THE PHONOLOGICAL STRUCTURE OF THE SENUFO WORD (SICITE)

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The study of the phonological make-up of the Senufo word (a Gur language of the Niger-Congo family) has led to some interesting discoveries. A large number of words seemed to exhibit some type of vowel harmony while other words followed no clear vocalic pattern. Pursuing the matter further, it was seen that many of the vowel harmony words were actually 'simple' words, that is, words with a single lexical unit, while almost all compound words (primarily nouns) had vowels that did not harmonize with each other. Furthermore it was seen that the same vowel harmony words words had a restricted set of tonal melodies and a restricted set of consonants in medial position, whereas compound words allowed for a much greater variety of tonal combinations, and the entire set of consonants could be found in word medial position.
These discoveries have led to the division of words into two groups, the phonological simple and the phonological complex, for the purpose of examining the contents and behaviour of each group. A non-linear theoretical approach will be used to facilitate the analysis of the tonal and vowel patterns. Special attention will be paid to vowel behaviour, since vowels undergo numerous phonological changes according to their position in the word. Finally this paper will discuss briefly the term 'phonological word' and its applicability to the phonological phenomena we have examined here.

Lorsque nous avons commencé à étudier la phonologie du mot en Senufo (une langue Gur de la famille Niger-Congo), nous nous sommes vite rendu compte de certains faits. Nous avons constaté qu'un grand groupe de mots, noms et verbes, suivait un certain comportement de harmonie vocalique tandis que d'autres ne paraissaient pas soumettre à aucune règle d'harmonie. En poursuivant les recherches nous avons remarqué qu'une grande partie de mots avec l'harmonie vocalique sont les mots dits 'simples', c'est-à-dire, avec une seule unité lexicale, et que presque tous les mots composés possédaient des voyelles qui ne s'harmonisent pas. De plus, nous avons découvert que pour les mots avec une certaine harmonie vocalique, l'ensemble de consonnes permis en position médiale est très restreint, et le nombre de schèmes tonales est limité. Les noms composés, au contraire, permettent une grande variété de combinaisons tonals et de consonnes en position médiale.
Ces découvertes nous ont amenées à mettre les mots Senufos en deux groupes, les mots phonologiquement simples et les mots phonologiquement complexes dans le but d'étudier le contenu et le comportement de ces deux groupes. Une approche non-linéaire phonologique facilitera surtout l'analyse du comportement des voyelles car les voyelles subissent à de nombreux changements phonologiques suivant leur position dans le mot. On conclusion, on discutera brièvement le term 'mot phonologique' et comment cette catégorie pourra s'appliquer à ce que nous avons découvert ici.

0. INTRODUCTION

A few years ago, I was trying to convince a colleague that **səkɑ̃** 'goat' was not a simple noun for the reason that it did not have the vowel or tonal pattern, nor the consonant behaviour typical of a simple noun in Senufo. He argued that one cannot define a simple noun according to its phonological behaviour, and that, as far as he knew, **səka** was not composed of two lexical morphemes, and was, therefore, a simple noun.

My colleague may have won his argument from the lexical standpoint. However, this paper will show that simplicity can also be defined from a phonological perspective, and that a phonologically simple word corresponds very closely to a lexically simple word.

In Senufo[1] a word, in particular a noun or a verb, is morphologically defined. Each noun allows for only one definite suffix regardless of its number of lexical constituents. Likewise, verbs allow for only one incompletive suffix.

In looking at this morphologically defined word, one quickly recognizes phonological behaviour that neatly divides words into two groups, as seen below. The first group, composed entirely of simple nouns and verbs, has quite predictable phonological behaviour for tones, consonants and vowels. The second group, of which the above word **səkā** is a member, has much less predictable phonological behaviour, with a greater variety of consonant, vowel and tonal conbinations than the words of the first group. All compound nouns are found in this group, as well as all prefixed nouns and a large number of borrowed words. To avoid confusion with lexically defined terminology, we shall call words of the first group 'basic words', and those of the second group 'complex words'. Mills (1985) uses these terms in her description of the same phenomena in Cebara, a major Senufo language in Côte d'Ivoire. Basic words will be seen to be a single phonologically defined unit (PDU) while complex words will be seen to contain two or more phonologically defined units. The tone, consonant and vowel behaviour which distinguishes these two groups of words will now be examined.

1. BASIC WORDS[2]

jexe	'soap'	**gbaxa**	'house	**bálé**	'pick up'
ta̲ʔana	'roselle plant'	**ceewè**	'woman'	**fulo**	'push'
cɛ̲xɛ	'sauce'	**nyùŋɔ̀**	'head'	**cɔɔ̲ri**	'settle, sort out'
juu	'speech'	**nyə̀ŋè**	'ground'	**cɔ**	'pick'
yarəxa	'thing'	**nta̲là**	'courtyard'	**cəri**	'shell(peanuts)'
gbu̲u	'funeral'	**ntɔ̀ɔ̀xɔ̀**	'pestle'	**fílé**	'tamp (a floor)'
laxa	'stomach'	**ndùxò**	'odour'	**cá̲**	'drop, knock down'
yelɛ	'year'	**lùlò**	'bile'	**ceʔelɛ**	'insult'
colɔ̀	'pot'	**cà**	'child'	**cɔ̀rì**	'be in a pinch'
ca̲ŋà	'day, sun'	**njɔ̀rə̀xɔ̀**	'mud'	**cə́rə́xé**	'faint'

COMPLEX WORDS

mənc̀ɔ̀	'older sister'	**tutū**	'iron-worker'
faaciì	'cultivator'	**cə́wúlô**	'week'
səkā	'goat'	**fùjòkulo**	'cup'
dùxùncà	'sheep'	**múnala**	'nose'
pə̀cɔ̀	'unmarried young woman'	**kacɛ̲lɛ**	'fetish'
mámbə́lɛ̂	'car'	**kàmɛnɛ**	'left hand'
tùntu̲ŋɔ	'messenger'	**káfórô**	'eggplant'
nəndeè	'elder'	**gbasɔ̲́xɔ̂**	'bedroom'
nànkàlù	'thief'	**pə̀mpɔ̲́nyɛ̀xɛ̂**	'baby'
kàpeŋɛ	'broom'	**bàrəntâ**	'banana'
kafyɛɛxè	'wind'	**kàjiixe**	'firewood'
kafuxò	'heat'	**kàlòxò**	'shower room'

[1] This paper deals with the Sɔ̀cɔ̀té dialect of Senoufo, spoken in southwestern Burkina Faso, and belonging to the popularly-called northern Senoufo group of languages. Senoufo languages are also spoken in northern Ivory Coast and southeastern Mali.

[2] Most nouns in this list include an indefinite suffix indicating membership in one of the eight noun classes. These indefinite suffixes possess no underlying vowel or tone of their own and for the purposes of a phonological analysis are considered part of the phonologically defined unit. Basic verbs indicate the completive aspect, from which the incompletive suffixed form is derived.

yagbɔ̲xɔ̀	'axe'	**dànàà**	'red pepper'
katexè	'hunger'	**nyɔ̀gbɔ̲̀xà**	'dry season'
naawaxa	'boil (infection)	**tulèxɛ̂**	'grandfather'
kàlaxa	'sorghum'	**nàmbâ**	'lamp'

1. TONAL PATTERNS[3]

1.1 BASIC WORDS

Basic verbs and nouns have consistent tonal patterns. All basic verbs are either High, Mid or Low tone regardless of the number of syllables (see 2.) while nouns have High, High-Mid, High-Low, Mid, Mid-Low, Low and Low-High melodies (see 3.)

2. VERB TONE MELODIES

High		**Mid**		**Low**	
lɔ́	'take'	**sɔ**	'buy'	**cù**	'catch'
pérɛ́	'sell'	**səxe**	'wait'	**gbàrà**	'meet'
fílé	'beat'	**fəle**	'approach'	**gbèlè**	'evaporate'
kálɔ́xí	'ruin, spoil'	**ceʔelɛ**	'insult'	**kàràŋà**	'conduct'
gbéxɔ́lé	'fabricate'	**suxəri**	'sift'	**tɔ̀rɔ̀xè**	'descend'

3. NOUN TONE MELODIES

Tone	1 syllable		2 syllables		3 syllables	
High[4]	**Ø**		**wérɛ̂**	'money'	**fálɔ́-xâ**	'rock'
High-Mid	**fyáa**	'fish'	**sáru**	'bee'	**búrú-xo**	'bread'
High-Low	**jɔ̂**	'pocket'	**sú-lò**	'floor'	**bárá-xà**	'strength'
Mid	**gba**	'river'	**gba-xa**	'house'	**ŋmɔlə-xɔ**	'dream'
Mid-Low	**jā**	'son'	**fu-ŋɔ̀**	'inside'	**tuxu-rò**	'load'
Low	**cà**	'child'	**pù-lò**	'body'	**fələ̀-xè**	'mat'
Low-High	**Ø**		**gbɔ̲̀-lɔ̂**	'granary'	**ndɔ̀rə̀-xɔ̂**	'yam'

Those nouns with two tones have a consistent pattern of tone assignment. If there is only one vowel or tone-bearing unit (TBU), both tones are linked to the same vowel (see 4a.). If there are two TBU's, each tone is assigned to a separate TBU (4b.), and if there are three TBU's, the first tone is associated with the first two TBU's while the second tone is consistently limited to the final TBU (4c. and 5.).

4. a. **jā** 'son' b. **fuŋɔ̀** 'inside' c. **tuxurò** 'load
ML M L M L

5.						
	búrúxo	'bread'	**nyɔ́ʔɔ́ŋɔ**	'camel'	**séʔénɛ**	'palm nut'
	kerəxè	'field'	**nyaʔəŋà**	'cloud'	**tuxurò**	'load'
	ndɔ̀rə̀xɔ̂	'yam'	**ŋkèrèxê**	'suffering'	**wɛ̀lə̀xɛ̂**	'tree, type'

1.2 COMPLEX WORDS

A large number of words follow the patterns of tone assignment above. However, if they do not follow this pattern one immediately suspects they are complex nouns.

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[3] For an indepth analysis of Sɔ̀cɔ́té tone, see Garber, 1987.

[4] High final nouns are phonetically High-Fall in phrase final positon only. Indefinite suffixes are marked with a hyphen.

Consider **púnyèxɛ̀** 'red clay'. It has two tones but contrary to the tone assignment pattern outlined above, the first tone is assigned only to the first syllable while the second is found on the last two syllables. As a compound word, it is made up of two lexical units, each lexical unit having its own tone melody as seen below.

6. **pú + nyèxɛ̀** 'clay + red'
   H + L

The problematic word **səkâ** 'goat' also violates the tone melody asignment for basic words. Here we have two TBU's and two tones, Mid and Low. Normally, Mid is assigned to the first TBU and Low to the final TBU, but we find here that Mid tone is linked to both the first and second TBU's, evidenced by the Mid-Low pattern on the final TBU. If we suggest that **səkâ** is actually made up of two units that have the same type of phonological parameters as lexical units, then we can propose that the first unit **sə-** possesses a mid tone while **-kâ** has a separate Mid-low tone melody, as shown below.

7. **sə + kâ** 'goat'
   M + ML

With the division of complex words into phonologically defined units, we see our tone melody assignment pattern is not violated after all. As we shall see, this division of complex words into PDU's is further supported by evidence from consonant and vowel behaviour. The chart in 8. shows the 22 tonal combinations discovered in nouns with two PDU's.

8.	Tonal Combination	Word	English
1	High + High	**cə́ + wúlô**	'week'
	High + High-Mid	Ø	
2	High + High-Low	**nə́ + fílɛ̀**	'anus'
3	High + Mid	**mú + nala**	'nose'
4	High + Mid-Low	**ká + tɔ̱ŋɔ̀**	'rust' (? + iron)
5	High + Low	**pú + nyèxɛ̀**	'red clay' (clay + red)
6	High + Low-High	**tə́ + nyùŋ̂**	'stump' (tree + head)
7	Mid + High	**gba + sɔ̱́xɔ̌**	'bedroom' (hut + spend the night)
8	Mid + High-Mid	**pɔ̱ + ndíi**	'nail (French 'pointe')
9	Mid + High-Low	**mɔ + tô**	'motorcycle' (French)
10	Mid + Mid	**ya + gbaxa**	'festival' (thing + drink)
11	Mid + Mid-Low	**ka + pilɛ̀**	'evil' (affair + bad)
12	MId + Low	**ka + cɛ̱nɛ̀**	'good thing' (affair + good)
13	Mid + Low-High	**tu + lèxɛ̂**	'grandfather' (father + old)
14	Low + High	**tùù + tə́nɛ̂**	'hoe handle' (hoe + stick)
15	Low + High-Mid	**dà?à + sɔ́ŋɔ**	'toad'
16	Low + High-Low	**fù + gbélɛ̀**	'basket'
17	Low + Mid	**ŋkù + lexe**	'cockroach' (chicken + eat)
18	Low + Mid-Low	**ŋkà + naà**	'packrat'
19	Low + Low	**kà + cù**	'mouse'
20	Low + Low-High	**vɑ̱à + tòŋ̂**	'cover' (cloth + close)
21	Low-High + Mid	**tùú + korəxo**	'hoe for weeding' (hoe + weeding)
22	Low-High + Low	**kɔ̀rə́ + ntə̱ŋɛ̀**	'tree, type'

2. CONSONANT BEHAVIOUR

2.1 PHONEMES

The consonant chart shown in 9. serves as a quick reference to the consonant phonemes found in Sɔ̀cɔ̀té.

9.

Stops	p	(mp)	t	(nt)					k	(ŋk)			ʔ
	b	(mb)	d	(nd)						(ŋg)		gb (ŋgb)	
Nasals	m		n				ny			ŋ		ŋm	
Laterals			l		r								
Fricatives	f	fy				s							
	v					z				x			
Affricates						c	(nc)						
						j	(nj)						
Glides	w, wy					y							

2.2 BASIC WORDS

Only certain consonants are allowed in medial position in **basic words**, while any consonant excluding /x/, /r/ and /ʔ/, are allowed in word initial position. Frequently these medial consonants are noun class markers, as shown in the words below.

10.	Class	Word		Class	Word	
	1	**cee-wɛ̀**	'woman'			
	3	**gba-xa**	'house'	4	**gba-ya**	'houses'
		nyù-ŋɔ̀	'head'		**nyù-nyô**	'heads'
	5	**co-lô**	'pot'			
		kì-dè	'country'			
	7	**su-rò**	'millet, corn, or sorgho mush'			
		taʔa-na	'roselle plant'			
	8	**ya-mà**	'sickness'			
		tə-be	'medicine'			

The consonants allowed in medial position of basic words because they are noun class markers are **b, d, l, m, n, ny, ŋ, r, w, x** and **y**. Note that all these consonants are voiced, including /x/ which sometimes becomes voiceless in certain environments.

Medial consonants which do not serve as noun class markers are much more limited in number. They are listed below (11) with representative noun and verb examples.

11.		Nouns		Verbs	
	r	**wɛ́ré**	'money'	**pɛ́ré**	'sell'
		búrú-xo	'bread'	**kárí**	'leave'
	x	**bùxù-rò**	'suburb'	**gbéxɔ́lé**	'fabricate'
		fyèxù	'earring'	**sóxí**	'burn'
	l	**calu**	'pig'	**kálá**	'fry'
		bɔ̀lɔ̀-xè	'well'	**kəlɔ̀xè**	'be intelligent'
	ŋ	NONE		**kàŋà**	'foam'
				wɛ́réŋɛ́	'pester'
	ʔ	**lɔʔɔ**	'water'	**céʔé**	'laugh'
		sèʔɔ̀-lè	'large basket'	**sɔʔɔ**	'cook'

Of these five consonants, only /l/ and /ŋ/ (very rarely) may be found in word initial position.[5]

2.3 STRESS

A likely explanation for such a distribution of consonants is stress. Mills (1985) states that in Cebara, a related Senufo language, 'Stress is a demarcative, non-distinctive feature serving as a cohesive factor within the word and occurring once in each basic word. It is realized as a long and fortis articulation of the onset consonant of the stressed syllable, and is an intense articulation of the syllable.' (p. 119) She continues by saying that 'stress always occurs on the first syllable of the basic word.' Thus the first consonant of a word is stressed while all other consonants of a basic word are unstressed. Unstressed consonants, she says, are lightly articulated. It follows, then, that those consonants which can be very lightly articulated, such as **x**, **r**, **ŋ** etc., lend themselves most easily to a lack of stress and are therefore the most likely candidates for word medial position. (Stress will also be seen as a factor governing vowel quality.) Stressed consonants on the other hand, are chosen from a much larger set which includes voiceless and pre-nasalized consonants.

2.4 COMPLEX WORDS

Complex words, however, allow for any type of consonant in word medial position. Examples found on previous pages effectively illustrate this point. We have already seen that initial position is the only place in a basic word where a large variety of consonants is allowed. Two consonants from this larger set, occurring in a word, indicate the presence of two phonologically defined units, and likewise two stressed syllables. The following examples illustrate our point.

The noun **tùúkorəxo** 'hoe for weeding' is a compound word. The beginning of each lexical unit coincides with a consonant (**t**, **k**) normally found only in initial and stressed position of a basic word. Likewise, we can conclude that the beginning of each lexical unit also has a stressed consonant chosen from the large set. Note also that two separate tone melodies operate within the limits of these two lexical units:

13.	**!t**	+ **!k**	Stress and PDU initial consonants
	tùú	+ **korəxo**	'hoe for weeding'
	LH	+ M	Tone

Considering the noun **səkâ** 'goat', we see that it, too, has a stressed consonant (**k**) in medial position at the same phonological boundary that we proposed for tone, thus further confirming the suspicion that **səkâ** has two phonologically defined units:

14.	**!s**	+ **!k**	Stress and PDU initial consonants
	sə	+ **kâ**	'goat'
	M	+ ML	Tone

[5] Some of these consonants represent certain types of transitivizing or causative suffixes or infixes, as shown in these examples:

tɔxì	'descend, intr.'	**tɔrɔxè**	'lower, tr.'
sóxí	'burn, intr.'	**sóróxó**	'burn, tr.'
cé?ɛ́	'laugh'	**cé?əlɛ**	'insult'
tóró	'pass by, intr.'	**tóróxó**	'send, accompany'
wɛ́ré	'be hot, quick, early'	**wɛ́réŋɛ́**	'pester'
kàrì	'turn, intr.'	**kàrəŋà**	'conduct, change, turn around, tr.'

Lack of research, however, does not permit us to propose rules for this phenomenon.

3. VOWEL BEHAVIOUR

If tone and consonant behaviour on basic words are not considered convincing enough evidence of a phonologically defined unit, the reader will find that vowel behaviour will serve as undeniable proof that the basic word has phonologically predictable behaviour and for that reason can be easily distinguished from a phonologically complex word.

3.1 PHONEMES

The vowels of Sɔ̀cɔ̀té are the following:

15.

i				u
	[ə]			[ʊ]
e				o
	ɛ		ɔ	
		a		

Instead of using the terms [+high] and [+low], we shall use [+close] and [+open] for reasons which will become clear in the ensuing discussion.

The centralized vowels are phonetic variants. However, this is not immediately clear as the examples below indicate. [ə] can be contrasted with /i/ and with /e/:

16.

ə/i	**fəle**	'appraoch'	**fílé**	'tamp (a floor)'
	tə́lé	'be straight'	**tile**	'cock's crest'
ə/e	**káátəxə́**	'bridge'	**katexè**	'hunger'
	səxe	'bush'	**sexe**	'birth'
	yənɛ́	'food, type'	**yenɛ́**	'the little thing'

Discussion later in this section will clarify the phonetic status of centralized vowels.

A long vowel is represented by a sequence of two vowels. Long and short vowels are phonetically distinct, as seen in 17.

17.

naàke	'sore'
nãke	'fire'

There are five nasal vowels. In this paper, nasaliity is marked by underlining:

18.

a̲	**waà pa̲w**	'he came'
ə̲	**waa tə̲̀w**	'he is full'
ɛ̲	**waà pɛ̲**	'it is difficult'
u̲	**waà tu̲**	'he is sent'
ɔ̲	**waa kɔ̲̀**	'it is cut'

The matter of nasality is a topic of research by itself with regards to both vowels and consonants. A few remarks will facilitate comprehension of the data presented here. All voiced stops and affricates (except /gb/), and the consonants /w/, /y/, /l/, /r/ and /x/ are followed only by oral vowels, while nasal consonants are only followed by nasal vowels. This is seen in the fact that only the five distinctive vowels listed above, have been discovered after nasal consonants. As a result, vowels after nasal consonants are not marked for nasality. Voiceless consonants and the voiced fricatives v and z (suspected of being underlying Nf and Ns) can be followed by both nasal and oral vowels. On the other hand, any consonant, including nasals, can be preceded by either a nasal or oral

vowel. The centralized vowel, **ə**, however, tends to be nasal preceding any nasal consonant.

3.2 BASIC WORDS

A first glance at vowel behaviour in basic words reveals that numerous words have identical vowels, and those which don't, generally have all back or all front vowels. In fact the only exceptions are verbs with a final /**i**/ and nouns with a final /**u**/. Further investigation shows that basic nouns and verbs have a single specified vowel that is assigned to all the V slots of the word, which then undergoes phonetic changes depending on its position in the word in relation to stress and its proximity to certain consonants. The data below groups together nouns and verbs according to their structure and behaviour. The first set, 19a, contains most of the words with identical vowels. All the words in this group are disyllabic with /**r**/ or /**x**/ as medial consonant. The second set, 19b, with medial consonants other than /**r**/ or /**x**/, has no words with identical vowels except those with /**a**/. In the third set, 19c, trisyllabic words are given. For the sake of comparison, those with /**r**/ and /**x**/ in second position are kept separate from the others. In 19d, words with glottal stops show a slight variation in behaviour, while those in 19e. and f. are verbs with a final /**i**/ and nouns with a final /**u**/ respectively. Indefinite noun suffixes are separated by a hyphen.

19a. Disyllabic with /**r**/ or /**x**/ medial consonant

tə-xe	'tree'	**gbàrà**	'agree'	**su-xo**	'mortar'
ndə̀-xè	'root'	**ka-rà**	'meat'	**ndù-xò**	'odour'
sə-re	'hair, fur'	**lóxó**	'hear'	**lúxó**	'put on (pants)'
je-xe	'soap'	**yo-xo**	'quarrel'	**po-ro**	'banco'
ce-re	'flesh'	**céré**	'be small'	**lɔ-rɔ**	'price'
we-rè	'cold'	**yére**	'wear out'	**pɔ̀rɔ̀**	'Friday'
wɛ-rɛ̀	'leaves'	**tɛ-xɛ̀**	'place'	**cɔ-xɔ̀**	'large pot'

b. Disyllabic with other medial consonant

də́-lé	'pull'	**célé**	'divine'	**fulo**	'push'
fəle	'approach'	**ye-lɛ**	'year'	**sú-lò**	'floor'
jə-de	'breast'	**ŋkè-dè**	'side'	**ŋkùlò**	'chicken'
ci-lè	'thigh'	**fala**	'cultivating'	**ku-dò**	'path'
fílé	'tamp (floor)'	**pàlâ**	'bucket'	**co-lɔ̀**	'pot'
kì-dè	'country'	**kolɔ**	'cough'	**sò-lɔ̂**	'millet'

c. Trisyllabic

tə̀rə̀xè	'lower'	**njèrə̀-ŋè**	'plant type'	**tuxu-rò**	'load'
yə̀rə̀xè	'raise'	**wɛ́rə̀ŋé**	'pester'	**bùxù-rò**	'suburb'
léxə́lé	'tickle'	**yarə-xa**	'thing'	**kúrə́ló**	'crumple'
ŋkèrə̀-xè	'suffering'	**soxɛlo**	'pack'	**fóxə́ló**	'plunder'
sèrə̀ŋè	'press'	**kɔrə-xɔ̀**	'inheritance'	**njɔ̀rə̀xɔ̀**	'mud'
fə̀lə̀-xè	'mat'	**pelə-mɛ**	'premature reaction'	**kúlə́ló**	'yell'
pə̀lə̀-xè	'night'	**velə-ŋè**	'wood shavings'	**nkùlə̀-xò**	'large chicken'
fələle	'crawl'	**cèlə-ŋè**	'trembling'	**cúlúŋɔ́**	'be healthy'
yələxe	'bring out'	**gbèlə̀-xè**	'grass, type'	**mpolə-mɔ̀**	'vine, type'
filə-xe	'type'	**wɛ̀lə̀-xè**	'tree, type'	**jɔlə-xɔ**	'sewing'
ntílə́ŋé	'lean against'	**nyáláŋá**	'get red'	**lɔ̀lə̀-xɔ̂**	'harvesting pole'
yilə-xè	'rodent type'	**fálá-xâ**	'rock'	**wɔləxɔ**	'be smooth'

d. Verbs with a glottal stop

sé²é-nɛ	'palm nut'	**bà²à**	'poison'	**so²o-lɔ̀**	'cooking'
ce²elɛ	'to insult'	**lá²álá**	'to peel'	**ntò²ò-rɔ̀**	'feminine dance'
fɛ̀²è-xɛ̀	'silence'			**lɔ²ɔ**	'water'
cɛ́²ɛ́	'to laugh'			**sɔ²ɔ**	'to cook'

e. Verbs with a final /i/

bɔ̀lì	'respect'	**sárí**	'hang'	**cùxì**	'be deep'
tɔxì	'get down'	**wáləxí**	'rip off'	**fuxəri**	'rummage'
sílí	'begin'	**jiili**	'cross'	**kùrì**	'fold'
cèlì	'spread out'	**gbèlì**	'wound'	**jooli**	'sew'
tèlì	'adapt'	**sóxí**	'burn'	**còrì**	'strangle'
feeri	'urinate'	**fori**	'exit'	**jɔɔxi**	'sharpen'
yɛri	'counsel'	**wɛ́rí**	'be quick'	**cɔ̀rì**	'plant'

f. Nouns with a final /u/

bəlù-u	'slave'	**`mpúlu-u**	'spider'
cìlù-u	'potter'	**pòlù-u**	'catfish'
kélu-u	'green monkey'	**poru-u**	'daughter'
calu-u	'pig'	**kóru-u**	'button'
sáru-u	'bee'	**kɔru-u**	'boat'

g. Other

sɔ́ré	'pound (hulls off grain)'
təra-xa	'grind'
kəlɛ̀	'god'

3.2.1 Consider first the examples in 19a. Disyllabic words with /x/ or /r/ in medial position have identical vowels except for words with [+close] vowels. In the latter case, the first vowel is slightly centralized and the final vowel is slightly more open than the first:

20.	**tə̱xe**	'tree'	**tʊ̱xo**	'carry'
	yɛ̱́xé	'question'	**lɔ̱̀xɔ̀**	'creek'
	tɛ̱xɛ̀	'place'	**cɔ̱xɔ̀**	'large pot'
	gba̱xa	'house'		

All these words indicate the presence of a single specified vowel. Those with identical vowels would have a non-linear representation[6] similar to the one given below:

21.

l r	Consonant tier		
CVCV	CV tier	**lɛ̀rɛ̀**	'hide'
ɛ	Vocalic tier		

The vowel /ɛ/ is first mapped onto the first V of the CV tier, and then it spreads to the second vowel which has no specified vowel of its own.

Words with close vowels require rules to account for the phonetic variation. After the assignment of vowels to vowel slots, the first vowel is slightly centralized (**u** > **ʊ**, **i** > **ə**) and the final vowel becomes slightly more open (**u** > **o**, **i** > **e**). Because of lack of

[6] We are using an approach here proposed by Clements and Keyser (1983).

space, we will not state formal rules here. An example of their application is given below:

22.

t x		t x		t x		
CVCV (**tixi**)	—>	CVCV (**tixɛ**)	—>	CVCV (**təxɛ**)	'tree'	
i		**i** [+o]	[+c]	**i** [+o]		
MAPPING		OPENING		CENTRALIZATION		

3.2.2 The nouns in 19b reflect a slightly different situation. The only words in this group with identical vowels are those with /**a**/. In all other cases, vowels are either all front or all back with the unstressed final vowel being slightly more open than the first vowel. Note also the absence of /ɛ/ and /ɔ/ in the first vowel position as well as the presence of both [ə] and [i] in the same position.

The reason for this may perhaps be found in examining monosyllabic, single tone-bearing unit words in both phrase final and non-phrase final position. The following seven vowels can be found in monosyllabic words.

23.

i	**tì**	'braid, weave'	**lí**	'eat'
e	**ce**	'do'	**pe**	'be bad'
ɛ	**tɛ̀**	'show'	**lɛ**	'be old'
a	**ta**	'receive'	**ca**	'look for'
u	**tu**	'be falling'	**pu**	'swell'
o	**to**	'fall'	**fo**	'emigrate'
ɔ	**tɔ**	'be hairy'	**pɔ**	'tie'

Five of these seven vowels, however, undergo a slight phonetic change when followed by the question marker, **la**. Compare the examples above with 24.

24.

i/ə	**waa lì**	'he ate'	**waa lə̀ la** or **waa lì la**	'did he eat?'
e/i	**kaà pe**	'it's bad'	**kaà pi la**	'it is bad?'
ɛ/e	**waà xə tɛ̀**	'he showed it'	**waà xə tɛ̀ la**	'did he show it?'
a/a	**waà xə tà**	'he received it'	**waà xə ta la**	'did he receive it?'
u/u	**wə ya tù**	'he is falling'	**wə ya tu la**	'is he falling?'
o/u	**waà to**	'he fell'	**waà tu la**	'did he fall?'
ɔ/o	**waà xə pɔ̀**	'he tied it'	**waà xə po la**	'did he tie it?'

In non-phrase final position, the close front vowel **i** becomes slightly centralized, and all other vowels except **a** and **u** are slightly more closed. To be more specific, these vowels which become more close are the partly closed, partly open vowels **e, ɛ, o** and **ɔ**. For ease of labelling we shall call them [+mid][7]. This same phenomenon occurs when monosyllabic verbs are nominalized and given a definite suffix, as seen in 25.

25.

	Verb		Nominalization	
i/ə	**lì**	'eat'	**ndə̀-ŋɛ ~ ndì-ŋɛ**	'the meal'
e/i	**se**	'give birth'	**`zi-ŋɛ́**	'the childbirth'
ɛ/e	**lɛ**	'age'	**`nde-ŋɛ́**	'the age'
u/u	**kù**	'die'	**kù-ŋɛ**	'the death'
o/u	**gbó**	'kill'	**gbu-ŋɛ́**	'the corpse'
ɔ/o	**tɔ**	'be hairy'	**`nto-ŋɛ́**	'the hairiness'

[7] We are not concerned here with what features to assign vowels. We are simply using terms that help to facilitate the analysis. Whether these terms are theoretically adequate needs further research.

The same vowel variation takes place between monosyllabic indefinite nouns (i.e. those which possess no indefinite suffix) and the definite suffixed form.

26.	Indefinite	Definite	
i/ə	**sì**	**sì-ŋɛ ~ sì-ŋɛ**	'life'
e/i	**`mpe**	**`mpi-ŋɛ́**	'rabbit'
ɛ/e	**fɛ̂**	**fê-mbe**	'footprint, trace'
u/u	**fù**	**fù-ŋɛ**	'greetings'
o/u	**tô**	**tū-ŋɛ**	'father'
ɔ/o	**wɔ̀**	**wò-ŋɛ**	'snake'

Comparing the behaviour of monosyllabic words, with regard to their position in the phrase, with that of disyllabic words, we see some striking similarities (27). Take, for example, Row c. of 27. The vowel [ɛ] is allowed only in phrase final position (Columns A and C) or before consonants such as /x/ or /r/ (Col. D). It becomes clear that [ɛ] becomes more close [e] when followed by another consonant either in the same word (Col. C) or in the following word (Col. B).

27.	A	B	C	D
a. **i/ə**	**waa lị̄** 'he ate'	**waa lə̱ la** 'did he eat?'	**fə̱le** 'approach'	**fə̱rè** 'excrement'
b. **e/i**	**kaà pe̱** 'it's bad'	**kaà pi̱ la** 'it is bad?'	**fi̱lé** 'tamp'	**je̱xe** 'soap'
c. **ɛ/e**	**waà xə tɛ̱̀** 'he showed it'	**waà xə tɛ̱̀ la** 'did he show it?'	**pɛ̱lɛ** 'bowl'	**pɛ̱xɛ** 'large bowl'
d. **a/a**	**waà xə tà̱** 'he received it'	**waà xə ta̱ la** 'did he receive it?'	**fa̱la** 'cultivating'	**gba̱xa** 'house'
e. **u/ʊ**	**wə ya tù̱** 'he is falling'	**wə ya tu̱ la** 'is he falling?'	**pù̱lò** 'body'	**tʊ̱xo** 'carry'
f. **o/u**	**waà to̱** 'he fell'	**waà tu̱ la** 'did he fall?'		**tò̱xò** 'leprosy'
g. **ɔ/o**	**waà xə pɔ̱̀** 'he tied it'	**waà xə po̱ la** 'did he tie it?'	**fo̱lɔ̀** 'owner'	**pɔ̱̀rɔ̀** 'Friday'

Considering the evidence, then, it appears that mid vowels become closer whenever followed by a consonant other than /x/ or /r/.

Why are vowels followed by /r/ and /x/ not subject to this vowel closing? Although I am not aware of the feature [+close] for consonants, it would follow logically that since these two consonants are very lightly and quickly pronounced (an English-speaking language learner had difficulty even hearing the articulation of /x/ and since the closure of the mouth is minimal and less so than for the other consonants, the [+close] feature may be assigned to all other consonants except /x/ and /r/.

If we consider the vowels of the monosyllabic words in phrase final position (Column A) to be a reflection of the underlying forms, then we can propose a rule which closes stressed mid vowels when they precede consonants other than /r/ or /x/. It could be stated as follows:

28. Closing V —> [+close]/ —— (#)C
[+stress] [+close]
[+mid]

In non-linear representation, this [+close] feature would spread onto any preceding mid vowel as shown in 29.

29. f l f l
[+cl] [+cl]
CVCV (**fɔlɔ**) —> CVCV (**folɔ̀**) 'owner'
ɔ

As a result of this rule, /ɔ/ and /ɛ/ become [o] and [e] respectively when followed by a [+close] consonant, while /o/ and /e/ become the more close [u] and [i] (but see ahead to trisyllabic basic words).

Other data supporting this rule surfaces when one indefinite suffix is replaced by another. In 30a the Class 5 indefinite suffix (with a close consonant) is replaced by the Class 6 plural suffix (with /r/). In 30b and c, the Class 2 **-xV** suffix is replaced by a Class 5 **-lV** or **-dV** suffix respectively. In each case, the vowels are closer before close consonants than before the consonants /x/ and /r/.

30. a.

jə-de	**jə̀-rəŋii**
kì-dè	**kè-rəle**
ŋkè-dɛ̀	**ŋkɛ̀-rəlɛ**
ce-dɛ	**cɛ̀-rəlɛ**
kù-dò	**kò-ròxi**
wo-dɔ̀	**wɔ̀-rəlɔ**

b.

Class 3, –xV		Class 5, –lV or –dV	
bə̀-xê	'large groundnut'	**bə̀-lê**	'groundnut'
we-xè	'large hole'	**wi-lè**	'hole'
te-xe	'large crest'	**ti-le**	'crest'
pɛ-xɛ	'large bowl'	**pe-lɛ**	'bowl'
su-xo	'mortar'	**sû-dõ̀**	'tiny mortar'
pò-xò	'large body'	**pù-lò**	'body'
fɔ-xɔ	'large credit'	**fo-lɔ**	'credit'
cɔ-xɔ̀	'large pot'	**co-lɔ̀**	'pot'

c.

Class 3, –xV		Class 4, –yV	
tə-xe	'tree'	**ti-ye**	'trees'
sə-xe	'bush'	**si-ye**	'bush'
je-xe	'soap'	**ji-ye**	'soap'
pɛ-xɛ	'large bowl'	**pe-yɛ**	'large bowls'
tɛ-xɛ̀	'place'	**te-yɛ̀**	'places'
gba-xa	'house'	**gba-ya**	'houses'
su-xo	'mortar'	**su-yo**	'mortars'
lò-xò	'stream'	**lù-yò**	'streams'
yo-xo	'quarrel'	**yu-yo**	'quarrels'
jatɔ-xɔ	'roof'	**jato-yo**	'roofs'

Comparison with other Senufo languages supports the hypothesis that the more open and less centralized set of vowels **i, e, ɛ, a, u, o** and **ɔ** serve as the underlying base vowels from which the other phonetic forms are derived. For example, **celè** from Tenere is equivalent to **cilè** of Sɔ̀cɔ̀té, both meaning 'thigh'. According to our analysis, we have

proposed that the [i] in **cilè** is underlying /e/. Tenere does not seem to undergo this closing rule; therefore its cognate displays quite clearly the underlying /e/. In Chart 31. below, each column represents a Senufo language. The words are organized according to the vowel found in Sɔcɔ̀té. Sources of the data are the following: Cebara, Tenere, Suppyire (Côte d'Ivoire) - Langues Gurs de la Côte d'Ivoire, Suppyire (Mali) - Robert Carlson.

31. Cebara (C.I.)	Tenere (C.I.)	Suppyire (C.I.)	Suppyire (Mali)	Sɔ̀cɔ̀té (Burkina)	English
ə/i					
tiige	**tiige**	**cix**	**cigé**	**təxe**	'tree'
jébiligè	**jébiligè**	**jebìlɛx**	**plàge**	**nyəbələxè**	'night'
i/e					
ceelè	**celè**	**cii**	**cyii**	**cilè**	'thigh'
weelè	**wielè**	**wii**	**wyii**	**wilè**	'hole'
léelí	**léelí**	**lìaadi**		**lílí**	'be far'
felege				**filəxe**	'type'
jegè	**jegè**	**jeŋ**	**yĩŋke**	**yiŋè**	'moon'
kate?è	**kate?e**	**kategè**	**katège**	**katexè**	'hunger'
e/ɛ					
jɛɛlɛ	**jɛlɛ**	**jee**	**yyeení**	**yelɛ**	'year'
cɛ̱nɛ	**cɛlɛ**	**cɛri**		**cedɛ**	'calabash'
wagà	**wɛgè**	**wɛŋ**		**weŋè**	'leaf'
cɛrɛ	**cèrè**	**bile**		**céré**	'be small'
u/o					
kologò	**koligò**	**kox**		**kudò**	'road'
solò	**solò**	**dàsòò**		**dàsùlò**	'elephant'
o/ɔ					
ŋɔripilè	**wɔlɔ̀**	**wɔɔr**		**wodɔ̀**	'star'
cɔ́rɔ́	**cɔ́rɔ́**	**cɔ́rɔ**		**cɔ́rí**	'to plant'
sɔ?ɔ	**sɔ?ɔ**	**zyɔ̀?ɔ**		**sɔ?ɔ**	'to cook'

It is clear then from the examination of the basic words given so far, that each word has a single specified vowel which is mapped onto all the V slots of the word, and is then subject to rules which slightly alter the surface form of certain vowels.

3.2.3 Stress. We have included stress as a conditioning factor in the above rules without much explanation. The data presented now will clarify the importance of stress in the formation of rules.

We described above the vowel changes on monosyllabic words with respect to their position in the phrase. We also noted similar vowel distribution in the first vowels of disyllabic words with respect to the type of following consonant. Since monosyllabic words inevitably have stress on their only syllable, and since evidence from the behaviour of consonants both in Cebara and Sɔ̀cɔ̀té suggests stress on the first syllable and lack of stress on all the remaining syllables of the basic word, the similarity of vowel behaviour on the first vowel of disyllabic words and the vowel of the monosyllabic words can be potentially attributed to stress.

By contrast, note the behaviour of the final vowel of disyllabic words. The vowel of monosyllabic words and the final vowel of disyllabic words are both in word final

position. When occurring phrase final, there is no difference in behaviour. In 32, both **pɔ́rɔ́** 'be better' and **fɔ́** 'roast' have a word final [ɔ]. However, when they are both followed by the queston marker **la**, the vowel in **fɔ́** becomes more close, while the final vowel in **pɔ́rɔ́** is centralized.

32. **fɔ́** 'roast' **waa fùùkíí fo la** 'did he roast peanuts?'
pɔ́rɔ́ 'be better' **waa pɔ̀rɔ́ la** 'is he better?'

We can account for these differences in behaviour if we posit stress-conditioned rules:

33. Closing (from 28.)

V —> [+close]/ —— (#)	C	**waà xi fo la**	'did he roast them?'
[+mid]	[+close]		
[+stress]			

34. Centralization

V —> [+centre]/ —— (#)	C	**waa pɔ̀rə́ la**	'is he better?'
[–stress]			

Both these rules can take place in the same consonant and vowel environment; it is stress that influences difference in pronunciation. The examples below show that all unstressed vowels regardless of their quality, are centralized in non-phrase final position.

35.	**e**	**yéré**	'stop'	**waa yèrə̱́ la**	'did he stop?'
		fəle	'approach'	**waa fələ̱ la**	'did he come closer?'
	ɛ	**cɛ́ré**	'be small'	**waa cɛ̀rə̱́ la**	'is he small?'
		célé	'divine'	**waa cèlə̱́ la**	'did he divine?'
	a	**gbàrà**	'agree'	**waa gbàrə̱̀ la**	'did he agree?'
		kálá	'fry'	**waa xə kálə̱́ la**	'did he fry it?'
	o	**tóró**	'pass by'	**waa tòrə̱́ la**	'did he pass by?'
		fulo	'push'	**waà wə fulə̱ la**	'did he push him?'
	ɔ	**pɔ́rɔ́**	'be better'	**waa pɔ̀rə̱́ la**	'is he better?'

Although [ə] is used for all centralizations, it must be noted that a true phonetic representation would show the centralizing vowel at approximately the same aperture of the mouth as the preceding stressed vowel.

3.2.4 Trisyllabic Words. The first syllable of a trisyllabic word is stressed. There is a fortis pronunciation of both the vowel and the consonant. Therefore the first vowel will be subject to rules that concern stressed vowels while the remaining two vowels will be subject to rules that concern unstressed vowels. The second vowel, being in medial position, is consequently subject to the centralization rule (34) because it is followed by another consonant, as seen in 36.

36.

		[+centre]			
lVxVlV —>		lVxVlV —>	**léxə̱́lé**	'tickle'
e		e		
MAPPING		CENTRALIZATION		

Therefore, if the word **léxəlé** 'tickle' itself is in non-phrase final position, we can expect that both unstressed vowels (medial and final) will be centralized, which is the case, as in 37.

37. **waà mɔ léxélé la** —> **waà mɔ léxə̱́lə̱́ la** 'did he tickle you?'

While unstressed vowels of trisyllabic words behave according to these rules, stressed vowels behave somewhat differently in certain environments. Trisyllabic basic words

whose first medial consonant is /l/ behave differently from disyllabic words with a medial /l/. While the latter exclude a preceding [ɔ] or [ɛ] phonetically, the former allow for all eight vowels preceding the /l/, as shown below.

38.	ə	yələ-xe	'bring out'	u	tùlù-xò	'type, ethnic group'
	i	yiləxè	'rodent type'	o	mpolə-mɔ	'vine type'
	e	cèlə-ŋɔ̀	'trembling'	ɔ	jɔlə-xɔ	'sewing'
		velə-ŋɛ	'wood shavings'		lɔ̀lə-xɔ̂	'harvesting pole'
		njélə́-ŋɛ	'large gravel'		wɔləxɔ	'be smooth'
	ɛ	wèlə̀-xɛ̀	'tree type'			
		gbɛ̀lə̀-xɛ̀	'plant type'			
	a	fálə́-xâ	'rock'			

Examining these examples more closely, we note certain restrictions in distribution. Of the four mid vowels **e, ɛ, o,** and **ɔ**, only [ɛ] and [ɔ] occur in words with medial consonants /l/ and /x/ while only [e] and [o] occur in words with /l/ followed by a nasal consonant. Therefore it appears that /x/ blocks the Vowel Closing rules (27) even at a distance. This new information requires a modification of the Vowel Closing rule 27.

39. Closing: V —> [+close]/ ——— # C (V C)
[+mid] [+cl] [+cl]

3.2.5 Exceptions. Glottalized words behave differently. At this point formal rules will not be attempted. In disyllabic words, mid vowels are open: [ɔ] and [ɛ]. In trisyllabic words, mid vowels are always the closer [o] and [e] regardless of the type of medial consonant. See 19d. for examples.

Finally, there are a few sets of basic word with apparently two specified vowels. The final [u] of the nouns in 19f., however, has a consonantal source. All nouns with final [u] belong to Class 1, whose historical **–w** suffix is almost non-existent today. The noun **cee-wɛ̀** 'woman' is the only example in our data. Therefore we suggest that the final [u] is a result of the spread of the [+back] feature of /w/ to the vowel, along with the consonant deletion, resulting in a single close back vowel [u]. This is illustrated in 40:

40. **calV–wV** —> **caluwV** —> **caluu** 'pig'

Thus the final [u] of certain nouns is not actually a specified vowel but rather a result of the spreading of features of /w/ to the V slot and a deletion of the C slot.

The final [i] on a large set of verbs (19e) is not so easy to account for. It also possibly results from a deleted consonant such as /y/, but I have not found any evidence to support this.

There are a few words whose first vowel is [ə] but whose second vowel is a fully specified vowel (19g). There are two possible solutionss. The first is to posit two specified vowels, both the [ə] and the second vowel. The second is to propose that a fully specified vowel in the second V slot is the result of a shift in the placement of stress from the first to the second syllable. The latter solution is not totally satisfactory, however, since stress affects both consonants and vowels, and the stressed consonant remains the initial consonant of the word. The matter awaits further research.

3.3 COMPLEX WORDS

The basic word or phonologically defined unit has, for the most part, only one specified vowel. Words with two or more PDU's have one specified vowel per PDU.

Below are a few examples of words with two PDU's each with its own specified and stressed vowel.

41.	**nàm + pɔŋɔ**		'stranger'
	cé + fólɔ̂	(divine + owner)	'diviner'
	ká + fórô		'eggplant'
	tu + lèxê	(father + old)	'grandfather'
	ka + fuxò		'heat'
	ka + texè		'hunger'

4. SUMMARY

We have examined a unit in Səcəté that has specific tone, consonant, vowel and stress parameters. It also tends to be a single lexical unit, but in certain cases it is less than a lexical unit, while in nouns it includes the indefinite suffix. We have called this unit a phonologically defined unit, because it is defined in phonological terms. Each unit has a single tone melody, a single stressed syllable, a single specified vowel, and if there is a medial consonant, it belongs to a very restricted set of consonants, three of which are excluded from the initial position of a PDU, /r/, /x/ and /ʔ/. All these factors need to be considered when determining the number of PDU's in a word.

Let us consider these factors in the analysis of several words. The word **nɔ̀ + kàrâ** is a compound word meaning 'cow + meat'. As 41 shows, it is a word with two stressed syllables, with two consonants allowed in PDU initial position, and two specified vowels. Since the tone pattern mimics the Low-High melody of certain single PDU's, it is difficult to independently ascertain two distinct tonal melodies. However, the stress, consonant and vowel evidence clearly indicate two distinct PDU's.

42.	**nɔ̀**	+	**kàrâ**	'beef'
	!		!	stress
	ɔ		a	specified vowels
	n		k	PDU inital consonants
	L		LH	tone melodies

The word **màrə̀ + fa** 'gun' is borrowed from Dioula. It's vowel behaviour does not indicate two separate PDU's. In this case, stress, consonants and tone indicate the division of the two PDU's.

43.	**màrə̀**	+	**fa**	'gun'
	!		!	stress
	m		f	PDU initial consonants
	L		M	tone melodies
	a		a	specified vowels

The word **kàlaxa** 'sorghum', though not a borrowed word does not have any lexically distinct parts. We note also that both medial consonants /l/ and /x/ are permitted for basic words. In addition, there is only one distinct vowel, /a/. One might assume that **kàlaxa** is a basic word, with only one PDU. There are two clues, however, that indicate that it has two PDU's. Firstly, the second vowel is a fully articulated [a]. We have already pointed out that an unstressed non-phrase final vowel is centralized. If **kàlaxa** was a single PDU, then the second vowel should have been centralized. Thus this second fully articulated vowel indicates placement of stress on the second syllable in addition to the first. Secondly, since there are no known basic words with a Low-Mid tone melody, one can assume that the tonal pattern also indicates two separate PDU's:

44.	**kà**	+ **laxa**	'sorghum'
	!	!	stress
	L	M	tone melodies
	a	a	vowels
	k	l	PDU initial consonants

From this example we suggest that even if tone, vowel and consonant behaviour do not clearly distinguish the PDU's, the effects of stress on vowels (and possibly consonants) will always make clear the number of PDU's in a phrase.

5. THEORETICAL CONSIDERATIONS: THE PHONOLOGICAL WORD

Having defined a phonologically simple word as containing a single phonologically defined unit, while a phonologically complex word contains two or more PDU's, what shall we then call this phonological unit?

Historically the phonological paraameters of a simple word ususally corresponded fairly exactly to the lexical parameters. However, today we have a situation where historically compound words are no longer identified as such, and many borrowed words, while having a phonological structure of a compound word have only a single lexical unit.

Since phonological changes take place with respect to these phonological parameters, this domain must be identified and accounted for in the theory. In non-linear phonological theory, the term **phonological word** is coming into use. It is distinguished from the term 'word', which has a morpho-syntactic definition. Van de Hulst (1984) states that the 'PhWord' and the 'word may but need not be isomorphic.' (p.8) It may be larger than the morphological word including such things as clitics, or it may be smaller. A commpound word, for example, may have two phonological words.

In the literature the PhWord has been used with respect to stress placement, as well as to identify a domain for certain phonological phenomena which take place in a domain that is smaller than the morpho-syntactic word domain (Booij, 1984; Nespor, 1984). In Senufo, we are also dealing with a domain that may be but is not necessarily smaller than a morpho-syntactic word, and that is defined primarily in phonological terms. We shall call this phonologically defined unit or domain, a phonological word.

The phonological word in Senufo is the domain for stress assignment, tone assignment, and vowel assignment. It is also the domain that defines the distribution of consonant types with respect to stress. A morpho-syntactic word will not have less PhWords than lexical units, if we do not consider the indefinite suffix a lexical unit. At every lexical boundary, one will also find a PhWord boundary, but a lexical boundary will not necessarily be found at every PhWord boundary. Rules affecting vowel changes refer to both stress, a phenomenon of the PhWord domain, and to syntactic phrase boundaries. How all this would be dealt with more formally in non-linear phonological theory requires further exploration.

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