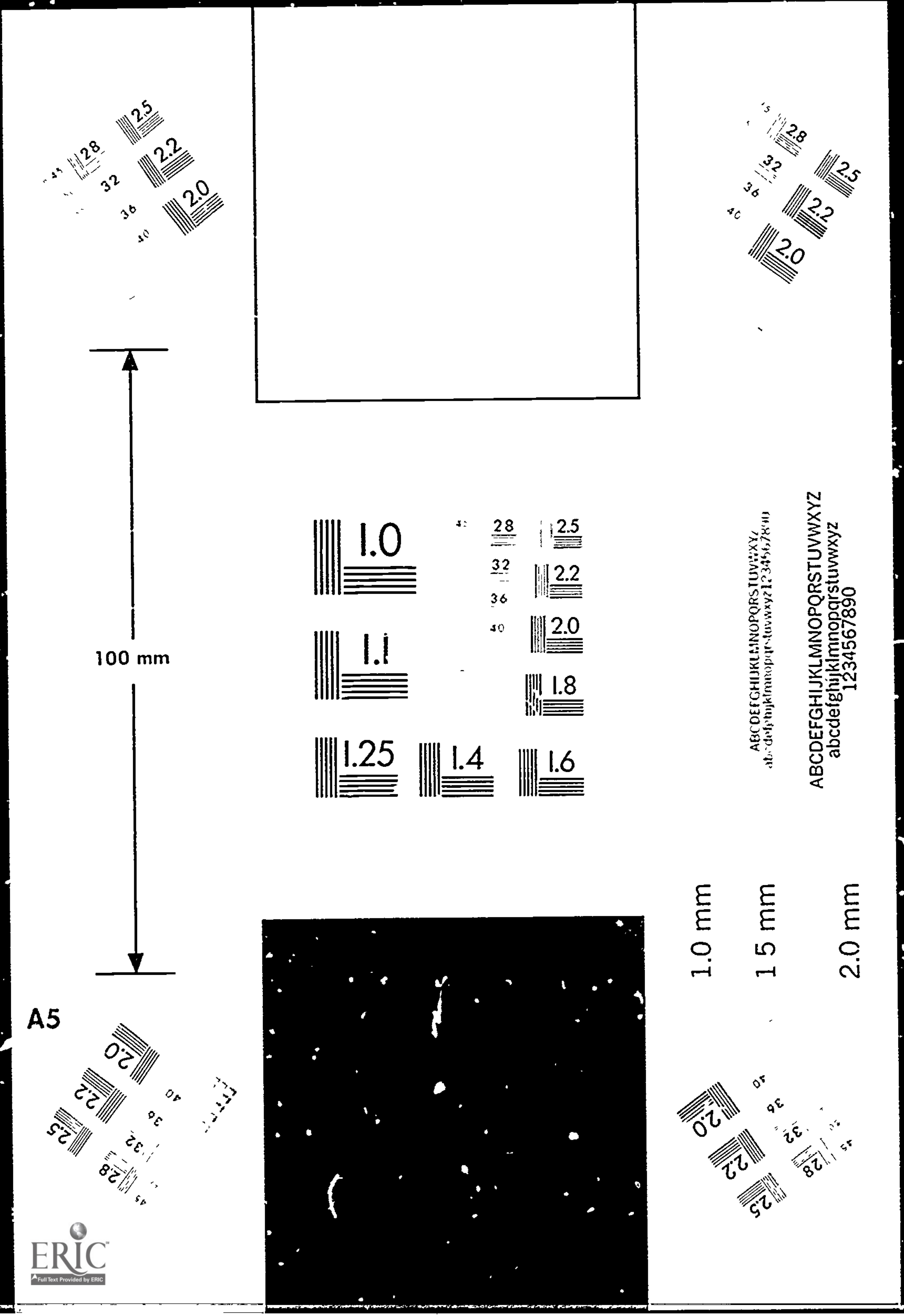
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ABSTRACT

A structural analysis provides new evidence concerning the internal structure of the syllable in Wolof, a West African language, through examination of the secret code called Kall, spoken mainly in Senegal's Ceneba area. It is proposed that Kall is better described as involving primarily a reduplication of the prosodic word. The first section examines Wolof syllable structure, detailing the surface syllable types, the representation of complex segments, and the syllabification principles of the language. The second section describes the different types of Kall and the phonological and morphological processes taking place. It also provides a prosodic analysis of the secret code, stressing the role of the syllable and the phonological word. The importance of secret code varieties in confirming the internal structure of the syllable in Wolof is shown. In particular, independently phonological rules (such as schwa insertion, glottal stop insertion and degemination) are shown to operate in the building or rebuilding of syllables of the secret code. (MSE)

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by

Omar Ka

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WOLOF SYLLABLE STRUCTURE: EVIDENCE FROM A SECRET CODE

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Secret languages and language games have been shown to provide new insights into the syllable structure and the morphology of a wide variety of languages (cf. Yip 1982, McCarthy 1982, 1984, 1985, Yin 1984, McCarthy and Prince 1986, among others). In particular, Yip (1982) has described Chinese secret languages as being cases of reduplication using a C-V skeleton; McCarthy and Prince (1986) have proposed to consider language games cross-linguistically as involving reduplication of prosodic categories such as prosodic word, foot, syllable, light (monomoraic) syllable, heavy (bimoraic) syllable, and core syllable.

In this paper, I will first attempt to give new evidence pertaining to the internal structure of the syllable in Wolof - a West African language belonging to the Northern West Atlantic branch of the Niger-Congo family (cf. Greenberg 1963) -, through the examination of a secret code called Kàll and spoken mainly in the Ceneba area in Senegal. Second, I will propose that Kàll is better described as involving primarily a reduplication of the prosodic word, an approach very much along the lines of McCarthy and Prince's (1986).

Section 1 examines Wolof syllable structure, detailing the surface syllable types, the representation of complex segments and the syllabification principles of the language. Section 2 describes the different types of Kàll and the phonological and morphological processes that take place. It also provides a prosodic analysis of the secret code, stressing the role of the syllable and the phonological word. I then conclude.

1. Wolof Syllable Structure

1.1 Surface Syllable Types.

On the surface, underived or uninflected lexical items belong to the following types (assuming that in Wolof the existence of a syllable is triggered by the occurrence of a V or VV element: cf. Ka 1988):

a.	CV	ba	"to abandon"
	V	fo	"to play"
	σ	ji	"to plant"
		we	"fingernail"
b.	CVV	ree	"to smile"
	V	saa	"moment"
	σ	yoo	"mosquito"
		daa	"ink"

c. CVC bañ "to refuse"

?ub "to close"
def "to do"
nit "human being"

d. CVCC mujj "to be last"

sedd "to be cold"
bokk "to share"
fatt "to plug"

e. CVVC baat "neck"

door "to start"
meew "milk"
ñuul "to be black"

In addition to the monosyllabic types mentioned above, the following disyllabic types are met:

f. CV CV

muyu "to greet"
bale "broom"
suba "morning"
tali "pavement"

g. CV CVC

dugub "millet"
jabar "wife"
rafet "to be beautiful"
polis "police"

h. CVC CVC

dëwlin "cooking oil"
?askan "ancestry"
bëccëg "daytime"
fuddën "henna"

i. CVV CVC

feebar "to be sick"
xaalis "silver, money"
poobar "black pepper"
taabal "table"

j. CV CVVC

bagaas "luggage"
dimaas "Sunday"
boroom "owner"
gunóór "insect"

k. CVV CV

?aada "custom"
caabi "key"
diiné "religion"
paase "to iron"

1. CVC CV fitnë "suffering"

bolde "big stick"
marto "hammer"
dolli "to add"

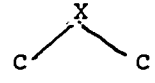
The examination of these surface syllable types reveals the presence of complex segments such as long vowels and geminate consonants (as I will show below, there exist also prenasal consonants). Several questions pertaining to the representation of those segments immediately arise, i.e., should they be seen (1) as two slots on the CV-tier linked to two elements of the segmental tier, or (2) as a single element on the segmental tier linked to two slots on the CV tier, or (3) as a single slot on the CV-tier linked to two elements on the segmental tier?

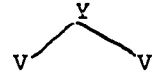
These questions are crucial to the understanding of Wolof syllable structure; I deal with them in the next section.

1.2. The Representation of Complex Segments.

1.2.1. Geminate Consonants and Long Vowels.

Geminate consonants and long vowels are treated in Wolof as simple elements of the segmental tier that are linked to two consecutive slots on the CV-tier, in accordance with the Obligatory Contour Principle (cf. discussion in Ka 1985, 1988):

(1) a. 

b. 

The OCP in effect prohibits sequences of adjacent identical elements such as those shown in (2) below:

(2) a. 

b. 

1.2.2. Prenasal Consonants.

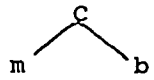
Prenasal consonants may occur in syllable-initial or syllable-final position, as is shown in m. and n. respectively:

m. ndaa "water pot"
ndey "mother"
ngooñ "cattle food"
mbedd "street"
ndënd "drum"
funki "to balloon"

n. démb "yesterday"
bant "stick"
donj "grain"

I propose to treat prenasal consonants in terms of one-to-many associations between a single element of the CV-tier and a sequence of elements on the segmental tier. In the case of /mb/ for instance, the following representation will obtain:

(3)



A one-to-one association will be ruled out:

(4)

Several arguments may be given in support of (3). I sketch them below, referring the reader to Ka (1988) for a detailed discussion of each argument:

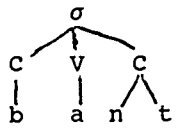
a. in contrast with geminate consonants, prenasals may appear in word-initial position;
b. a VV may appear before a prenasal consonant either underlyingly or as a result of a vowel coalescence rule: this is never the case before a geminate where only a single V is possible;
c. while a schwa insertion rule always applies between a geminate and a following simple consonant, it does not between a prenasal and a following simple consonant;
d. in the case of prenasals, there is no phenomenon analogous to degemination.

Notice that (somewhat weaker) counterarguments can be given in favor of the one-to-one association in (4) (cf. Ka 1988).

I now turn to the description of the syllabification principles that explain the surface syllable structures detailed in 1.1.

1.3 Syllabification Principles.

In agreement with Clements and Keyser's (1983) approach to the syllable, I will identify three tiers in syllable representation: the segmental tier, the syllable tier and the CV-tier, which is intermediate between the first two. The elements of the CV-tier divide themselves into syllable peaks and syllable margins. A syllable peak represents any segment dominated by a V, and a syllable margin any segment dominated by a C. Thus, in bant, [a] represents the syllable peak and [b,nt] the syllable margins (respectively left and right margins):



In CV terms, the syllable structure of Wolof lexical items obeys the following syllabification principles:

1. the syllable peak may consist of a short vowel or a long vowel: the contrast between them is represented in terms of non-branching vs. branching nodes on the syllable tree;
2. each syllable begins with a consonant, hence the syllable left margin is an obligatory constituent: it consists of either a simple consonant or a prenasal;
3. the syllable right margin is an optional constituent: if it is present, it may consist of a simple consonant, a geminate, or a prenasal;
4. neither the syllable left margin nor the syllable right margin may consist of a sequence of consonants that is not a geminate or a prenasal structure.

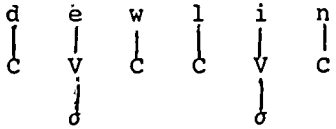
A number of arguments, language-external as well as language-internal, can be given to justify the existence of the above syllabification principles, among them native speaker intuitions, slow speech, the behavior of words borrowed from other languages, linguistic games or secret codes. The argument pertaining to borrowed words, (probing in particular the reality of syllabification principle 2) is detailed in Ka (1988). In this paper, I will concentrate on the evidence provided by the Wolof secret code Kàll.

The next question that needs to be answered is how syllable structure gets assigned to the CV-tier. Following Clements and Keyser's (1983) algorithm, I will posit the following steps in the mapping process:

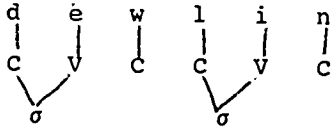
(5) a. prelink a V or a VV to the node σ;
b. attach to σ all preceding C_S which do not violate the constraints on possible syllable-initial C_S;
c. attach to σ all following C_S which do not violate the constraints on possible syllable-final C_S.

In the case of Wolof, possible syllable-initial consonants are simple and prenasal consonants. Possible syllable-final consonants are simple, geminate and prenasal consonants. The steps in (5) are illustrated in (6) below:

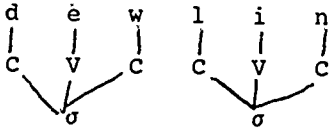
(6) a.



b.



c.



(6a) corresponds to the initial step in (5a). (6b) gives /de/ and /li/ as syllables; notice that /w/ cannot be adjoined to /li/ because the syllabification principles of the language prohibit syllable-initial consonant clusters. (6c) corresponds to the final step in (5c).

After this introduction to Wolof syllable structure, I will now turn to the examination of the different types of Kàll and their analysis.

2. Types of Kàll.

Kàll refers to a secret code used for various purposes related to a need for unintelligibility; for instance, it was used in precolonial times by the king to communicate with his people without strangers or foes understanding; during the colonial period to prevent representatives of the colonial power from knowing the intentions of the colonized; still today to treat appropriately a guest without his prior knowledge. Kàll is routinely used in the areas of Ceneba and Silmaxa, in the Kajoor-Bawol region of Senegal.

On the surface, the different varieties of Kàll seem to involve such phonological or morphological processes as transposition, insertion, deletion, reduplication and infixation. I will describe each of the varieties and I will try to show that in fact they involve only two major processes: true transposition and reduplication of a designated prosodic category.

2.1 True Transposition.

Consider the following data, in which the sentences are unaltered:

(7)	jaay	ma	yàpp[1]	"sell me (some) meat"
	sell	1 p.s. obj. pro.	meat	

(8) ma yóbbu ko sama kër "I bring it (to) my home"
1p.s. bring 3p.s. 1 p.s. home
sub. pro. obj. pro. poss.

(9) jox ko sama jabar "give it (to) my wife"
give 3 p.s. 1 p.s. wife
obj. pro. poss.

(10) mu toggu ko "she cooks it"
3p.s. cook 3p.s.
sub. pro. obj. pro.

(11) samay doom lekk "my children eat"
1p.s.-plural child eat
poss.

Compare now (7) through (11) to the corresponding "secret" forms in (12) through (16):

(12) yë ma jaa pë yaa

(13) ma buko yoo masa rëkë

(14) ko jo masa barja

(15) mu guko too

(16) masa mëdoo kële

The "secret" forms all involve a transposition of a CV or CVV syllable from initial to final position within a prosodic word. A prosodic word is constituted by a lexical item followed by an optional clitic. If the clitic precedes, it will form a separate prosodic word (this is exactly parallel to the definition of the phonological phrase in Wolof: cf. Ka 1988, Ka and Kisseberth to appear). The bracketing will look like this:

(17) [jaay ma] [yàpp] → [yë ma jaa] [pëyaa]

(18) [ma] [yóbbu ko] [sama] [kër] → [ma] [bu ko yoo] [masa] [rëkë]

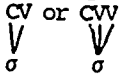
(19) [jox ko] [sama] [jabar] → [ko jo] [masa] [barja]

(20) [mu] [toggu ko] → [mu] [gu ko too]

(21) [samay] [doom] [lekk] → [masa] [mëdoo] [kële]

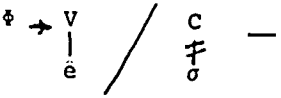
The next problem is the characterization of the transposed syllable. Notice that it is not the <u>original</u> syllable that is transposed, but just a part of it (namely the peak and the left

margin). Interestingly, that part coincides with the "minimal" syllable in Wolof, i.e., CV or CVV



(recall syllabification principle 3 which states the optionality of the right margin). Following McCarthy and Prince (1986), the "minimal" syllable will be equated to the core syllable σ_c.

Now the transposition of σ_c will leave the right margin (if any) of the original syllable in the position of a left margin; in order to be syllabified, that left margin needs a peak. A rule of schwa insertion will apply:

(22) 

This rule is independently motivated: in the derivational morphology of Wolof, it applies between a stem ending in a geminate consonant and a suffix beginning with a consonant. Consider the following alternations (cf. Ka 1985, 1988):

(23) lə̀kk "to speak"	làkk[e]kat "speaker"
togg "to cook"	togg[ë]kat "cook"
napp "to fish"	napp[ë]kat "fisherman"
rëbb "to hunt"	rèbb[ë]kat "hunter"

(22) is illustrated by the data in (12), (13) and (16).

Finally, if the right margin of the original syllable was a geminate consonant, it will degeminate in its new left margin position, in conformity with syllabification principle 2 which allows only a single C in syllable-initial position. Thus:

(24) yàpp → pëyaa
lekk → kèle

To summarize, the true transposition variety may be characterized as involving the transposition of the syllable core from the left end to the right end of the prosodic word[2].

2.2 Reduplication.

I will distinguish two varieties of Kàll involving reduplication of a prosodic category, one entailing apparent transposition, and the other apparent infixation. I will examine each variety in turn.

2.2.1. Transpositior and Reduplication.

Consider the following data:

(25) ?ay ma jaa ?app yaa

(25) is the secret form corresponding to the unaltered sentence in (7). The parsing of (25) into prosodic words will be as in (26):

(26) [?ay ma jaa] [?app yaa]

Apparently, the syllable core σ_c is transposed from the left end to the right end of the prosodic word, in a manner similar to true transposition. However, in the case of (25), σ_c leaves behind a "trace", i.e., a copy of a mora (followed of course by the original right margin). Wolof distinguishes light and heavy syllables, a light syllable containing one V and a heavy syllable two Vs. (cf. the analysis of stress in Ka 1988). Assuming a light syllable to contribute one mora and a heavy syllable to contribute two moras, one would have expected the copied vowel to be heavy, i.e., to contribute two moras, but obviously it is not the case. How to explain this situation?

Notice first that this is not unusual in many languages: cf. for instance, Sanskrit verb reduplication (Steriade 1982, McCarthy and Prince 1986), Ponapean durative verb reduplication (McCarthy and Prince 1986), Southern Paiute reduplication (McCarthy 1983). Second, if we view this reduplication of only one mora in terms of a partial loss of information, we would be able to draw an interesting parallel with the situation in Masa, a secret language based on Taiwanese (cf. Yip 1982): in this language, the base tone is replaced by 5 and 2:

(27) ma3 → ma5 sa2
ti 5 → ti5 si2
kun 31 → kun5 sun2

Third, if we were to consider (25) as a case of rhyme transposition, we would not be able to give a satisfactory account of the short vowel in ?ay and ?app: the vowel length of the base is not preserved.

A possible solution to the mora problem is to adopt a modified version of McCarthy and Prince's (1986) Copy-Base Complementarity Principle:

(28) If the base is heavy, consider the copy as light.[3]

The application of (28) will yield the correct result in (25).

A residual problem is that of the left margin: the transposition of the core syllable has left the copied mora and the right margin without a left margin. Since syllables in Wolof must have left margins (cf. syllabification principle 2), the empty position in word-initial position is filled with an epenthetic glottal stop:

(29) $\phi \rightarrow ? \; / \; [_{wd} \; -$

(29) is independently motivated: it operates as a default rule on borrowed words that are vowel-initial (cf. Ka 1988). The rule is illustrated by the following borrowings from French:

(30) ?ordonaas "prescription" (from: ordonnance)
?oto "car" (from: auto)
?afeer "business" (from: affaire)
?eleew "student" (from: élève)
?isin "factory" (from: usine)

The transposition and reduplication variety may then be characterized as involving a monomoraic copy of the transposed σ_C.

2.2.2. Infixation and Reduplication.

Consider the following data:

(31) jaray mara yara pere

(32) jalfay malfa yalfa pelfe

(33) jancay manca yanca pence

(34) jañatlañay mañatlaña yañatlaña peñetleñe
(ñ represents the velar nasal /ŋ/)

Superficially, (31) through (34) seem to involve the insertion of C_s after the peak of every syllable of the base; those C_s are followed by a copy of the preceding V. These configurations are found in languages as diverse as Cuna, Javanese, Saramaccan Creole, Tagalog (cf. McCarthy 1982), English, German (cf. McCarthy 1984, McCarthy and Prince 1986).

A prosodic analysis of the data would take the following steps:

(35) a. determine a core syllable $\begin{matrix} C & V \\ & \vee \\ & \sigma \end{matrix}$;

b. prespecify on a different tier[4] a melody consisting of fixed consonants;

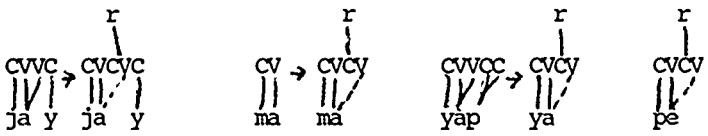
c. spread the peak of the core syllable to all available V-slots, from left to right.

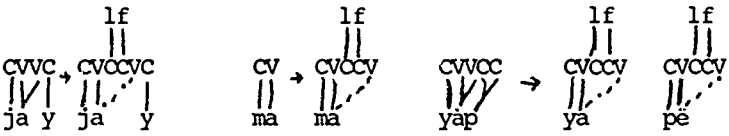
At each step, different processes will be involved. (35)a will entail the transfer of an original right margin to a left margin position (triggering degemination); schwa insertion will then operate, to provide a peak to the new left margin (cf. section 2.1):

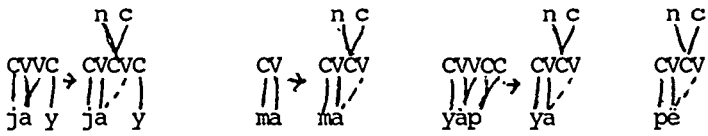
(36) yàpp → yara përë
→ yalfa pëlfë
→ yanca pëncë
→ yaʼatlaʼa pëʼëtlëʼë

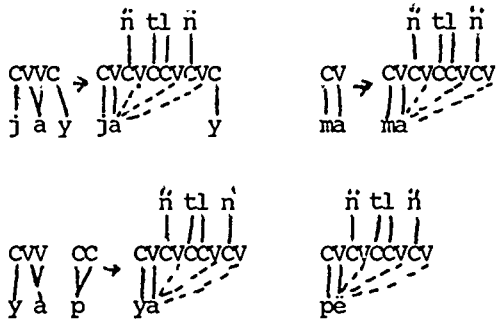
(35)b has the property of taking precedence over any melodic element that is not part of the core syllable, namely the right margin (cf. Marantz 1982, McCarthy and Prince 1986). Thus, r in (31), lf in (32), nc in (33), ʼ t l ʼ in (34) will be associated before y (the right margin of jaay) in the "secret" forms jaray, jalfay, jancay, jaʼatlaʼay.
(35)c provides a peak to the prespecified consonants that have become left margins.

The representations in (37) through (40) illustrate the application of the steps in (35):

(37) 

(38) 

(39) 

(40) 

Tier Conflation will then apply to the above representations,

"linearizing" the original and the infixed melodies on a single tier, and yielding the sentences in (31) through (34) after resyllabification. Resyllabification always applies in accordance with the syllabification algorithm, as a means to preserve syllable well-formedness (cf. discussion in Ka 1985, 1988).

At this point, one needs to answer a central question about the nature of the prosodic category that is involved in this type of Kàll. Consider first a language game in English and German (called Chicken language) that bears striking resemblances with the Wolof variety. The data come from McCarthy 1984, and McCarthy and Prince 1986, and are given in (41) a and b:

(41) a. Secret languages are fun (English)
sihiləfi krəthətləfət ləjhäɹləfəj gwIjhIjlə
fIj æhəzləfəz arharləfər fənhanləfən

(41) b. Ein gutes Wort findent einen guten Ort (German)
Einheinlefein guhulefu testheslefes
worthortlefort finhinlefin dethetlefet
eiheilefei nenhenlefen guhulefu tenhenlefen
orthortlefort

McCarthy and Prince (1986) analyze this language game as involving a fixed initial consonant, h in one copy and f in the other (the syllable lə ultimately cliticizes). They propose that "the language game is operating separately on virtual words (se, cret), the individual syllables of the real word secret" (p. 75). This is exactly parallel to the Wolof case, where each syllable of the original form triggers a separate phonological word in the "secret" form. Furthermore, each phonological word is constituted by one binary (left-branching) foot (as in (42)) or two binary feet (as in (43))[5]:

(42) [ja ray] [ma ra] [ya ra] [përe]
V V V V
F F F F

(43) [jañatlañay] [mañat lañá] [yañat lañá]
V V V V V V
F F F F F F

[pëñëtlëñé]
V V
F F

To explain this regularity, one could invoke the Uniformity Parameter of McCarthy and Prince (1986), which requires all feet to have the same labelling within the word: in the Kàll variety examined here, all feet are binary within the phonological word.

Taking into account these facts, it is then possible to treat the Kàll variety as an instance of word reduplication, just as in the Chicken Language Game.

3. Conclusions.

We have seen the importance of secret code varieties in confirming the internal structure of the syllable in Wolof. In particular, independently motivated phonological rules (such as schwa insertion, glottal stop insertion and degemination) are shown to operate in the building or rebuilding of syllables of the secret code. A second important point was to emphasize the central role of prosodic categories such as core syllable, foot and prosodic word in understanding the prosody of the secret code: that prosody generally involves reduplication of one prosodic category within a particular secret code variety.

FOOTNOTES

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1. The phonological system of Wolof vowels is depicted below:

	Front	Central	Back
High	i		u
Mid	é	ë	ó
	e		o
Low		a	

Only ë /ə/ has no corresponding long counterpart. à is a notational device representing the vowel /aa/ before geminate and prenasal consonants.

2. An alternative analysis would consider true transposition as simply involving the copying of a prosodic word, in light of the data in (17) through (21): cf. McCarthy and Prince (1986).

3. Of course, this principle will not apply to languages like Lardil or Mokilese, where reduplication copies a long vowel as long.

4. I assume that a melodic matrix belongs to a different tier if and only if it belongs to a different morpheme (cf. Steriade 1986). Therefore, r, lf, nc, ntln are infixed morphemes.

5. I refer to the analysis of Wolof stress in Ka (1988).

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