason glides are not regarded as underlying segments (Ndinga-Koumba-Binza, 2000: 64-66).

The semivocalization process takes place in the contact of two words or morphemes, when the first ends by a vowel /i/ or /u/ and the following starts by any vowel except /i/ and /u/. The residual vowel that remains after the process is systematically lengthened occupying the skeletal timing position left vacant. This is formulated through the configurations that follow.

a.  (Underlying form)

b.  (Disassociation of i from its ×)

c.  (Fluttering of ×)

d.  (Semivocalization)[7]

e.  (Lengthening of o)

(Other processes)

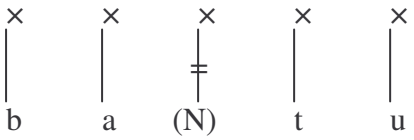
[myó:kù] "*Arms*" (phonetic output)

Ndinga-Koumba-Binza added that apart of prenasalization and semivocalization, the compensatory lengthening in Civili is also due to a process of deletion of a nasal segment and due to a process of vocalic elision.

(7) ***From nasal deletion process***

In a succession of N(asal) + unvoiced C(onsonant), the N is systematically deleted because of a constraint that refuses the prenasalization of the N with a voiceless segment. The nasal deletion occurs in the same contexts of prenasalization, but only with an adjacent voiceless C. Both phenomena of prenasalization and nasal deletion obey the constraint according to which in a sequence N+C, the two units N and C should bear the *voicedness* feature. In Civili when the N precedes an unvoiced C and when it does not bear a tone[8], this N disappears automatically in actual phonetic realization. This disappearance produces systematically the lengthening of the adjacent vowel that eventually occupies the skeletal position left vacant. This is in the following configurations.

(Underlying form)



(Deletion of N)

(Fluttering of skeletal position)

(Lengthening of a)

(Other processes)

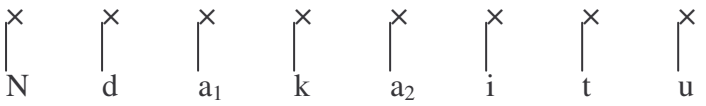
[bą́:tù] "*People*" (Phonetic output)

Nevertheless, orthographically the nasal N is written in order to keep the nasality feature that remains on the neighboring vowel. That is the case of the word above analyzed, which is normally written **Bantu** (also written **Baantu**).

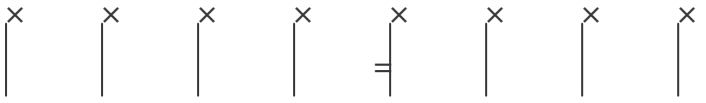
(8) ***From the elision process***

The phenomenon of vowel elision is a vocalic deletion. This process occurs in the same contexts of semivocalization, but only when the first vowel is not /i/ or /u/. This process appears according to universal principles that Casali (1996) brought out. In a

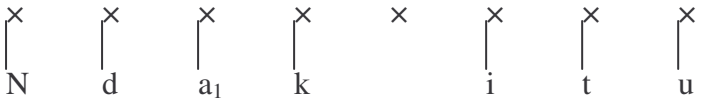
hiatus V_1V_2, V_1 elides. This deletion causes the lengthening of V_2, which recovers the timing unit left vacant. The configurations below show the process.



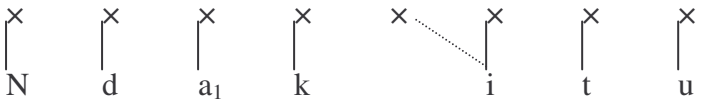
(Underlying form)



(Deletion of a_2)



(Fluttering of timing unit)



(Fluttering of timing unit)

(Other processes)

[ndàkí:tù] "*Our tongue*" (Phonetic output)

Ndinga-Koumba-Binza (2000) also mentioned a case of phonetic lengthening that does not come within compensatory lengthening rules stated above. The vowel quantity observed here does absolutely not appear in the same phonemic contexts of the compensatory lengthening. In general, it only appears before the consonant /l/ and /r/. This is a general lengthening rule that some languages of the world display (Trask 2000: 190). The rule stipulates that any vowel is always phonetically realized lengthened when the vowel in question precedes a liquid (/l/ or /r/). This rule might be illustrated through the following examples that show a physically induced vowel length.

(9)	/célà/	[cɛ́:là]	"*Bait*"
	/káràsà/	[ká:rəsə̀]	"*Trouser*"
	/líbólà/	[líbɔ́:là]	"*Basin*"

It can be observed that Ndinga-Koumba-Binza's above acknowledge the predictability of vowel length, both as a phonological process brought out through an autosegmental study and as a phonetic phenomenon. For that reason Ndinga-Koumba-Binza (2000: 44) proposed without taking into account the problem of assimilation through a probable vowel harmony[9] the following table as the set of underlying vowels of Civili.

	Articulation		
	Front	**Central**	**Back**
1st degree	**i**		**u**
2nd degree	**e**		**o**
3rd degree		**a**	

Table 2: *Underlying vowels of Civili*

This table is made, not according to the principle of distinctiveness but according to the principle of predictability. Only non-predictable segments are allowed to come within this table. Thus every segment that can be anyway explained is not proper to enter into the phonological table. The phonological table is agreed as a set of structural segments of the language. Ndinga-Koumba-Binza (2000) concludes this discussion claiming that long vowels are not structural in Civili, because autosegmentally explicable or explained.

Weakness of Analyses and More Difficulties

In Civili long vowels appear rarely in polysyllabic nominal stems. Neither do they appear in prefix syllables, if it is not a monosyllabic word or onomatopoeia such as in **(10)** below.

(10)	/vó:/	"*Nothing*"
	/vé:/	"*Tranquil*"
	/mbwí:/	"*How is it? Fine!*"

That is to say that the contexts of appearance of long vowels seem very restricted. In fact, the reader may have noticed through all examples above that all durations occur in penultimate syllable.

Although Ndinga-Koumba-Binza (2000) cared about the contexts of appearance of long vowel, and even if he tried to analyze entirely the process of compensatory lengthening some interesting cases of length have not been studied. Thus, the vowel duration such as seen in **(10)** above and such as in the following examples in **(11)** has been left inexplicable.

(11)	[kúlé:sì]	"*To show*"
	[kúlè:sì]	"*To lay*"
	[ńcyé:tù]	"*Woman*"
	[mbá:sì]	"*Friend*"

	[tá:tə]	"*Dad, father*"
	[má:mə]	"*Mum, mother*"
	[yá:yì]	"*Oldest brother, oldest sister*"
	[ló:sù]	"*Rice*"
	[ló:sì]	"*Shop*"

The question here is to know how to explain this kind of duration. A phonetic rule such as any vowel lengthens before the segments /s/, /t/, /m/, or /y/ is impossible because of the following examples in **(12)**.

(12)	[mívésì]	"*Bones*"
	[mátá]	"*Guns*"
	[cílésì]	"*Youngest*"
	[másì]	"*Water*"
	[límɛ́mə]	"*Goat*"
	[məkáyì]	"*Leaves*"
	[líbèyì]	"*Mockery*"

We observe here that before the same segments /s/, /t/, /m/ and /y/ vowels do not lengthen. Moreover the phonetic lengthening observed in **(9)**, and which seemed solve some problems is actually inexplicable. For some other examples negate completely such kind of rule. Some of these examples are the following in **(13)**.

(13)	[sɔ́lə]	"*Plantation*"
	[mbúlə]	"*Palm wine*"
	[lúbálì]	"*Sardine*"
	[kwɛ́rə]	"*Waistcoat, small skirt*"
	[kwárùtù]	"*Bedroom*"

In these examples, vowels are not lengthened before the segments /l/ and /r/. Therefore, this ends with a big question: Is lengthening or no lengthening in these particular environments?

We can finally and clearly understand that one of the principal defects of previous phonological analyses is due to the lack of specific and reliable data. For instance, the acquisition of a sufficient number of data might have caught the attention of authors on duration in the environments of /l/ and /r/.

Eventually, important questions are still unsolved as far as vowel duration is concerned.

- Is the duration structural in the distinctive features of certain vowels of Civili?
- Is it a vowel length or a sequence of identical vowels?
- Is there a general rule for lengthening in Civili?
- Are all these physically long or perceptual long?
- Although many forms are involved in minimal pairs, but what happens to these forms in different syntactic environments?

In order to respond to these questions the Civili vowel-sound system must be systematically examined. It must be accurately explained whether this duration is merely phonetic or it can be regarded as derivate from a phonological process as compensatory lengthening previously mentioned. Evidence must also be shown whether duration observed in items like those quoted in **(10)**, i.e. in monosyllabic items or onomatopoeia, might be analyzed phonologically as sequences of identical vowels or not since this duration neither comes within compensatory lengthening rules established, nor within the phonetic lengthening that Ndinga-Koumba-Binza (2000) thought to state. If we followed an autosegmental framework, we would be tempted to assume an autosegmental configuration such as the following in **(14)**.

(14)

This representation seems better theoretically accepted than the one which could admit a sequence of identical like the one below in **(15)**.

(15)

The problem in **(15)** is this configuration is not right about the Obligatory Contour Principle (OCP), which does not allow the adjacency of two identical units in the underlying form. That could also pose the question of the syllabic structure, i.e. stipulating if two identical vowels imply two different syllables or not.

Therefore, the resulting identical vowel configurations merge by OCP in **(14)**. However, nothing structurally explains why and by which process a single underlying segment in **(14)** occupies two timing units in the skeletal tier.

Consequently, it seems that phonologically there is no rule to explain such vowel duration as we consider the theoretical framework, autosegmental phonology. Thus, another defect of the length/lengthening analyses as done in Ndinga-Koumba-Binza (2000) and in other Civili phonological studies (Marichelle, 1902; Ndamba, 1977; Blanchon, 1990; Mabika-Mbokou, 1999) might be due to the theoretical phonological patterns, i.e. the theoretical approach.

The question now is to know where the problem stands. Vowel lengthening in Civili as we can see is astride phonetic and phonological levels of the language. The unsolved issue is due to both the lack of reliable data and the limits of the theoretical framework.

Moreover, we will see below from Mabika-Mbokou's investigation (1999: 47), that different native speakers sometimes regard Civili vowel-duration alternatively as relevant or as irrelevant. A question remains, how can a phenomenon be perceived both merely phonetic in the one hand and as phonologically relevant in the other hand? If it does not bring any semantic distinction, it is probably a phonetic element depending on the speech realization.

Thus, in the particular case of Civili the difficulty to analyze vocalic quantity is both in the phonetic level and in the phonological level. For, as we regard the two dimensions as independent from each other it is impossible to see their interaction into the same phenomenon. Phonetically we observe the articulatory duration, but we cannot explain it. Phonologically we also observe the duration, but we cannot either explain it.

We should consider the phonological theories used in the analyses. We know, as shown in the *phonetics-phonology interface debate (P-PID)*, that phonetic data can confirm or disconfirm phonological analyses. Alternatively, the phonetic output as well, predicted by phonological theories could lend credibility to the analysis or negate the analysis. And as the vowel length is seen phonetically, it is also considerable phonologically.

Aspects of collected data

The phonetic data currently available shows in other manner the problem of vowel duration in Civili. For her study Mabika-Mbokou used as corpus a list of 140 simple words, nouns, adjectival phrases and verbs. Phonetically she notices some vowel duration that she analyzes as phonological such as those presented more above in **(1)**. But, dealing with analogies when she tests her data on her three Civili native speakers she observes that vowel length can be variously interpreted.

In fact the first speaker makes exactly a semantic distinction between short vowels and long vowels. That establishes the Civili vowel length as pertinent phonologically as observed in **(1)** through the distinctiveness criterion from minimal pairs. With her second informant, she notices that long vowels do not exist. The speaker does not produce any vocalic duration. That poses another question, i.e. how does this speaker distinguish words such as quoted in **(1)**? As for the third speaker the vowel length presents irrelevant. For distinctive minimal pairs are non-existent, the informant does not make any distinction between long vowels and short pronouncing them indifferently without semantic distinction.

It is regrettable that the author does not mention how these tests were conducted. This could be crucial to the results obtained.

Consider a way of three phonological studies of Civili vowels from each of these informants. This will force us into the position that these three speakers have three different phonologies.

> "*Which could be true, but is by no means self-evident on other grounds*" (Ladefoged, 1990: 399).

Because of her analogical objectives Mabika-Mbokou retraces her phonological conclusions noted more above. She concludes that vowel lengthening in Civili might be resulting from an analogical process, but the author avoids mentioning whether the underlying segment is short or long. She prefers to suppose from the informants 2 and 3 that any basic underlying form, which could be short or long, appears short for the informant 2 and both short and long without semantic distinction for the informant 3. Finally, main critique of Mabika-Mbokou's work shall be focused on her limited data and her unknown perception testing procedures.

I said above that data from Ndinga-Koumba-Binza (2000) as well as those from Mabika-Mbokou (1999) were not consistent. The data Ndinga-Koumba-Binza (2000) had gathered were extremely impressionistic and proper only for a probable general phonological study. They could not offer satisfactory analyses like those we should get for a specific requirement as the vowel lengthening is, in any language.

As for Mabika-Mbokou data, her corpus looks short (only a set of 140 items) as well as impressionistic. And she built it with the view to doing an analogical study on phonological system and the morphological system of Civili. Thus neither could her data satisfy for a reliable treatment of the Civili vocalic quantity.

Towards a solution

Finally the sound system of Civili need to be studied again, particularly the question of duration. Any possible study should consider both data and phonological theories. In the area of phonetics/phonology Civili has already been the topic of some studies, but not in experimental approach. I propose a re-examination of Civili vocalic length into a framework that integrates both phonology and phonetics, such as experimental phonology.

Laboratory phonology, also known as experimental phonology, is an approach that focuses on the relationship between the phonological component and the phonetic component, and relates to the so-called *phonetics-phonology interface debate* (*P-PID*), which has dominated some parts of the linguistic scene for the last three decades.

The experimental-phonological study to exploring the Civili vowel-duration should be in the sense of the following questions from Beckman and Kingston (1990:1) on the essence of laboratory phonology,

> "*First, how, in the twin processes of producing and perceiving speech, do the discrete symbolic or cognitive units of the phonological representation of an utterance map into the continuous psychoacoustic and motoric functions of its phonetic representation? Second, how should the task of explaining speech patterns be divided between the models of grammatical function that are encoded in phonological representations and the models of physical or sensory function that are encoded in phonetic representations? And third, what sorts of research*

> *methods are most likely to provide good models for the two components and for the mapping between them?*"

The methods applied in laboratory phonology can be seen as part of a

> "*…process of continuously generating hypotheses, designing a suitable experiment, gathering and evaluating data, supporting or refuting the hypotheses, and reinforcing or overthrowing part of the general theory*" (Tams, 1999: 3).

Indeed, it is all about an experimental procedure that consists of:

- Gathering appropriate data that are in line with what we are looking for;
- Evaluating data by statistical methods;
- Arriving at a generalization concerning data;
- Expressing this generalization as a fact, and fitting the facts into a model

In other words, it is to examine in detail the acoustic waveform of sounds of speech. However, laboratory phonology is not a theoretical model of phonology as such, but simply a trend that usually serves as a tool for many post-Chomsky-and-Halle generative phonologies.

Beckman and Kingston (1990: 3) briefly introduce experimental phonology in the following way.

> "*How can we use the physical models and experimental paradigms of phonetics to construct more viable surface phonological representations? Conversely, what can we learn about underlying phonetic representations and processes from the formal cognitive models and computational paradigms of phonology? Determining the relationship between the phonological component and the phonetic component demands a hybrid methodology. It requires experimental paradigms that control for details of phonological structure, and it requires observational techniques that go beyond standard field methods*".

Moreover,

> "*the techniques and attitudes of this hybrid laboratory phonology are essential to investigating the large group of phonic phenomena which cannot be identified a priori as the exclusive province of either component*" (Beckman & Kingston, 1990: 3).

Ohala (1990) who claims a fundamental unity between phonological and phonetic representations, such as one from a P-PID sense, argues that such phonetic motivations should be made to constrain the phonological description directly, by including in the phonological model the primitives and principles of aerodynamics, of the mapping from vocal tract shape to acoustic pattern, of peripheral auditory processing of the signal, and so on. He suggests that since such constraints are not an inherent or derivable property of autosegmental formalisms, more general physical ones should simply replace autosegmental representations.

A study within this realm of laboratory phonology and focusing on the experimental verification and the re-interpretation of Civili vowel lengthening should consist of in-depth acoustic description and analysis. It might consist of representative data (e.g., spectrograms or pitch traces) and graphs of measurements (such as vowel duration). For all of these I assume that the acquired speech data will be annotated and acoustically analyzed using the equipment of the software so-called *Praat*, which allows to perform analyses of time domain as well as of spectral domain.

The main objective of the proposed study might be to give an answer to this question. What vowel-duration patterns can exist in Civili? That may possibly review and influence phonological and phonetic mechanisms that might govern the vocalic length in this language.

In order to understand the structure and phonological behavior of any language, and specially a particular phenomenon such as the vocalic quantity, it is necessary to have absolute clarity on the physical aspects constituting a particular language. Except at articulatory level (the actual production of sounds) and acoustic level (the transmission of sounds), the physical aspects of a language are also attested at *perceptual level*. It consists of the recognition and interpretation of sounds.

Phonetic descriptions of Civili have unfortunately never moved beyond impressionistic descriptions at articulatory level. Within the view to clarifying the vowel duration in Civili, I suggest acoustic stimuli electronically prepared in order to

conduct a wide range of perceptual tests with mother tongue listeners of Civili. Identification as well as discrimination tests should be prepared. The testing might take place on individual as well as group bases.

The proposed study to re-examine the vowel lengthening should also look through a series of perception tests for how listeners can interpret structures that bear the problematic phenomenon; and what cues they use.

I noticed above that the lack of specific and reliable data caused previous studies to fail on Civili vowel-duration explanations, because they were limited and in nature totally impressionistic.

In general data consist of observations about events in the world. For a study focusing on the Civili problematic phenomenon we are speaking about the first step in the experimental work I am proposing is to gather data. According to Andy Tams (1999: 2),

> "*an efficient way of dealing with data is to evaluate its reliability by statistical techniques*".

In order to address the related phonological problem to vowel lengthening we need to apply scientific methods to authenticate existing Civili data and to explore larger sets of phonetic data, not only at acoustic level but also at perceptual level. The reason for this is that there is no direct relationship between the acoustic speech signal as such and its perception. Quantified phonetic databases are the same reason extremely required.

Therefore digital speech recordings should be made in various environments and conditions covering as wide a population as possible. These new data will complement existing data stemming from my previous study. In order to apply these phonetic data to the determination of phonological analyses such data ought to, as said Botha[10],

> "*satisfy at least criteria of (i) genuiness, (ii) correctness, and (iii) comprehensiveness*".

I regard more efficient the two criteria Roux (1979: 5-6) pointed following and interpreting Botha, the relevance and the correctness of data. The criterion of relevance relates to datum that

> "*represents the perceptual judgment of a speaker-hearer, then this datum is relevant to the construction/evaluation of a phonological analysis within the framework of SPE theory*".

For the specific case of Civili this criterion might be adequate for perceptual data gathered through acoustic stimuli and perceptual tests.

So, the phonetic status of data might be both acoustically and perceptually gathered and analyzed. Gathering acoustic data consists of conducting phonetic investigation into the acoustic properties of speech recorded (Ndinga-Koumba-Binza 2002a). And, acquired acoustic and perceptual data will be interpreted in terms of up-to-date non-linear phonological models in a quest for a credible phonological analysis.

Conclusion

Vowel lengthening presents a certain complexity. I tried in this paper to highlight it by reviewing the existing studies and noting incommodities of different analyses. The questions, – how to interpret the vocalic length feature in Civili? Is it a structural distinctive feature of certain vowels in this language? – are extremely difficult phonologically regarded. Existent phonological studies based on impressionistic data and phonological theories could not clearly and efficiently explain this phenomenon observed in Civili. Furthermore, after all phonological analyses

> "*the resulting surface forms are not attested in the spoken language*" (Garnes, 1973: 273).

That is both due to unreliable and limited data and incapacities and limitedness of theoretical phonological frameworks.

Finally existent data and phonological analyses having lost credibility, a re-examination of the process of vowel lengthening in Civili is desperately required. In this paper I mainly advocate for a future study of the Civili problematic phenomenon experimentally approached through

- Elaboration of appropriate data,
- Acoustic and perceptual procedures and testing,
- And then an interpretation in terms of current non-linear phonological approaches.

I believe, the results that the future-proposed study might reach could help to solve such kind of problems in this language, and in some other Bantu languages in general. By this time the proposed study has been undertaken and data are being collected and analyzing at both acoustic and perceptual levels (Ndinga-Koumba-Binza, 2002b and 2003).

Notes:

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[1] IAI = International African Institute; ASG = Alphabet Scientifique des langues Gabonaises (Scientific Alphabet of Gabonese languages); IPA = International Phonetic Alphabet.

[2] Libreville, 20-24 February 1989

[3] For the sake of the discussion it has not been convenient to write these words orthographically. We will see later how vowel length can be correlated to the orthography of the language.

[4] [ə] is phonologically a variety of [a] within an unstressed syllable.

[5] × is a skeletal position, i. e. a timing unit. The range of × is the skeletal tier.

[6] *Semivocalization* is the process that some other authors call by *glides formation* and/or *consonantization* (cf Poulos and Msimang 1998).

[7] The process of semivocalization finally forms a consonantal cluster heard phonetically as Consonant + Glide, [Cy] or [Cw].

[8] Case of syllabic Nasal. In Civili, there are nasal prefixes that contain only the nasal unit without vowel. They generally bear a high tone. E.g. N'cyeetu [ncye:tu] "woman"' N'kwati [nkwati] "machete".

[9] Bringing out the relationship between /e/ and /ɛ/ in one hand, /o/ and /ɔ/ in the other hand might bring into the table the vowels /ɛ/ and /ɔ/ as underlying segments. For, they are not predictable.

[10] As quoted by Roux (1979: 4).

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