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CONSONANT MUTATION IN SEEREER-SIIN*

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This study presents a description and analysis of stem-initial consonant mutation within the nominal system of Seereer-Siin, a West Atlantic language closely related to Fula. Two distinct mutation patterns are isolated. The first consists of a voiced stop—voiceless stop—prenasalized stop set of alternations, while the second is a Fula-like pattern consisting of continuant—stop—prenasalized stop alternations. Consonant mutation is shown to be the result of the prefixation of a class marker that contains a floating autosegment which associates to an underspecified stem-initial consonant. Both mutation patterns occur in the same morphological environments, thereby presenting a potential problem for an autosegmental analysis: e.g., How can we account for the occurrence of continuants and voiced stops in the same environment? By positing different underlying forms for each of the mutation patterns we show how consonant mutation in Seereer is quite complex but also more regular than previously thought.

1.0 Introduction

Seereer-Siin[1], a West Atlantic language most closely related to Fula, is characterized by a complex system of consonant mutation that pervades the nominal and

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[1] There are four main dialects of Seereer, which is spoken by approximately seven hundred thousand people in the west central area of Senegal and parts of coastal Gambia. Seereer-Siin is spoken in the inland area of Senegal that corresponds to the precolonial kingdom of Sine (Siin) and surrounding areas, including the city of Kaolack and the towns of Fatick and Diakhao (Jaxaaw).

(continued...)

verbal morphology of the language. Mutation in verbs is conditioned by number, and is thus limited to a binary set of alternations reflecting singular and plural forms, as illustrated in (1).

(1) a. *a-xon-a* 's/he died'[2]
a-nGon-a 'they died'

b. *a-ga?-a* 's/he saw'
a-nga?-a 'they saw'

Mutation in nouns is conditioned by the class for which a noun is specified, and stems may show up to three alternations, as illustrated in (2).

(2) a. 'village'

saax	Class 5	singular
a-caax	Class 4	plural
o-njaax	Class 12	diminutive singular

b. 'horn'

o-jan	Class 10	singular
xa-can	Class 11	plural
fo-njan	Class 13	diminutive plural

While consonant mutation in the various dialects of Fula has been well described [e.g., Klingenheben 1963, Arnott 1970, Anderson 1976, Sylla 1982, Lieber 1984, Paradis 1986], these numerous descriptions and analyses seem to

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Seereer has borrowed heavily from Wolof, especially towards the northern extent of the Seereer-Siin speaking area which borders on the Wolof heartland, and in urban areas that are undergoing wolofisation—the adoption of Wolof as the dominant language.

A subgroup of Northern West Atlantic languages, originally thought of as a series of Seereer dialects, was reclassified by Pichl [1966] as a distinct group, thereby corroborating what native speakers had implicitly reported, namely that those languages are only very distantly if at all related to Seereer. Pichl gave them the name Cangin languages after their common name for the city of Thiès, in and around which they are spoken. They include Safen, Lehar, Non, and Ndut, which, along with their speakers, are still commonly referred to as Seereer, causing some confusion in the literature. In Sapir's [1971] classification the Cangin Languages and the Senegal Languages, along with the Bak Languages, the Eastern Senegal-Guinea Bissau languages, and a fifth, nameless category of languages, go to make up the Northern Branch of West Atlantic. Because the term Seereer is commonly used to refer to the Cangin languages and their speakers, official studies such as the 1988 Senegalese census give figures for ethnicity and language that do not differentiate between the two groups. Consequently, the figure of approximately 700,000 speakers is only an estimate based on the total figure of 929,360 Seereer speakers, or 13.7% of the Senegalese population, reported in the census. [République du Sénégal: 1989]

[2] *a-* is the third person marker, *-a* a perfective marker.

have actually hindered research on consonant mutation in Seereer. Most accounts of the latter [Sapir 1971, Fal 1980] go no further than attempting to extend the familiar Fula pattern of a three-way (continuant-stop-prenasalized stop) mutation system to Seereer, with only limited success. The purpose of this paper is to provide a description and an analysis of consonant mutation in Seereer, showing that there are two distinct mutation patterns operating in the morphophonology of the language. The first pattern involves a three-way alternation between voiced stops, voiceless stops, and prenasalized stops; the second type is similar to mutation in Fula. The challenge of the Seereer data is to account for the occurrence of two distinct mutation patterns within a single set of morphological environments. Based on an analysis of mutation as prefixation to an underspecified consonant, we will show that consonant mutation in Seereer, while quite complex, can be viewed as much more regular and predictable than previously thought. This paper will focus on consonant mutation in the context of the noun classification system, since that is where the fullest range of mutation occurs.

The consonantal inventory of Seereer-Siin is as follows.

(3)

	labial	coronal	palatal	velar	uvular	glottal
OBSTRUENT						
Plosive						
voiceless	p	t	c	k	q	ʔ
voiced	b	d	j	g		
Implosive						
voiceless	ɓ	ƭ	ƈ			
voiced	ɓ	ɗ	ʃ			
Prenasalized						
voiced	mb	nd	nj	ng	nG	
Fricative						
voiceless	f	s		x		
SONORANT						
Nasal	m	n	ɲ	ŋ		
Flap		r				
Lateral		l				
Glide	w		y	(w)[3]		

[3] The glide /w/ appears twice in the chart of phonemes, once as a labial, and again as a velar segment. This dual classification reflects the fact that the glide occurs in two gradation sets: w/b/mb and w/k/ng. The labial set is much more common in Seereer than the velar set which, to my knowledge, occurs only once in the language in the allomorphs for the stem meaning person: *o-kiin* (singular), *wiin* (plural), *fo-ngiin* (diminutive plural).

Data upon which this study is based are from the Fatick dialect of Seereer-Siin, which is similar in many respects to the Jaxaaw dialect described by Fal [1980]. Perhaps the most salient aspect of the phonemic inventory of both dialects is the occurrence of voiceless bilabial, alveolar, and palatal implosive stops, /ɓ/, /ƭ/ and /ƈ/. These stops, which are not found in Seereer dialects outside the Siin region, participate in the mutation system.[4]

2.0 Mutation and noun classification

Noun classification in Seereer may best be described as an obligatory agreement system in which each and every noun belongs to a maximum of five of fifteen possible classes. Each of the fifteen classes is associated with a class prefix that triggers stem-initial consonant mutation.

While the majority of noun stems in Seereer undergo the complete set of initial mutations, there are two categories of stems which do not. Non-alternating stems are characterized by initial consonants that never undergo mutation. This subset of consonants includes only the simple nasal (as opposed to prenasalized) stops, m, n, ɲ, ŋ, and also y and l.[5] In addition, there are certain stems which we would normally expect to undergo mutation, but which do so only partially, for idiosyncratic reasons. These stems will be discussed briefly in 4.2. The following discussion, however, will focus on typical, i.e., mutating, stems.

A typical nominal paradigm consists of a singular and plural form, a diminutive singular and diminutive plural form, and an augmentative singular form, as illustrated in (4).

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[4] In Fal's study [1980: 11], she describes these sounds as glottalized aspirates (*aspirés glottalisés*) based on the phonetic findings of S. Sauvageot. The notation she uses reflects this.

Fal:	ʰɓ	ʰɗ	ʰƈ̲
This study:	ɓ	ƭ	ƈ

Of ʰɓ and ʰɗ Fal says that each is *réalisé sonore* by which I assume she means that they are realized as voiced. ʰƈ̲, however, is described as inherently *sonore*. Whether she meant to imply some type of distinction regarding voicing between the former two and the latter, i.e., that the former two are underlyingly voiceless, is unclear. Moreover, although she worked under Sauvageot's assumption that they are voiced, she mentions in a footnote that she has not abandoned her original hypothesis that they are the voiceless counterparts of the voiced implosive stops. Fal's current thinking on the matter is that the segments are, in fact, voiceless implosive stops (personal communication).

[5] According to Crétois (1972), certain dialects, including the Petite Côte and Fadiouth dialects, occasionally exhibit a mutation involving /l/, which alternates with /t/ and /nd/. In the Fatick dialect, however, /l/ does not undergo mutation.

(4) Full paradigm for 'milk bowl'

o-roon	singular	Class 10
xa-toon	plural	Class 11
o-ndoon	diminutive singular	Class 12
fo-ndoon	diminutive plural	Class 13
a-ndoon	augmentative singular	Class 3b

In contrast to Fula, Seereer does not have class suffixes. Class is, however, marked on an enclitic determiner that also encodes definiteness and proximity as the examples in (5) show.

(5) *o-roon-ole* 'the milk bowl' (proximate)
xa-toon-axe 'the milk bowls' (proximate)

Consonants that undergo mutation may have up to three variants which, following Arnott (1970), will be designated by the term "grades". Allomorphs of the noun stem in (4), for example, exhibit three grades of the initial consonant: a continuant in the case of the singular form, a stop in the case of the plural, and a prenasalized stop in the diminutive and augmentative forms.

Taken together, the three grades of any given consonant will be designated by the term "gradation set". Seereer exhibits thirteen distinct gradation sets which are presented in (6).[6]

6 Consonants that occur within a given mutation set are assumed to be homorganic in that they share the same place features. There are two apparent exceptions to this generalization: the gradation set s/c/nj, where [s] is alveolar, and the two other mutations are palatal; and the gradation set x/q/nG, where [x] is velar and the two other mutations are uvular. These apparent anomalies can be explained by defining homorganicity within a model of feature geometry consistent with McCarthy [1988]. Homorganicity would depend only on the major place nodes, [labial], [coronal], and [dorsal], rather than features that are dependents of those nodes. In that case, the first gradation set would be considered a coronal set, and the second a dorsal set.

(6) Seereer gradation sets

	LABIAL				CORONAL						DORSAL		
a-	b	ɓ	f	w	d	ɗ	r	s[7]	j	ʃ	g	x	w
b-	p	ɸ	p	b	t	f	t	c	c	c̓	k	q	k
c-	mb	ɸ	mb	mb	nd	f	nd	nj	nj	c̓	ng	nG	ng

In stems that undergo mutation, a given noun class always conditions the same grade, either a, b, or c in (6), regardless of the gradation set. The chart in (7) summarizes the class prefixes, enclitic determiners, and the grade that each class conditions.[8] Note that Class 3 takes the a-grade (designated as Class 3a), except when it is the augmentative singular, in which case it takes the c-grade (designated as Class 3b).

(7)

Class	Prefix	Clitic determiner	Grade	Class content
1	*o-*	*oxe*	b	human singular
2	*ø-*	*we*	a	human plural
3a	*a-*	*ale*	a	singular
3b	*a-*	*ale*	c	augmentative singular
4	*a-*	*ake*	b	plural
5	*ø-*	*le*	a	singular
6	*ø-*	*ne*	c	singular
7	*ø-*	*fee*	a	singular
8	*fo-*	*ole*	a	plural
9	*ø-*	*ke*	b	plural
10	*o-*	*ole*	a	singular
11	*xa-*	*axe*	b	plural

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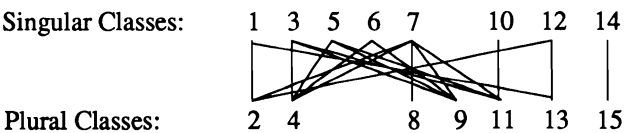
[7] The s/c/nj gradation set is not very productive in Seereer. In the present corpus there are only a few lexical items that exhibit all three grades, and Fal [1980] reports for the Jaxaaw dialect that the gradation set is restricted to the speech of older speakers.

[8] Class numbers are consistent with Fal [1980]. In contrast to most Bantu languages where noun classes tend to occur in corresponding singular and plural pairs, in Seereer there is little systematic correspondence between singular and plural classes. Given the singular class specification for a noun, the plural is rarely predictable, and vice versa. The main exceptions to this are the relatively rare classes 14 and 15 which are singular and plural, respectively.

Singular - plural correspondences



Class	Prefix	Clitic determiner	Grade	Class content
12	*o-*	*onɢe*	c	diminutive singular
13	*fo-*	*ne*	c	diminutive plural
14	*fa-*	*fee*	c	singular
15	*pa-*	*ke*	b	plural

Representative examples of noun stems that exhibit full mutation sets are given in (8).

(8) a. 'sin' (b-p-mb)

ø-bakad	Cl. 7 (s.)
ø-pakad	Cl. 9 (pl.)
o-mbakad	Cl. 12 (dim. s.)

b. 'hand/arm' (ɓ-ƥ-ƥ)

o-ɓay	Cl. 10 (s.)
xa-ƥay	Cl. 11 (pl.)
fo-ƥay	Cl. 13 (dim. pl.)

c. 'slave' (f-p-mb)

ø-fad	Cl. 2 (human pl.)
o-pad	Cl. 1 (human s.)
o-mbad	Cl. 12 (dim. s.)

d. 'hair' (w-b-mb)

ø-wiil	Cl. 5 (s.)
a-biil	Cl. 4 (pl.)
a-mbiil	Cl. 3b (aug. s.)

e. 'mouth' (d-t-nd)

o-don	Cl. 10 (s.)
xa-ton	Cl. 11 (pl.)
o-ndon	Cl. 12 (dim. s.)

f. 'stick' (ɗ-f-f)

o-ɗon	Cl. 10 (s.)
xa-fon	Cl. 11
fo-fon	Cl. 13 (dim. pl.)

g. 'pig' (r-t-nd)

ø-ruul	Cl. 5 (s.)
a-tuul	Cl. 4 (pl.)
o-nduul	Cl. 12 (dim. s.)

h. 'village' (s-c-nj)

ø-saax	Cl. 5 (s.)
a-caax	Cl. 4 (pl.)
a-njaax	Cl. 3b (aug. s.)

i. 'illness' (j-c-nj)

ø-jir	Cl. 5 (s.)
a-cir	Cl. 4 (pl.)
a-njir	Cl. 3b (aug. s.)

j. 'bracelet' (ʃ-ƈ-ƈ)

o-ʃang	Cl. 10 (s.)
xa-ƈang	Cl. 11 (pl.)
fo-ƈang	Cl. 13 (dim. pl.)

k. 'stone' (g-k-ng)

o-gac	Cl. 10 (s.)
a-kac	Cl. 4 (pl.)
fo-ngac	Cl. 13 (dim. pl.)

l. 'manioc' (x-q-nɢ)

ø-xaƥ	Cl. 5 (s.)
a-qaƥ	Cl. 4 (pl.)
a-nɢaƥ	Cl. 3b (aug. s.)

m.	'person'	(w-k-ng)
	ø-wiin	Cl. 2 (human pl.)
	o-kiin	Cl. 1 (human s.)
	o-ngiin	Cl. 12 (dim. s.)

3.0 Mutation patterns

Besides the basic observation that all gradation sets except for those involving the glottalized consonants have a prenasalized grade, there is no readily apparent regularity to the system as a whole, a fact that has led to the conclusion that it is basically idiosyncratic in nature [Fal 1980]. Nevertheless, certain regular patterns appear in subsets of the system, a fact that suggests that more than one distinctive pattern of mutation occurs in Seereer.

Superficially, three mutation patterns are apparent in the gradation sets in (6). The first involves the pattern of the implosive consonants which alternate between only two forms, distinguished by voicing.

(9)	a.	ɓ	ɗ	ʃ	(voiced)
	b.	ƥ	f	c̓	(voiceless)
	c.	ƥ	f	c̓	(voiceless)

These mutations are distinct from the others in that they lack a prenasalized form.

The second pattern involves alternations between an a-grade voiced stop, a b-grade voiceless stop, and a c-grade prenasalized stop. There are four such gradation sets.

(10)	a.	b	d	j	g	(voiced)
	b.	p	t	c	k	(voiceless)
	c.	mb	nd	nj	ng	(prenasalized)

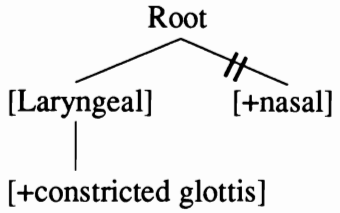
Lastly, a Fula-like pattern involving alternations between a continuant, a stop, and a prenasalized stop, characterizes the remainder of the gradation sets.

(11)	a.	w	f	r	s	x	w	(continuant)
	b.	b	p	t	c	q	k	(stop)
	c.	mb	mb	nd	nj	nG	ng	(prenasalized)

The similarities between the behavior of the implosive gradation sets in (9) and the gradations involving plosive stops in (10) are quite striking: both involve voicing, and are distinguished only by the fact that the implosive consonants do not have a prenasalized grade. Since prenasalized implosives are not found underlyingly in Seereer, we may assume that their derivation in mutation contexts is

prohibited by the structure preserving rule [Kiparsky 1985] in (12); in other words, implosive consonants do not undergo prenasalization.

(12)



The three distinct mutation patterns may now be reduced to two: a voiced stop-voiceless stop-prenasalized stop type, and a continuant-stop-prenasalized stop type. These two mutation patterns, which I refer to as voicing and continuancy mutations, respectively, are represented in (13).

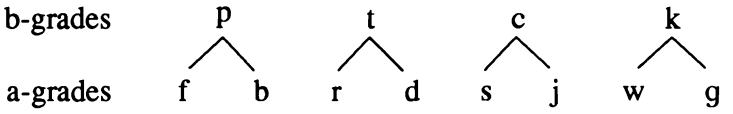
(13) Mutation types in Seereer

Voicing							
a. voiced	b	d	j	g	ɓ	ɗ	ʃ
b. voiceless	p	t	c	k	ƥ	ƭ	ƈ
c. prenasalized	mb	nd	nj	ng	ƥ	ƭ	ƈ
Continuancy							
d. continuant	w	f	r	s	x	w	
e. stop	b	p	t	c	q	k	
f. prenasalized	mb	mb	nd	nj	nG	ng	

4.0 Underlying forms

In determining the underlying form of Seereer noun stems we must take into consideration the considerable overlap apparent in the mutation system. The segments /p/, /t/, /c/, and /k/ appear in the b-grades of both the voicing mutations and the continuancy mutations. This distribution provides strong evidence against choosing the b-grades as the underlying forms, since we would then be forced to account for identical segments behaving differently in identical morphological environments, as illustrated in (14).

(14) The non-predictability of a-grades from underlying b-grades



If we were to posit the b-grades as the underlying forms for both the voicing mutations and the continuancy mutations, the only way to account for /p/ sometimes becoming [f] and sometimes becoming [b] in a-environments would be to have each /p/-initial stem be lexically specified for the type of mutation (voicing or continuancy) it undergoes, a highly unsatisfactory solution that would fail to exploit the morphophonological regularities inherent in the mutation system.

Likewise, positing the prenasalized forms as the underlying grades seems implausible. The overlap both within and between the two mutation sets is too high to warrant such a claim. For example, the segment [mb] occurs three times, and the segments [nd], [nj], and [ng] occur twice each, making almost the entire mutation system unpredictable.

Positing the a-grades as the underlying form of the mutations eliminates the necessity of lexical specification for mutation type, since (with the exception of /w/[9]) there is no overlap between a-grade and b-grade segments. This analysis, however, is problematic for mutations involving the glottalized consonants. If we are to maintain the claim made earlier that the implosive mutations are identical to the voicing mutations, and that prenasalized implosives are simply not derivable in the language, we cannot maintain that the a-grades, which are voiced, are the underlying grades. Note that the c-grades for the implosive consonants are voiceless. If we were to posit the voiced forms as underlying, we would have to account in some way for the devoicing of those forms in the nasal grade. Given these problems, and in light of the fact that there is already somewhat of a dichotomy in the mutation system of Seereer between voicing mutations and continuancy mutations, we will posit a split mutation system in which each of those two types has a distinct underlying form. For the voicing mutations, we posit the voiceless or b-grade forms as underlying, and for the continuancy mutations we posit the continuant or a-grade forms as underlying. There is no compelling reason to require both mutation types to have the same grade as their underlying form, and in fact the above discussions show that such a premise presents a multiplicity of problems.

A recapitulation of this approach to underlying mutation forms is given in chart form in (15). Underlying forms are in italics.

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[9] Recall that two variants of /w/ are posited. One is essentially labial in nature, while the other is velar.

(15)

	Voicing mutations							Continuancy mutations					
a-	b	d	j	g	ɓ	ɗ	ʃ	*w*	*f*	*r*	*s*	*x*	*w*
b-	*p*	*t*	*c*	*k*	*ɓ*	*f*	*c*	b	p	t	c	q	k
c-	mb	nd	nj	ng	ɓ	f	c	mb	mb	nd	nj	nG	ng

4.1 Voicing mutations. There is much evidence in favor of this analysis when we consider the mutation types individually. With regard to the voicing mutations, if we establish the voiceless forms as underlying it is possible to derive both the a-grades and the c-grades by the addition of a single feature: [voiced] in the case of the former, and [+nasal] in the case of the latter, since, as we shall see, there is evidence to suggest that presence of the feature [voiced] in c-grade segments is a consequence of prenasalization by way of a redundancy rule, given in (16), that voices all nasal segments.

(16) [+nasal] → [voiced]

Most importantly, however, positing the voiceless stops as the UR's allows us to derive the c-grade implosive stops, which are voiceless, in a natural way by simply invoking the redundancy rule in (12). This may be construed as further evidence for the existence of rule (16): implosive stops, which are underlyingly voiceless, do not undergo prenasalization, thus they do not become voiced. Consider the alternative. If the a-grades or voiced stops were underlying we would need a rule that devoiced c-grade forms. While this would work for the implosive gradation sets, the analysis for the other voicing mutations would be far-fetched; they would first have to undergo the same devoicing rule as the implosives, then prenasalization, and finally re-voicing via rule (16). In these cases the devoicing rule seems to complicate the grammar quite unnecessarily. Based on these facts we will definitively adopt the position that the b-grades are the underlying forms for the voicing mutations.

4.2 Continuancy mutations. Turning now to the continuancy mutations, recall that we have posited the a-grade or continuants as underlying for these mutations. While setting up the b-grades as underlying for the voicing mutations effectively prescribes setting up the a-grades as underlying for the continuancy mutations, if we are to have a mutation system that is in any way predictable, there is much independent evidence to suggest that our position is, in fact, the correct one. Let us examine these criteria independently of the voicing mutations. First, the distribution of stem types favors an underlying continuant on the grounds of predictability. There are certain stems in Seereer, like those shown in (17a), that exhibit a stop in the a-grade, where we would normally expect to find a continuant, but undergo prenasalization in the regular fashion in the c-grade. The opposite, however, is not true. Consider the following examples.

(17) a. Partially mutating stems

Grade	'pigeon'		'field'		
a	*a-qoɗoxoŋ*	(Cl. 3a)	*o-qol*	(Cl. 10)	singular
b	*a-qoɗoxoŋ*	(Cl. 4)	*xa-qol*	(Cl. 11)	plural
c	*a-nGoɗoxoŋ*	(Cl. 3b)	*a-nGol*	(Cl. 3b)	aug. sg.

b. Fully mutating stems

Grade	'ring'		'heart'		
a	*o-xaɗ*	(Cl. 10)	*ø-xeeŋ*	(Cl. 5)	singular
b	*xa-qaɗ*	(Cl. 11)	*a-qeeŋ*	(Cl. 4)	plural
c	*a-nGaɗ*	(Cl. 3)	*a-nGeeŋ*	(Cl. 3)	aug. sg.

The examples in (17a) and (17b) illustrate the two possible types of stems. There are no stems that exhibit a continuant in the b-grade where we would expect to find a stop. The variation, and hence unpredictability, is taking place in the a-grade forms, while the b- and c-grades are completely predictable. This fact clearly supports the establishment of the a-grades as underlying. A similar distribution of stem types in Fula has been used as evidence to support the generally accepted position [Lieber 1984] that the continuant grade is also underlying for mutations in that language. The relevance of the Fula facts for Seereer will become clear in section 6.0, after we have fully analyzed mutation in Seereer.

In establishing the a-grade as underlying for the continuancy mutations we can now derive the other grades through the addition of a single feature, as we did for the voicing mutations. To derive the b-grades we add the feature [-continuant], and for the c-grades, [+nasal]. The association of these features is not sufficient to derive the surface forms, but with the help of a minimal number of well motivated rules we will be able to account for the derivation of b- and c-grades in a satisfactory manner, as will be shown in section 5.0.

4.3 Prefixes. In deriving forms from the underlying representations in both voicing and continuancy mutations, we have posited the association of a single feature: [voiced] for the a-grades, [-continuant] for the b-grades, and [+nasal] for the c-grades. We will consider these features to be part of the representation of the class prefix, so that each prefix, in addition to possibly consisting of an overt (C)V sequence, also contains one of those features. Those prefixes without an overt (C)V consist of a sole feature. Prefixes conditioning the a-grade contain the feature [voiced]; those conditioning the b-grade contain the feature [-continuant]; and those conditioning the c-grade contain the feature [+nasal]. Mutation, then, is regarded as a type of prefixation.

5.0 Analysis of consonant mutation

In our analysis of consonant mutation we will adopt the framework of contrastive underspecification [Steriade 1987; Clements 1988; Mester and Itô 1989] in which only redundant features are absent from the underlying representation; however, following McCarthy (1988), we will assume that root node features [+/-consonantal] and [+/-sonorant] are always present in the underlying representation. The major place features [labial], [coronal], or [dorsal] are also present.[10]

Based on the consonantal inventory of Seereer given in section 1.0, we will assume that the underlying default in the consonantal inventory is [-continuant] and [-nasal], with absence of the feature [voiced]. Unless otherwise specified (as in, for example, the case of simple nasals which are assumed to be underlyingly [+nasal], or the obstruents /f/, /s/, and /x/, which are assumed to be underlyingly [+continuant]) these features are eventually filled in by the following default rules.

(18) [ ] → [-continuant]

(19) [ ] → [-nasal]

Based on the recognition that a two way mutation system calls for different underlying grades, the analysis of Seereer consonant mutation presented below accounts in a constrained and fairly straightforward manner for all the mutations by positing a single floating feature for each of the a-, b-, and c-grade prefixes.

5.1 A-grade derivations. Recall that a-grades are conditioned by class prefixes that contain the floating autosegment [voiced].

5.1.1 Voicing mutations. With regard to the voicing mutations, in which the b-grades or voiceless stops are the underlying forms, a-grade mutation involves the association of the feature [voiced] to the Laryngeal node. The mutations involved are as follows.

(20) Underlying forms	**p**	**t**	**c**	**k**	**ɓ**	**ɗ**	**ƈ**
a-grades	b	d	j	g	ɓ	ɗ	ʃ

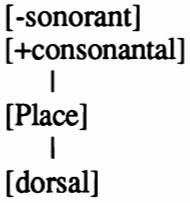
The mutation process is illustrated in the representative derivations in (21) and (22).

---

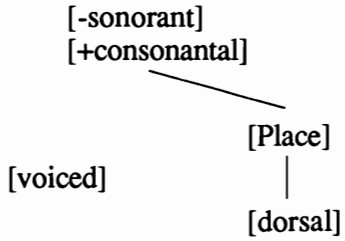
[10] Nothing crucial in the analysis of consonant mutation hinges on the choice of underspecification theory.

(21) *kend* → *gend* 'agemate'
Class 2 prefix: Ø[voiced]

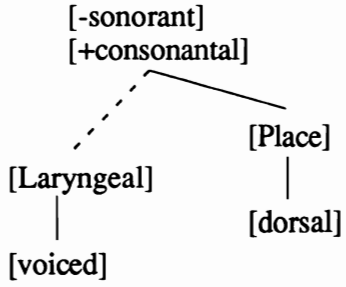
a. Feature geometric representation of stem-initial consonant



b. Prefixation

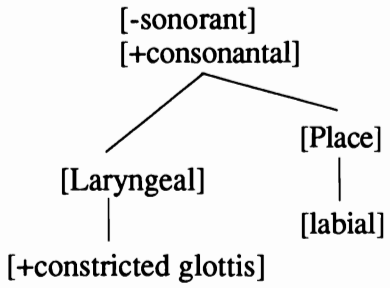


c. Association of floating feature

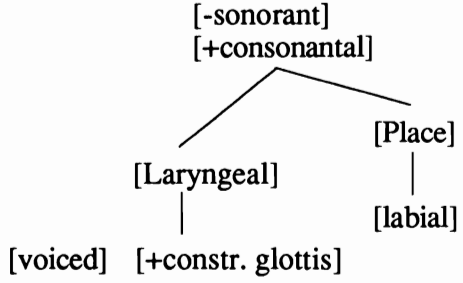


(22) *ɓaak* → *ɓaak* 'baobab fruit'
Class 5 prefix: Ø[voiced]

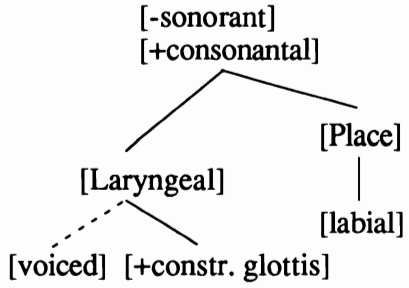
a. Feature geometric representation of stem-initial consonant



b. Prefixation



c. Association of floating feature



5.1.2 Continuancy mutations. A-grade continuancy mutations are the underlying form for continuancy mutations. Of the six segments, three are voiced and three are voiceless, as shown in (23).

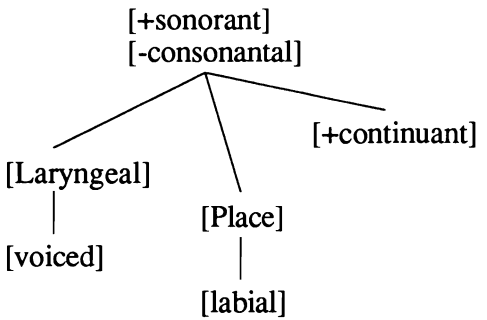
(23) A-grade (underlying) continuancy mutations

Voiced			Voiceless		
w	r	w	f	s	x

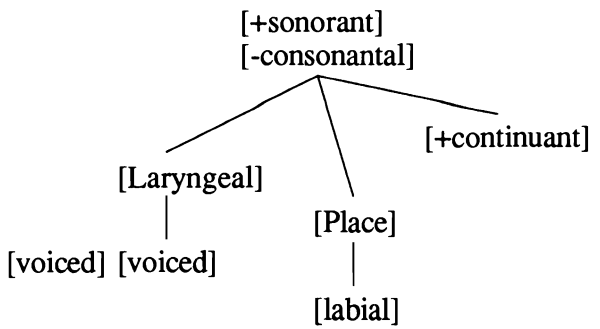
Association of the feature [voiced] from the a-grade class prefix has no effect on the surface forms of continuancy mutations. In the case of the three voiced segments, /w/, /r/, and /w/, the feature associates to the Laryngeal node, but is subsequently eliminated by the Twin Sisters Convention [Clements and Keyser 1983:95] which converts two identical specifications associated to the same element into a single specification. This process is illustrated for a stem containing the bilabial glide /w/ in (24).

(24) *wiil* → *wiil* 'hair'
Class 5 prefix: Ø[voiced]

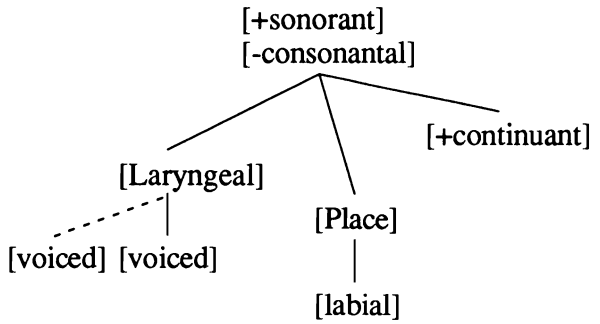
a. Feature geometric representation of stem-initial consonant



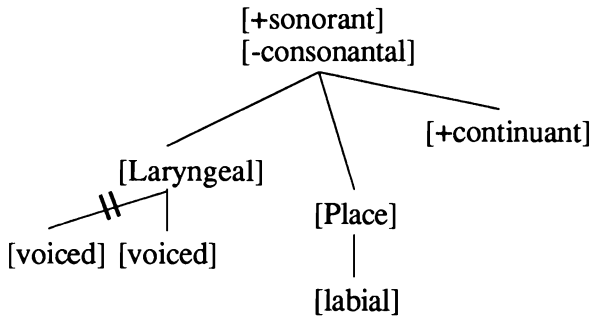
b. Prefixation



c. Association of floating feature

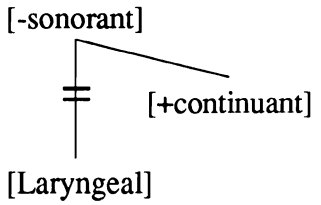


d. Delinking of identical feature by Twin Sisters Convention



Turning now to the three voiceless segments, /f/, /s/, and /x/, we see that their surface representation does not include the feature [voiced]. In this case, we will assume that the feature [voiced] associates to the Laryngeal node, but that it is delinked by a rule that prohibits expansion of the phonemic inventory of Seereer to include voiced counterparts of those segments, namely *[v], *[z], and *[ʔ]. We will posit the following structure preserving rule which will eliminate the Laryngeal specification of any segment that is [+continuant] and [-sonorant].

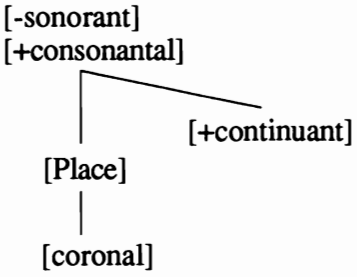
(25)



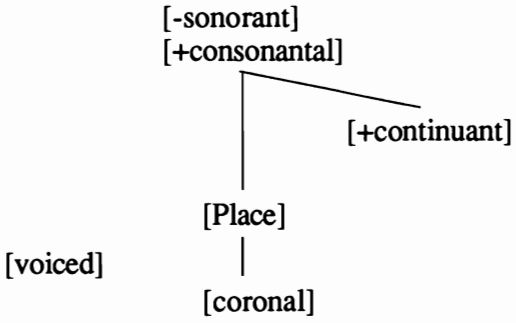
A sample derivation involving the coronal segment /s/ is given in (26).

(26) *saax* → *saax* 'village'
Class 5 prefix: Ø[voiced]

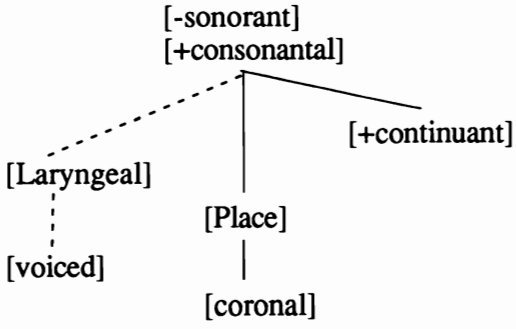
a. Feature geometric representation of stem-initial consonant



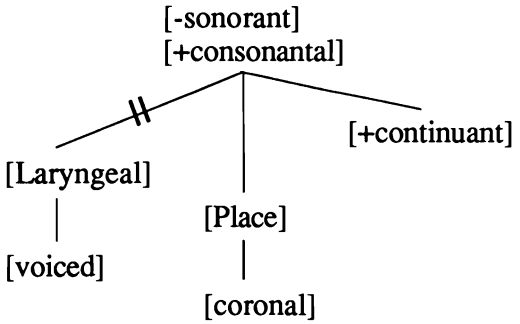
b. Prefixation



c. Association of floating feature



d. Delinking of Laryngeal node by rule (25)

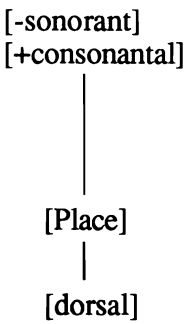


5.2 B-grade derivations. B-grades are conditioned by a class prefix that contains the floating feature [-continuant].

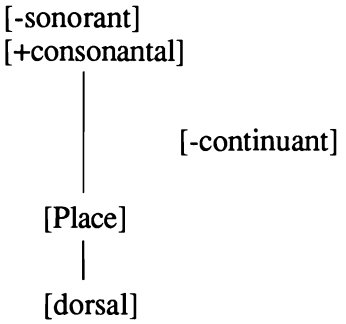
5.2.1 Voicing mutations. B-grade voicing mutations are the underlying forms for the voicing mutations. They consist of the voiceless stops /p/, /t/, /c/, /k/, /ɓ/, /ƭ/, and /ƈ/, which remain unaffected by the prefixation of [-continuant] since the value for this feature is identical to the default value, as supplied by the rule in (18). We will assume that the feature is associated by class prefixation, which would in any case apply before the default rule. A sample derivation is given in (27).

(27) *kac* → *a-kac* 'stone'
Class 4 prefix: $a^{[-\text{continuant}]}$

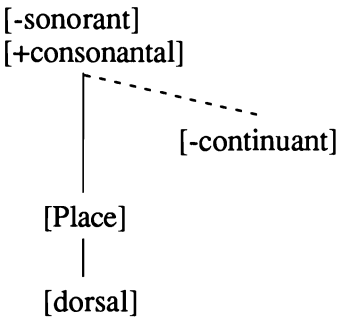
a. Feature geometric representation of stem-initial consonant



b. Prefixation

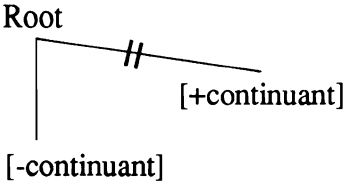


c. Association of floating feature



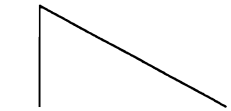
5.2.2 Continuancy mutations. By far the most challenging mutations to account for, b-grade continuancy mutations are derived from underlying continuants by the association of the feature [-continuant]. Subsequently, a persistent rule, given in (28), that blocks the formation of affricates in Seereer, is invoked to delink the [+continuant] specification from the root node.

(28)



A second rule, given in (29), that changes [+sonorant] to [-sonorant] is invoked in the case of the mutations w/b, r/t, and w/k.

(29) [+sonorant] → [-sonorant]



[-continuant] [-nasal]

The most problematic aspect of b-grade continuancy mutations, however, lies in the voicing specification. As we saw in (23), three of the underlying representations, labial /w/, /r/, and velar /w/ are voiced; the fricatives /f/, /s/, and /x/ are voiceless. Let us examine what happens to the voicing specification of the b-grades.

(30)	Underlying forms	w	f	r	s	x	w
	b-grades	b	p	t	c	q	k

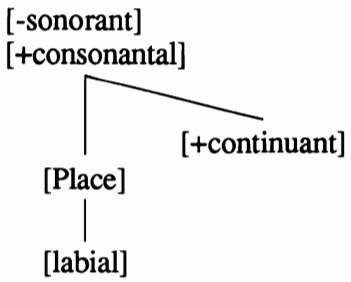
If voicing did not play a role in these mutations, we would expect [r] to alternate with [d], and [w] to alternate with [g]. In order to account for these forms we will posit that the b-grade, in addition to prefixing the [-continuant] feature, also involves a neutralization rule that delinks the feature [voiced] from the Laryngeal node. The only major problem associated with this solution is that devoicing does not occur in the w/b alternation. A second, minor problem is that there is only one substantiated instance of the w/k alternation in the language (*wiin/o-kiin* 'person') so the alternation may very well be lexicalized rather than productive.[11] On the other hand, within the broader context of Northern West Atlantic, Seereer is the only language that exhibits the r/t alternation rather than r/d as in Fula and Wolof, so a devoicing rule would appear to be a logical choice. A solution to these problems must be sought elsewhere, within the comparative and historical context of Northern West Atlantic. In the meantime we will adopt the solution posited above, namely that the b-grade involves a devoicing rule, and that the w/b

11 Given that there is only one instance of this mutation in Seereer, it is very difficult to establish its correlate in the related languages. It is possible, however, that the stem *wiin/kiin* is cognate with the suppletive stem for 'person' in Fula. The stem occurs in Class 2, human plural in Fula as *yim-ɓe*, showing a stem initial glide, [y]. The suppletive form of this stem in the singular is *nedɗ-o*, cognate with Wolof *nit*. In Fula, [y] may alternate with [g], providing a possible analog for the w/k mutation in Seereer. In alternations involving the segment [g] in Fula, in the a-grade it alternates with either [y] before [i] and [e], [w] before [u] and [o], and [ʔ] before [a], hence we get phonological condition for [yim-ɓe] as opposed to *[wim-ɓe] or *[ʔim-ɓe].

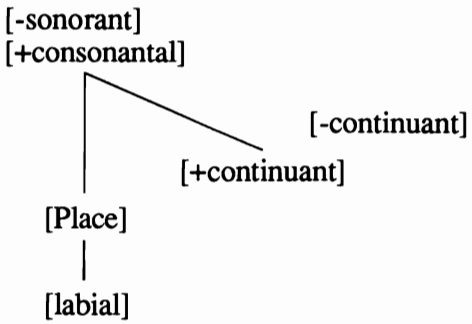
alternation is an anomalous exception.[12] The following sample derivations illustrate the mutations f/p and r/t.

(31) *faaɗ* → *xa-paaɗ* 'heel'
Class 11 prefix: *xa*[-continuant]

a. Feature geometric representation of stem-initial consonant

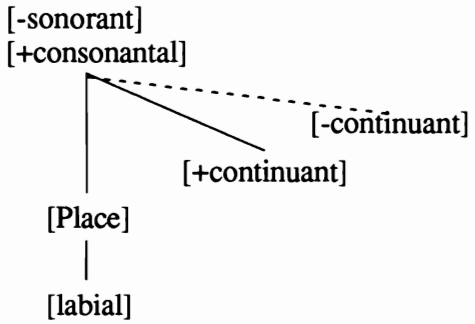


b. Prefixation

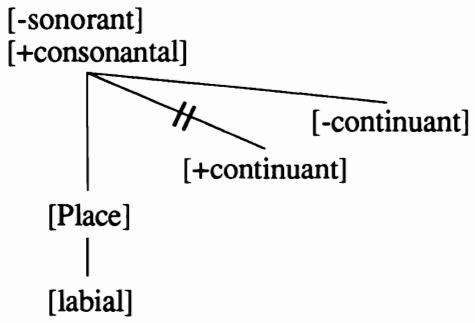


12 The w/b/b mutation occurs in Fula, so although it is anomalous for the Seereer mutations, in which voicing takes a part, it is not anomalous within the West Atlantic family. See section 6 for a discussion of the Seereer mutations within the West Atlantic context.

c. Association of floating feature

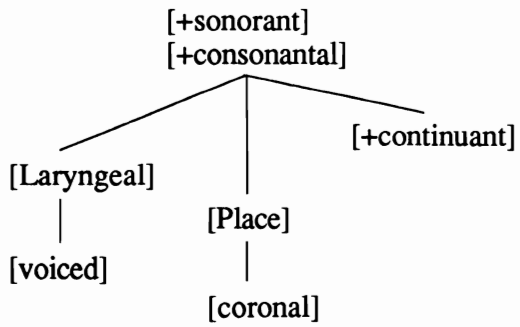


d. Application of affricate blocking rule (28)

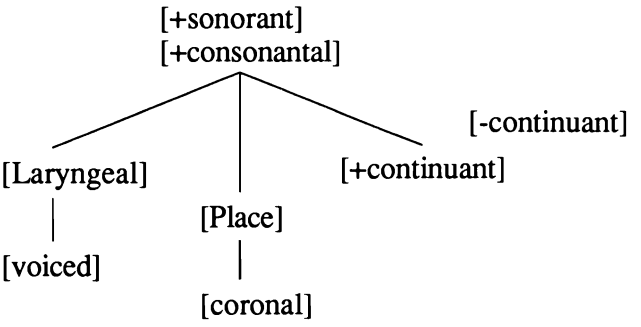


(32) *rew* → *o-tew* 'woman'
Class 1 prefix: *o*[-continuant]

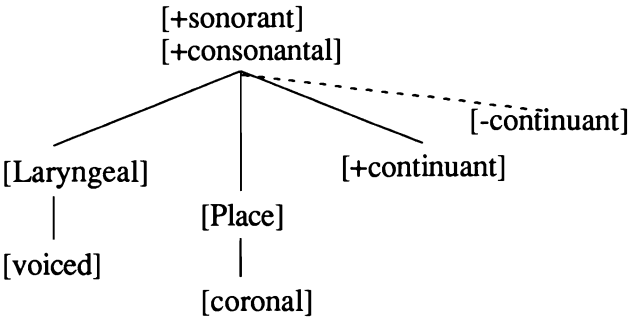
a. Feature geometric representation of stem-initial consonant



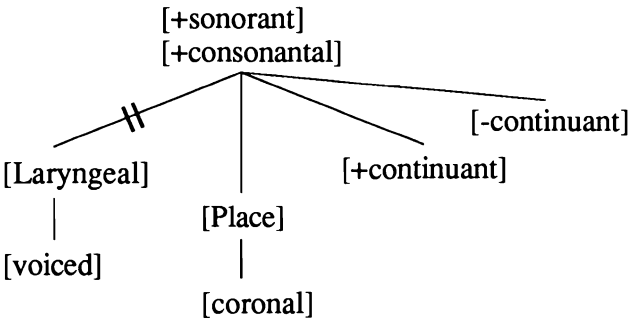
b. Prefixation



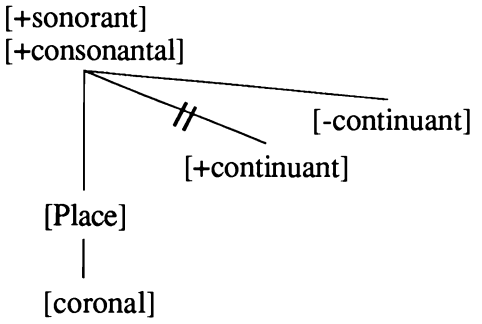
c. Association of floating feature



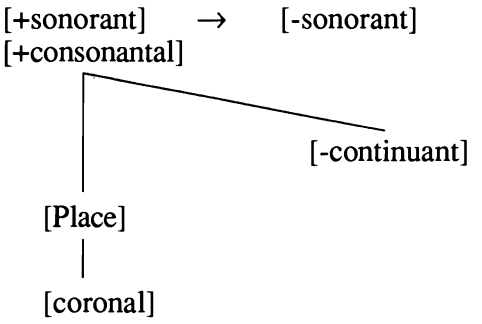
d. Application of neutralization (devoicing) rule



e. Application of affricate blocking rule (28)

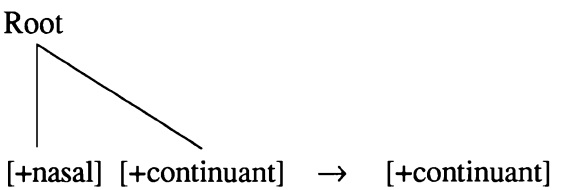


f. Application of rule (29)



5.3 C-grades. The c-grades, or prenasalized grades, are conditioned by class prefixes that contain the floating feature [+nasal]. Two additional rules are required to derive the correct surface forms. First, a structure preserving rule, given in (32), blocks the formation of prenasalized continuants; second, the rule that we saw in (18) ensures voicing of all [+nasal] segments.

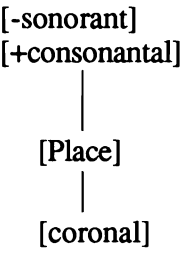
(33)



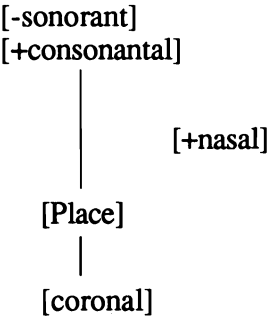
5.3.1 Voicing mutations. The c-grades of voicing mutations, other than the glottalized series, are derived from the underlying voiceless stops by association of the feature [+nasal] and application of rule (16), as illustrated in (34).

(34) *caf* → *fo-njaf* 'leg'
Class 13 prefix: *fo*[+nasal]

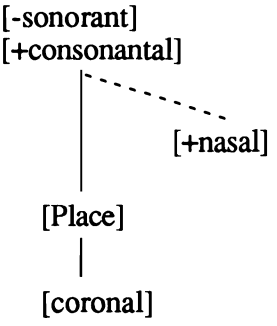
a. Feature geometric representation of stem-initial consonant



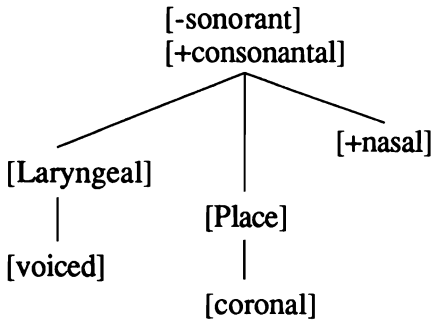
b. Prefixation



c. Association of floating feature



d. Application of rule (16)

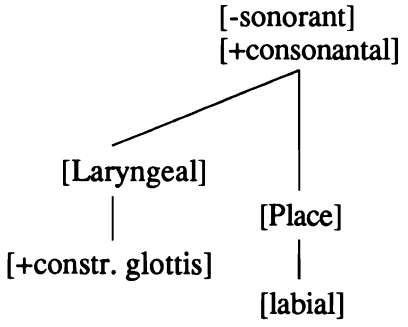


Note that a plain nasal segment, [ɲ], cannot result from the association of [+nasal] to the underlying form because it is already underlyingly [-sonorant]. The basic structural description of a prenasalized stop, however, is met in the combination of features [-sonorant] and [+nasal].[13]

C-grade voicing mutations involving the implosive stops do not undergo prenasalization, which is blocked by rule (12). Consequently, they do not undergo voicing, so the c-grade forms are identical to the underlying voiceless forms, as the following example shows.

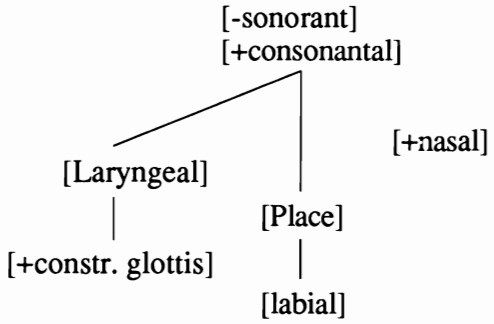
(35) *ɓaŋ* → *fo-ɓaŋ* 'spoon'
Class 13 prefix: *fo*[+nasal]

a. Feature geometric representation of stem-initial consonant

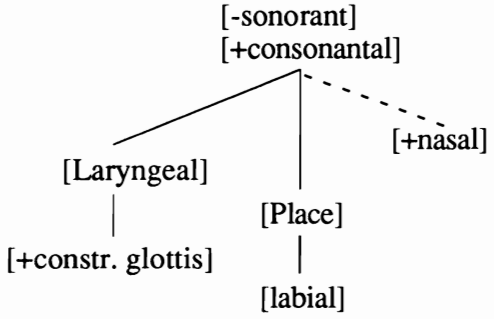


[13] Given the facts of Seereer, this structural description of prenasalized stops is to be preferred to one that consists of the cooccurrence of the features [+nasal] and [-nasal] associated with a single root node.

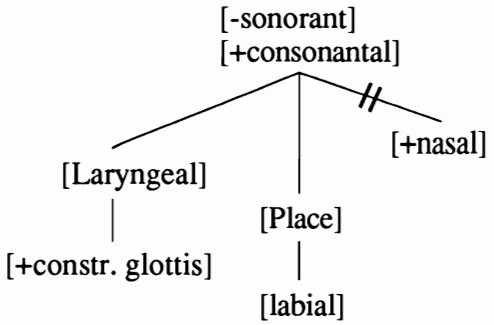
b. Prefixation



c. Association of floating feature



d. Application of rule (12)

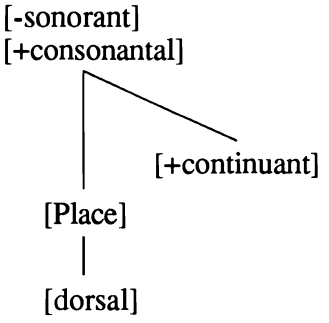


5.3.2 Continuancy mutations. The c-grades of continuancy mutations are derived from the underlying continuant forms by the prefixation of the feature

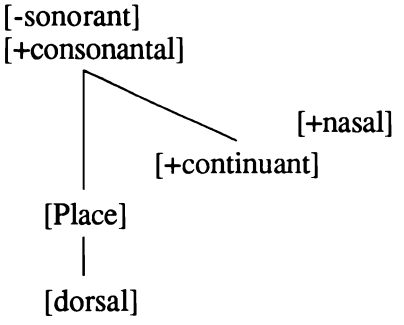
[+nasal] and subsequent application of two rules, rule (16) which voices [+nasal] segments, and rule (33) which changes the feature value of [+nasal] segments to [-continuant]. Sample derivations are given in (36) for the mutation x/nG and (36) for s/nj.

(36) *xiiC* → *fo-nGiiC* 'bone'
Class 13 prefix: *fo*[+nasal]

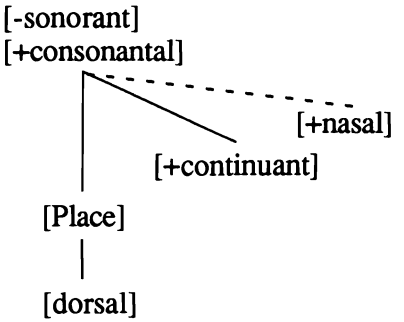
a. Feature geometric representation of stem-initial consonant



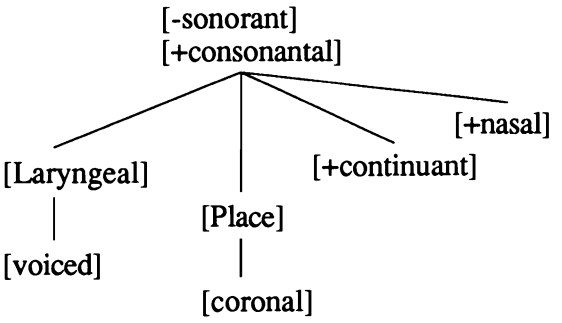
b. Prefixation



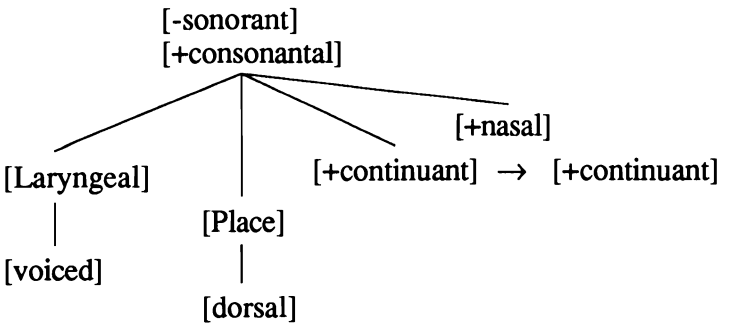
c. Association of floating feature



d. Application of rule (16)

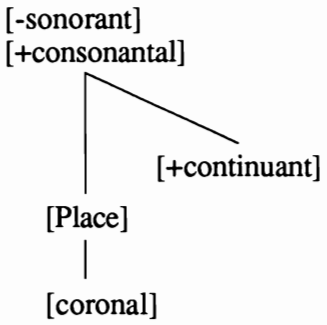


e. Application of rule (33)

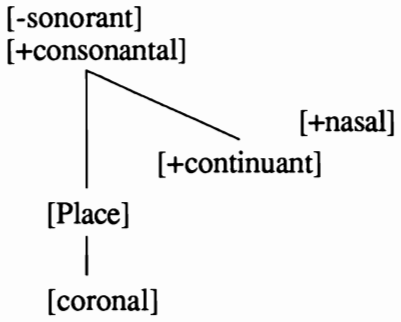


(37) *saxaal* → *fo-njaxaal* 'calabash'
Class 13 prefix: *fo*[+nasal]

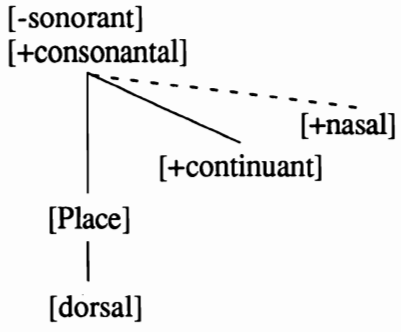
a. Feature geometric representation of stem-initial consonant



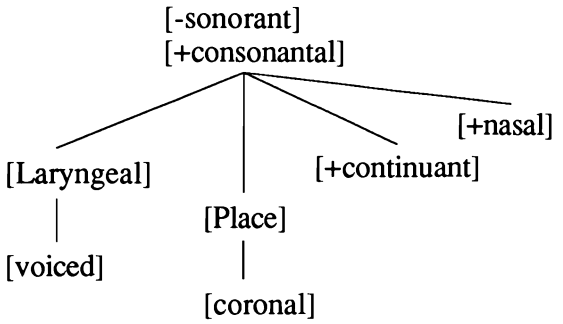
b. Prefixation



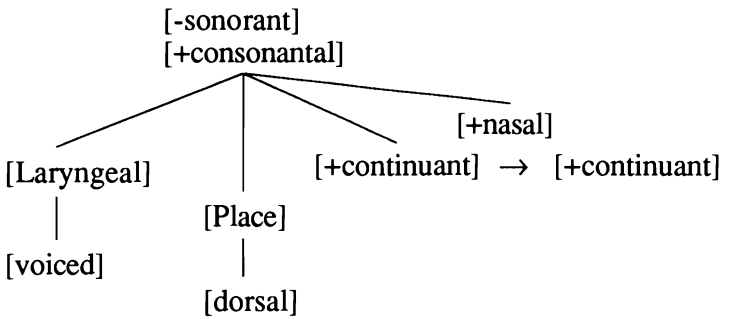
c. Association of floating feature



d. Application of rule (16)



e. Application of rule (33)



6.0 Summary and conclusion

As we have seen in the preceding sections, the challenging nature of Seereer consonant mutations reflects a complex morphophonological system that is characterized by a basic dichotomy in mutation type. Any analysis of the facts of Seereer must account for both voicing and continuancy mutations within the same morphological environments. The analysis presented above accounts for consonant gradation in Seereer in a satisfactory manner by positing both a partially underspecified stem-initial consonant in mutating stems, and a floating autosegment, [voiced], [-continuant], or [+nasal], as part of the morphological representation of the class prefixes that condition a-grades, b-grades, and c-grades, respectively.

We have seen how the Seereer mutations are unique to Northern West Atlantic in their behavior regarding voicing. The anomalous forms are the b-grades of the continuancy mutations where we get [t] derived from a-grade /r/ as opposed to [d]

in Fula and Wolof. What the analysis presented above shows is that the feature [voiced] has the status of an autosegment in Seereer, which is not true of Fula. In Seereer, the behavior of [voiced] plays a crucial role in the mutations. First, it appears as a floating autosegment attached to prefixes that condition the a-grade; second, it is independently delinked by the neutralization rule associated with the b-grade; and finally, it surfaces in the rule which voices all nasal segments, thereby affecting all three grades of the mutations.

If we briefly examine the stem-initial gradation sets in the Pulaar (Senegalese) dialect of Fula, as illustrated in (38), we see that voicing or devoicing plays no such role. Gradation sets are uniformly either voiced or voiceless; moreover, notice that stops that are underlyingly voiceless do not become voiced through prenasalization. There is no equivalent in Pulaar of the rule in (16) which automatically voices all nasal segments in Seereer.

(38) Gradation sets in the Pulaar dialect of Fula

	LABIAL		CORONAL			DORSAL			
a. continuant	w	f	r	s	y	h	y	w	ʔ
b. stop	b	p	d	c	j	k	g	g	g
c. prenasalized	mb	p	nd	c	nj	k	ng	ng	ng

Although a thorough comparative study of the mutations in Seereer and Fula is well beyond the scope of this paper, these initial observations show that the crucial difference between the two languages hinges on the behavior of the feature [voiced]. Not only does it account for the fact that the implosive consonants in Seereer participate in the mutation system by exhibiting voiced and voiceless alternants, it also accounts for the devoicing of the continuancy mutations in the b-grade,[14] perhaps the most puzzling aspect of Seereer consonant mutation.

[14] Within the historical context, it would appear that the dichotomous system of Seereer is the innovative one, triggered by the autonomous behavior of the feature [voiced], thereby differentiating itself from a proto-system that looked more like modern Fula. Although such a hypothesis obviously awaits more comparative and historical research into Northern West Atlantic, I would like to suggest that the devoicing that occurs in the b-grade of the continuancy mutations is a result of the influence of the voicing mutations. The devoicing of the b-grade continuancy mutations is, then, a later innovation than the split in mutation type. I have discussed these issues in more depth elsewhere [Mc Laughlin 1993].

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