EPENTHESIS, DELETION AND THE EMERGENCE OF THE OPTIMAL SYLLABLE IN CREOLE: THE CASE OF SRANAN

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Abstract

One of the central problems in creole studies is the nature of the processes that are involved in creolization. This paper investigates this issue with regard to the restructuring of the syllable in the genesis of one English-based creole, Sranan.

In the emergence of Sranan, as in that of many other creoles, we can observe the restructuring of syllables through epenthesis and deletion of segments. These processes are, however, not uniform. For example, in some environments (e.g. certain kinds of complex onsets) deletion is preferred (cf. *story* > *tori*), whereas in others epenthesis is preferred (in word-final position, as in *walk* > *waka*). The paper presents a systematic analysis of the two interrelated processes in optimality theoretic terms, showing that the observed phenomena can be accounted for in a unitary fashion by the complex interaction of violable ranked constraints.

Based on this analysis, we address the question which principles govern the development of syllable structure in creolization: universal preference laws, transfer from the substrate languages or superstratal influence? We argue that all three elements are important in the creation of the creole, but each of them in a different and very specific way. The superstrate provides the segmental material which the emerging creole tries to preserve faithfully, but universal preference laws disturb faithful copying of the superstrate system. This is possible because the substrate exerts its influence imposing a particular grammar - high ranked structural constraints and low ranked faithfulness constraints - on the creole.

Keywords: creole languages, syllable structure, optimality theory

1 INTRODUCTION[1]

One of the central problems in creole studies is the nature of the processes and factors that are involved in creolization. In order to account for the emergence of a particular creole feature, three major approaches have been taken. According to the so-called superstratist view, creole features can be attributed to the properties of the lexifier language. The second approach (the so-called substratist approach) is to adduce the creole features to one or more of the substrate languages involved in the contact situation, whereas the third, universalist, approach stresses the role of universal tendencies of language development and acquisition, which are taken to be more or less directly reflected in the creole structures. This paper investigates the emergence of syllabic structure in one creole language, Sranan, teasing apart the respective contributions of superstrate, substrate and universals in shaping creole syllables.

It has frequently been observed that creole languages tend to favor a rather simplex CV syllable structure. Hence, the deletion of segments in words taken from their lexifier language is quite common (e.g. Holm, 1989:108-113). At the same time, in many creoles we find non-etymological segments, especially vowels, being epenthesized (see also Holm, 1989:108-113), apparently for the same reason, i.e. simplifying syllabic structure. Examples of epenthesis from different creoles are given in (1), examples of deletion in (2) below. The pertinent segments are given in bold capitals for emphasis.

(1) EPENTHESIS IN CREOLES

a.	ál**I**ma	<	Pt. alma	Principe CP[2]
b.	gal**U**fu	<	Pt. garfo	São Tomè CP
c.	lávU**l**u	<	Pt. libro	Annobón CP
d.	k**I**ni	<	Dt. knie	Negerhollands CDt
e.	c**A**rabe	<	Fr. crabe	Mauritian CF
f.	wor**O**m	<	E. worm	Jamaican CE
g.	s**I**ton	<	E. stone	Cameroon Pidgin E.
h.	s**U**muk**U**	<	E. smoke	Saramaccan CE
i.	mit**I**	<	E. meet	Vernacular Liberian E.
j.	dios**O**	<	Sp. dios	Palenquero CSp
k.	hop**I**	<	Dt. hoop	Papiamentu CSp/P
k.	tak**I**	<	E. talk	Sranan CE

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[1] Earlier versions of this paper were presented at the annual conference of DGfS 1998, at the Max-Planck-Institut für Evolutionäre Anthropologie, Leipzig, at the universities of Hannover and Regensburg and the biennial conference of the Society for Carribean Linguistics 2000, Kingston. We thank the audiences as well as our anonymous reviewers for comments and discussion. Both authors have contributed equally to the present paper, their names appear in alphabetical order.

[2] The following abbreviations are used: CDt - Creole Dutch, CE - Creole English, CF - Creole French, CP - Creole Portuguese, CSp - Creole Spanish.

(2) DELETION IN CREOLES

a.	tomp	<	Dt. **S**tomp	Negerhollands CDt
b.	kupa	<	P. **O**cupa**R**	Principe CP
c.	ris	<	Fr. ris**QUE**	Haitian CF
d.	tan	<	Dt. tan**D**	Negerhollands CDt
e.	merican	<	E. **A**merican	Bahamian CE
f.	tan	<	E. **S**tan**D**	Sranan CE

Although there are some systematic studies available that are concerned with one of the two processes (in particular epenthesis, e.g. Smith, 1977; Singh & Muysken; 1995, Plag & Uffmann, in press), work on the relationship between deletion and epenthesis and their competing roles in shaping creole syllables is rather scarce (Tinelli, 1979; Singler, 1996a 1996b; Aceto, 1996; Lipski, 1999). The latter studies either survey patterns of syllabic restructuring across many different creoles (Tinelli, 1979; Lipski, 1999) or concentrate on one aspect of a single language (Aceto, 1996; Meade, 1995; Singler, 1996a, 1996b). To our knowledge, the present study is the first attempt to provide a comprehensive account of the emergence of syllable structure in the creolization of one particular language.

The main questions that need to be answered are the following. Given a particular creole language, when does epenthesis occur, when does deletion? What causes these processes and which factors govern their variability within and across creoles? In other words, why is it that sometimes segments are inserted, while in other cases segments are lost in creolization? Is one of the two, e.g. deletion, the default, unmarked mechanism, the other only occurring under special circumstances? Which structural and historical factors govern the choice of epenthesis as against deletion or vice versa? Which principles govern the development of syllable structure in creolization: universal preference laws, transfer from the substrate languages or superstratal influence?

In this article we will try to answer these questions for one creole language, Sranan. One of the reasons for choosing this particular language for a case study was that it is a creole in which both kinds of processes are widely attested. We will systematically compare early Sranan words with their English etyma and present a constraint-based account in the framework of optimality theory. On the basis of this comparison it is argued that three elements are important in the creation of the creole, but each of them in a different and very specific way. Firstly, the superstrate language provides the base forms which the creole creators are more or less faithful to. Secondly, universal preference laws - encoded in universal structural constraints against certain types of syllable - disturb completely faithful copying of the superstrate system. This is possible because, thirdly, the substrate exerts its influence in that it imposes a particular grammar on the creole in the form of high ranked structural constraints and low ranked faithfulness constraints. This possibility of unfaithful copying arises whenever the substrate imposes tighter structural restrictions than the superstrate. Epenthesis and deletion thus are the result of the substrate ranking imposing a relatively unmarked syllable structure. The non-uniformity of these adjustment processes is due to the interaction of different faithfulness and markedness constraints.

The article is structured as follows. In the following section we will give some background on Sranan and present the relevant sets of data. Section 3 presents a detailed optimality theoretic

analysis of the data and section 4 discusses the role of language universals and substrate transfer in the emergence of optimal syllables in creole.

2 DELETION AND EPENTHESIS IN SRANAN

Sranan is an English-based creole language spoken in Surinam, on the Caribbean coast of South America. Surinam was colonized in the middle of the 17th century by British planters from St. Kitts, Nevis, and Barbados, who brought an unknown number of African slaves with them. In 1667 the British exchanged the colony for what later became New York City and the Dutch took over. In 1680 only very few British settlers were left in the colony and the influence of English practically ended, so that we can state that within only three decades a form of an English-based Pidgin or creole had emerged as the main medium of communication in the colony. Today, Sranan is the lingua franca of Surinam, spoken by the vast majority of Surinamese either as a first or as a second language. The total number of speakers (including the large amount of speakers immigrated to the Netherlands) is about 500,000, some 60 % of which are native speakers (Adamson and Smith, 1995). The major substrate languages of Sranan are the West African languages Kikongo (a Bantu language), Gbe and Twi (both Kwa languages).

The majority of Caribbean creole languages have been under continuing influence by their lexifier languages, leading to the gradual erosion of basilectal creole features. This does not hold, however, for Sranan and the other Surinamese creoles due to the early removal of speakers of the superstrate language(s). Therefore, the Surinamese varieties have been of central importance for the field of creole studies: they are assumed to have preserved their original properties to a much greater extent than their Caribbean relatives (see, for example, some of the articles in Baker & Bruyn 1999 for recent evidence for this assumption).

In order to reconstruct the phonological development of English words undergoing creolization we have consulted data as attested in the earliest available documents of Sranan dating from the early 18th century to the mid 19th century (Herlein, 1718; van Dyk, 1765; Nepveu, 1770; Stedman, 1790 (data from 1773-1777); Schumann, 1783; Focke, 1855; Wullschlägel, 1856)[3]. A large portion of the data presented here are taken from Smith's (1987) pioneering study, to which we refer those readers interested in full philological documentation of individual words. The decision to use the earliest sources has the advantage that the data deviate from the *status nascendi* as little as possible, so that some later developments which might blur the picture are eliminated from the analysis. The sources have been used in a number of large-scale syntactic and phonological studies before (Arends, 1989; Bruyn, 1995; Plag, 1993; Smith, 1987) and can be regarded as linguistically reliable (see Arends, 1995a; Bruyn, 1995; Plag, 1993 for more detailed discussion).

For our analysis, we adopt a theory of syllabic structure which assumes the existence of at least three sub-syllabic constituents, onset, nucleus and coda. The analysis will be fleshed out in terms of optimality theory (Prince & Smolensky, 1993 et seq.)

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[3] The forms cited below are usually given in their modern Sranan form if, with respect to epenthesis and deletion, the early Sranan forms do not differ from their Modern descendents. Where there are such differences it has been noted.

Let us turn to the deletion phenomena first. Deletion can occur in word-initial position as in (3), in word-internal position as in (4), and in word-final position as in (5) below. We will discuss each in turn (pertinent strings are underlined).

(3) WORD-INITIAL DELETION

	ENGLISH		SRANAN
a.	speak	>	piki
	spermaceti	>	pramaseti[4]
	spoil	>	pori
	stand	>	tan
	story	>	tori
	strong	>	tranga
	scrape	>	krebi
	square	>	kweri
	scratch	>	krasi
b.	speak	>	*sipiki, *siki
	strong	>	*sitaranga, *sranga
c.	smoke	>	smoko (*somoko, *moko, *soko)
	snake	>	sneki (*sineki, *neki, *seki)

The data in (3a) show that in a large number of words, word-initial [s] is systematically deleted if it occurs as part of a complex onset involving a plosive as its second element. Hence, deletion of initial [s] can be interpreted as a strategy to simplify complex onsets.[5] Two other possible strategies, namely epenthesis (breaking up the cluster), or deletion of the second consonant are not available options, as illustrated in (3b), where the asterisks indicate that these forms are unattested. This is a systematic gap. Interestingly, not all onset clusters involving initial /s/ show deletion. Those involving e.g. nasals as their second element, survive without further manipulation, as exemplified in (3c).

In word-internal position, consonant clusters are often reduced by eliminating one of the two or more consonants. In some cases deletion affects the first consonant of the cluster, as in (4a), in other cases it is the second consonant that vanishes (see (4b)).

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[4] For a discussion of liquid metathesis as attested in *pramaseti* see below. We do not say anything in this paper about processes of adaptation on the segmental level, i.e. the changes individual sounds underwent in creolization. See Smith, 1987 for a detailed analysis of this aspect of phonological restructuring in creolization.

[5] There are also a number of forms that have preserved their initial /sC/ clusters. Many of them are later borrowings from Dutch (e.g. *schop* > *skop* , *schrijven* > *skrifi, schrik* > *sreki*) and are therefore excluded from the discussion. However, there are also some English-based words that have resisted deletion of /s/, e.g. *skin* > *skin, stone* > *ston, spit* > *spiti.* Although this kind of variation is interesting in itself, this paper focuses on the question why and where segments were deleted (or epenthesized) and not why single words escaped this process.

(4) WORD-INTERNAL DELETION

	ENGLISH		SRANAN	
a.	doctor	>	datra	kt > t
	goodmorrow	>	kumara	dm > m
	goodnight	>	kuneti	dn > n
b.	master	>	masra	st > s
	nasty	>	nasi	st > s
	softly	>	safri	ft > f
	sister	>	sisa	st > s

By way of this cluster simplification obstruent codas (**dak.tra*) and complex onsets consisting of two obstruents (**ma.ster*) are avoided. Only nasals are systematically allowed as codas, so that internal clusters beginning with a nasal (such as *ntr* or *ndr*) are split up into two syllables without deletion or epenthesis.

In word-final position, we have to distinguish between the behavior of nasals and that of non-nasal consonants. Let us first deal with those English words that end in a non-nasal consonant. Non-nasal consonants in word-final position are deleted if and only if they are part of a consonant cluster. Examples of deletion are given in (5). Single word final consonants are preserved (and trigger epenthesis), as shown in (6) below:

(5) WORD-FINAL DELETION IN CONSONANT CLUSTERS

ENGLISH		SRANAN
field	>	firi
first	>	fosi
haste	>	hesi
soft	>	safu

The pattern in (5) can be captured by the generalization that word-final consonant clusters lose their final obstruent and take an epenthetic vowel. As in (4) above, this means that consonants are deleted if non-deletion would either lead to non-nasal codas (**soft* > *saf.tu*) or to certain types of onset clusters (**first* > *fo.sti*). Interestingly, final NC clusters do not behave in this fashion in early Sranan, they preserve the cluster (for example *want* > *wanti, wandi,* or *paint* > *pendi*). Only later do these words lose their obstruents (Modern Sranan: *wani, peni*).

Let us now turn to cases of insertion of segments. Epenthesis can be found only in one position, that is word-finally. The data in (6) illustrate this phenomenon. The asterisked forms (and the patterns they represent, i.e. deletion or toleration) again are unattested.

(6) EPENTHESIS IN WORD-FINAL POSITION ('paragoge')

ENGLISH		SRANAN
afraid	>	frede (*fre, *fred)
because	>	bikasi (*bika, *bikas)
nose	>	noso
top	>	tapu
walk	>	waka

The epenthesis facts boil down to the generalization that (only) English words ending in non-nasal consonants take an epenthetic final vowel, a phenomenon known as (vowel) paragoge. The quality of the paragogic vowel in Modern Sranan is partly lexicalized, partly predictable, but will not be considered any further in the context of this study (see Smith, 1977; Plag & Uffmann, in press for details and historical development).

We finally come to the nasal-final etyma, which do neither undergo deletion nor epenthesis, as shown by the data in (7):

(7) WORD-FINAL PRESERVATION OF NASALS

ENGLISH		SRANAN
anyone	>	iniwan (*iniwa, *iniwani)
begin	>	bigin (*bigi, *bigini)
fall down	>	fadon
handsome	>	hansum
woman	>	homan
man	>	man
name	>	nen
time	>	ten

This account of the fate of nasal-final etyma faces two apparent exceptions. The first one concerns final nasals in unstressed syllables, which, in their majority, are no longer present in Modern Sranan. It is, however, clear that this must be a later development, since in the earliest sources many such nasals are still attested, as evidenced by words such as *iniwan, homan,* and *hansum* in (7) (see Alber & Plag, in prep. for a detailed account). The second exception concerns base words ending in a velar nasal, which often take a paragogic vowel, hence pattern with consonant-final etyma. This phenomenon has already been dealt with in some detail in Plag & Uffmann (in press) and need not be further commented on here.

There is yet another phenomenon which could be analyzed as an instance of syllabic optimization, metathesis. Metathesis frequently occurs with items that feature post-vocalic /r/ or /l/ in English etyma. The behavior of such stems is not uniform in Sranan. Thus there are many items where no trace of the liquid is left, as in (8a), another set of English words show metathesis, as in (8b), some words from earlier sources seem to feature epenthesis, see (8c), and one group of words have even preserved their coda liquid, as in (8d). Some of the items in (8c) are variants of items in (8b):

(8)	a.	first	>	fosi
		ginger	>	gindja
		heart	>	hati
		horse	>	hasi
		river	>	liba
		sister	>	sisa
	b.	burn	>	bron
		court	>	krutu

	doctor	>	datra
	help	>	repi, jrepi
	kiver	>	kibri
	master	>	masra
	over	>	abra
	remember	>	memre
	turn	>	tron
	sharp	>	srapu
	silver	>	sriba
	work	>	wroko
c.	help	>	jerepi
	other	>	atara
	over	>	abere
	kiver	>	kiepere
	master	>	massera
	remember	>	memere
	silver	>	siliba
	warm	>	waran
	work	>	woroko
	worm	>	woron
d.	hark	>	arki
	mark	>	marki
	shark	>	sharki

The variability in the preservation vs. deletion of coda /r/ has been attributed to the variability already present in English. Speakers of both rhotic and non-rhotic dialects of English must have been contributing words in the formation period of Sranan, hence the apparent cases of deletion are straightforwardly accounted for by the non-presence of post-vocalic /r/ already in the varieties on which Sranan words were modeled (e.g. Smith, 1987:341; Plag, 1999a:181-183). Those words that have preserved coda liquids fall into two groups. The minority of forms show no phonotactic manipulations, see (8d), whereas a clear majority of forms show what is commonly referred to as liquid metathesis: the liquid has swapped positions with its tautosyllabic neighboring vowel. How can these phenomena be analyzed? Is it similarly to the cases of deletion and epenthesis discussed above, in that its primary function is to bring about a more umarked syllable structure? In other words, is liquid metathesis a case of syllable optimization?

For the cases of metathesis as given in (8b) Smith (1987:345ff) proposes that, historically, this is in fact epenthesis followed by deletion of the (later unstressed) etymological vowel, as exemplified in (9):

(9) work > wóroko > woróko > wroko

Indeed, for many of the forms in (8b), epenthesized variants are attested in the early sources (and given in (8c)), so that an account of metathesis along these lines is conceivable. But why does it happen? One might argue that metathesis is an instance of phonotactic optimization, since the

resulting structure has lost its coda consonant(s). This raises two questions, however: why was the offending coda liquid not simply deleted? And why is metathesis in Sranan restricted to liquids?

We will argue that Sranan liquid metathesis is not a case of phonotactic optimization, but a case of perceptual metathesis as discussed in Blevins and Garrett (1998). Perceptual metathesis is a historical process which only affects consonants that have an acoustic or perceptual feature of relatively long duration. This feature leads to some ambiguity as to the linear or segmental cause or origin of the feature in question. Thus perceptual metathesis originates "when features extending across a CV or VC domain, or perceived as extending across such a domain, are reinterpreted as originating in nonhistorical position" (Blevins and Garrett, 1998:510). This proceeds in three historical stages. In the first, original stage, a string of segments is analyzed into a discrete VC or CV sequence. In the following stage, the features of the consonant shift or spread across an adjacent vowel leading to multiple linking: VC, CV > VCV. Thus, a word like *work* is reanalyzed as *woroko*. So, what looks as word internal epenthesis is in fact multiple linking of the vowel. In the final stage the consonant is analyzed as belonging to the other (nonhistorical) side of the vowel. Cases of CV metathesis that have formerly been argued to be epenthesis followed by deletion can thus be subsumed under perceptual metathesis. Due to its very nature, perceptual metathesis is restricted to liquids, laryngeals, pharyngeals and glides (Blevins and Garrett, 1998:513).

Under the perceptual metathesis analysis the restriction of metathesis to liquids in Sranan is not surprising because liquids belong to the set of segments that are prone to perceptual metathesis. Thus, the perceptual metathesis analysis can explain the fact that only one type of consonant (liquids) is affected. Furthermore, given that stage 2 with multiple and variable linking is typical of perceptual metathesis, data like those in (8c) are to be predicted.

Perceptual metathesis even offers a possible (though tentative) explanation of the forms in (8d), which all violate the generalization that Sranan only allows nasal codas. Notably, preservation of liquids in coda position only occurs with English words ending in /ark/ (see also Smith, 1987:343). In the light of perceptual metathesis it can be argued that the perceptual interpretation of the liquid differs according to context. Thus, /r/ might be more clearly associable with a neighboring /k/ than with other neighboring consonants. Effects of this kind are described by Blevins and Garret (1998) for example for Latin and Le Havre French.

In sum, the perceptual metathesis analysis can account for certain problems that cannot be solved by an analysis that exclusively rests on phonotactic optimization. Given the equivocality (or complementarity) of the two explanations we will restrict ourselves in the following section to those cases that we think are unequivocally analyzable as driven by requirements concerning syllabic structure.

3 ANALYSIS

3.1 Theoretical preliminaries

The phonological restructuring involved in creolization necessitates some mapping of phonetic/phonological representations of the lexifier language onto the phonetic/phonological

representations of the emerging creole. We propose that this mapping can be modeled as a two-level process involving the English and the Sranan output forms.[6] The relationship between the two outputs is similar to the one between underlying representation (UR) and phonetic realization in a single language, the difference being that in our case two output forms of two different languages are targeted.

(10)

UR		UR
|		|
[English output]	←faithfulness→	[Sranan output]

In both cases we are dealing with a relationship of faithfulness (in OT terms): the creole output strives to represent the English output as it is. Of course, if faithfulness was the only active principle, this would be the end of the story, the creole would be identical to the superstrate. This is not the case, since structural constraints can disturb the relationship pictured above, as we will see in detail throughout the analysis.

The proposal to extend faithfulness-relations to output-output relationships has been a major topic in recent OT literature. Thus, it has been proposed to analyze the relationship between a reduplicant and its base in reduplication with the same faithfulness constraints as the relation between an underlying representation and its output (McCarthy & Prince, 1995). Similar approaches have been extended to truncation, cyclic affixation and paradigmatic relationships in general (cf. Benua, 1995, 1997; McCarthy, 1995; Kenstowicz, 1996; Kager, forthcoming ; Alber, 1998; Plag, 1998, 1999b, among others). Following the above literature on reduplication we will use the term 'base' for the English superstrate word and the term 'output' for the Sranan word derived from this base.

Although we try to present the process of creolization, in an idealized way, as a snapshot mapping base to output, we cannot exclude later influences, e.g. from other languages such as Dutch, which might disturb the mapping we are describing. In fact, the phonological changes we observe in the following sections are not without exceptions, but the tendencies are clear and worth of an analysis.

3.2 Word-final epenthesis

The first syllable adjustment process we will be looking at is paragoge. The motivation for this process, we will argue, is that Sranan has severe restrictions on possible coda consonants. To repair word-final English consonants Sranan chooses to insert an epenthetic vowel.[7]

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[6] This is similar in spirit to Yip's (1996) analysis of loan word adaptation, OT analyses of interlanguage phonology (Hancin-Bhatt & Bhatt, 1997; Broselow et al., 1998), and Singler's (1996a, 1996b) and Lipski's (1999) treatment of creolized forms in Liberian English and Portuguese based creoles. See Silverman (1992) for a model involving more than two levels of analysis.

[7] In what follows we will illustrate the various processes only with one example of each of the patterns given in section 2.

(11) because > bikasi

Sranan syllables almost never end in a consonant other than a nasal, neither word-internally, nor at the word edge.[8] We interpret these facts as the result of a dominant constraint against non-nasal codas:

(12) **CODACOND**: only nasals are possible codas
cf. Itô (1986)[9]

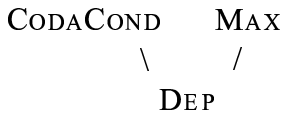
While word-internally potential coda consonants delete (see discussion in next section), word-finally epenthesis takes place. In our approach the reason for epenthesis is that DEP, the faithfulness constraint banning insertion, is lower ranked than MAX, the constraint militating against deletion.[10]

(13) **MAX**: no deletion
Every segment of the base has a correspondent in the output

(14) **DEP**: no epenthesis
Every segment of the output has a correspondent in the base

McCarthy & Prince (1995) use these constraints for correspondence relations between input and output as well as for the relation between base and reduplicant in reduplication. In our case faithfulness targets the relationship between the English base and the creole output.
The proposed partial ranking to account for word-final epenthesis is as follows:

(15) Partial hierarchy for word-final epenthesis



The following tableau illustrates how the constraints decide on the winning candidate:

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[8] There are some cases where liquids appear in the coda (see section 2. above). The only clear cases of obstruent codas we found are *jacket* - *djakti* and *crooked* - *kruktu*

[9] cf. Itô & Mester (1994) for a redefinition of coda conditions in terms of alignment. According to their proposal segments banned from coda position are under the influence of an alignment constraint ALIGN (SEG, L, σ, L) requiring them to align to an onset position. In our case all segments except nasals would be under the influence of alignment constraints of this type. In this view, our CODACOND is shorthand for a much more complex state of affairs.

[10] We follow correspondence theory as outlined in McCarthy & Prince (1995)

Tableau 1

Base: *because*	CODACOND	MAX	DEP
☞ (a) bikasi			*
(b) bikas	*!		
(c) bika		*!	

Candidate (b) would be faithful to the English base. But it violates the high ranked constraint CODACOND and hence is ruled out. Candidate (c) repairs an offending coda through deletion but violates MAX, the faithfulness constraint banning deletion. Finally, the winning candidate (a), avoiding a coda through epenthesis, only violates lowest ranked DEP and thus turns out to be the winner.

3.3 Cluster simplification through deletion

Sranan faces yet another problem concerning the English base: while English allows for complex onsets consisting of a fricative and a plosive such as [st], Sranan has no complex onsets of this type. Instead, potential complex onsets are resolved through deletion. In the following examples, the first consonant of a cluster is lost word-initially, while the second consonant is lost word-finally:

(16) (a) s t rong > t ranga deletion of C_1

C_1 C_2 C_2

(b) lo s t > la. s i deletion of C_2

C_1 C_2 C_1

It is not the case that Sranan prohibits complex onsets in general, as can be seen from the name of the language itself.

(17) s r anan

C_1 C_2

So what is it that makes a syllable initial [st] cluster bad for the creator of Sranan? We claim that what is active here is the well known principle that the sonority of syllables has to increase towards the peak. We rephrase this principle, taken from Clements (1990), as a constraint:

(18) Sonority sequencing principle (SSP): sonority must increase towards the peak.
(following Clements, 1990)

We assume the following sonority hierarchy:

(19) Sonority hierarchy (< = less sonorous):
plosives < fricatives < nasals < liquids < vowels
(cf. Blevins, 1995 for a similar scale)

This means that the complex onset [st] creates a sonority decrease towards the syllable peak, thus violating the SSP. In what follows we will see in detail how this constraint triggers deletion in various contexts.

3.3.1 Word-initial cluster simplification

In principle, there are several possibilities to avoid a word-initial sonority decrease: the first or the second consonant of the offending cluster could be deleted, or epenthesis could be used to resolve the cluster:

(20) Possible repair strategies for clusters violating the SSP:

☞ (a) Deletion of C1: strong > tranga
(b) Deletion of C2: strong > sranga
(c) Epenthesis: strong > sitranga

Sranan chooses the first possibility and we have to ask what favors (a) over (b) and (c). We want to propose that (a) is better than (b) and (c) in that it copies faithfully the linear sequence of segments in the base: segments that are contiguous in the base are also contiguous in the output. In (b), on the other hand, two segments, [s] and [r], meet in the output which were not neighbors in the input, while in (c) the base sequence [st] is interrupted by the epenthetic vowel.

A faithfulness constraint requiring contiguity has been proposed e.g. by Kenstowicz (1994), Baković (1994), McCarthy & Prince (1995) and Lamontagne (1996). In our definition of the constraint we follow McCarthy & Prince (1995) and, specifically, their suggestion that contiguity be split into two constraints: one evaluating whether elements that are contiguous in the base are also contiguous in the output and a mirror constraint making sure that elements contiguous in the output are also contiguous in the base. This differentiation of the two constraints will be important for our discussion of the repair of word-internal clusters.

(21) B-CONTIGUITY[11] = NO SKIP: "no internal deletion!"
The portion of the base standing in correspondence forms a contiguous string.

O-CONTIGUITY = NO INTRUDE: "no internal epenthesis!"
The portion of the output standing in correspondence forms a contiguous string.

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[11] What we call B-CONTIGUITY is labeled I-CONTIGUITY in McCarthy & Prince (1995), who define the constraint for the relationship between input and output while in our case it is defined for the correspondence relation between the (English) base and the (Sranan) output.

Like MAX and DEP, contiguity constraints are part of the family of faithfulness constraints. They require base and output to be identical. They are special faithfulness constraints in that they do not require segments to be identical, but their relationship of adjacency to be the same in the base as in the output.

Both contiguity constraints defined above allow that elements be deleted or inserted at the margins. They make different evaluations regarding the disturbance of a sequence in the middle of a string. B-CONTIGUITY (which we will call NO SKIP for mnemonic reasons) works against internal deletion while O-CONTIGUITY (NO INTRUDE) rules out internal epenthesis.
We will illustrate this with the following example, where vertical bars "|" indicate the portion of the string standing in correspondence:

(22)	initial deletion	medial epenthesis	medial deletion
base:	$s_1\ t_2\ r_3\ \ldots$	$s_1\quad t_2\ r_3\ \ldots$	$s_1\ t_2\ r_3\ \ldots$
	$\quad\ \|\ \|$	$\|\quad\ \|\ \|$	$\|\quad\ \|$
output:	$\varnothing\ t_2\ r_3\ \ldots$	$s_1\ i\ t_2\ r_3\ \ldots$	$s_1\ \varnothing\ r_3\ \ldots$
	√ NO INTRUDE	* NO INTRUDE	√NO INTRUDE
	√ NO SKIP	√ NO SKIP	*NO SKIP

In the case of initial deletion both contiguity constraints are observed: t_2 and r_3 are contiguous in the base as well as in the output. The segment s_1 is not part of the "portion standing in correspondence" since s_1 has no correspondent in the output and therefore the contiguity requirement is fulfilled vacuously. Medial epenthesis leads to a violation of O-CONTIGUITY: t_2 and t_2, though contiguous in the base are not contiguous in the output because they are separated by the epenthetic element. Medial deletion, on the other hand, violates NO SKIP since s_1 and r_3, the portion of the string standing in a correspondence relation, do not form a contiguous string in the base because of intervening t_3, which does not have a correspondent in the output.

Let us now return to the problem of initial clusters that do not respect the sonority hierarchy. We propose the following constraint hierarchy to analyze the problem of cluster simplification:

(23) SSP CODACOND NO INTRUDE
\ | /
MAX, NO SKIP
|
DEP

= SSP, CODACOND, NO INTRUDE >> MAX, NO SKIP >> DEP

The details of the hierarchy will become clear as we move on in our discussion of cluster simplification, but some general idea can already be gleaned from its overall structure. First of all, the hierarchy has integrated the partial hierarchy we used for the analysis of word-final epenthesis and thus is compatible with it. The high ranking of structural constraints such as the principle requiring a certain sonority profile (SSP) and a constraint militating against syllables

with non-nasal codas (CODACOND) indicates that structural constraints are very important in this corner of Sranan phonology. The low ranked faithfulness constraints show that it is at their cost that structural constraints are observed. DEP is lowest, hence epenthesis will take place, but MAX, too, is dominated, by a contiguity constraint, and this will lead to deletion. The ranking of NO INTRUDE over NO SKIP won't be important for initial clusters, but it will be for medial ones.

The following tableau illustrates how the proposed hierarchy evaluates the base *strong* and selects as the winning candidate [tranga]:[12]

Tableau 2

Base: *strong*	SSP	CODACOND	NO INTRUDE	NO SKIP	MAX	DEP
☞ (a) tranga					*	
(b) sranga				*!	*	
(c) sitranga			*!			*
(d) stranga	*!					
(e) i.stranga	*!					*
(f) is.tranga		*!				*

The high ranking of the sonority sequencing principle makes sure that the initial [st] cluster cannot survive. Thus, although very faithful to the base *strong*, candidate (d), [stranga], must fail. Candidates (a), (b) and (c) would obey the SSP, but two of them violate a contiguity constraint. Candidate (b) deletes a word-medial consonant violating NO SKIP. In candidate (c) the epenthetic vowel disrupts the sequence of segments in the output violating NO INTRUDE. Candidates (e) and (f) show that epenthesis at the word edge, although helpful in avoiding CODACOND violations, is not a possible strategy here. No matter how deep DEP is ranked, its violations cannot rescue the last two candidates of the tableau: candidate (e) is ruled out through an SSP violation, candidate (f) because the first syllable has a coda which is not a nasal.

So far we have seen one context in which Sranan uses epenthesis and another one in which it uses deletion to accomodate segment strings to the SSP. If no higher constraints intervene, epenthesis is chosen to repair word-final codas. But epenthesis is blocked by high-ranked contiguity constraints that prohibit deletion or epenthesis inside a root. Hence, the best repair of offending clusters is to cut material at the edges.

We have illustrated what happened to clusters with a bad sonority profile at the left edge of the word. In the next subsection we will see that the hierarchy in (18) makes also the right predictions for clusters at the right edge.

3.3.2. Word-final cluster simplification

Word-final clusters present us with the mirror image of initial ones. Take for example

[12] Those DEP-violations that are triggered by the word-final epenthetic vowel are ignored here and in the following tableaux.

(24) haste > hesi

The base *haste* cannot surface as [hesti], since this would mean either a violation of the SSP, in the syllabification [he.sti], or a violation of CODACOND, if *haste* is syllabified as [hes.ti]. Again, the same repair strategies can be thought of as in the case of initial clusters. One of the two consonants can be deleted or an epenthetic consonant could be inserted:

(25) Possible repair strategies for final clusters:

(a) Deletion of C1: haste > heti
☞ (b) Deletion of C2: haste > hesi
(c) Epenthesis: haste > hesiti

In this case, Sranan chooses to repair the cluster by deleting the second consonant of the cluster. Why the second? The reason is clear if we take into account the contiguity constraints discussed above. Deleting segments at the edge of the word does not cause any contiguity violations and therefore in this case C2 and not C1 is the target of deletion. Note that deleting the consonant before the epenthetic vowel does not constitute a violation of NO SKIP, even though it might seem that something has been deleted in the middle of the word. The reason for this is that the epenthetic vowel is not present in the base and therefore does not fall under the requirement to be contiguous to some other segment in the base. Technically speaking, the epenthetic vowel does not stand in correspondence. Below, we illustrate how the proposed constraint hierarchy leads to deletion of C2 in the case of final clusters:

Tableau 3

Base: *haste*	SSP	CODACOND	NO INTRUDE	NO SKIP	MAX	DEP
☞ (a) hesi					*	
(b) heti				*!	*	
(c) hesiti			*!			*
(d) he.sti	*!					
(e) hes.ti		*!				

As in the case of initial clusters, the cluster cannot be preserved, since this leads either to a violation of the SSP (candidate (d)) or to a violation of the coda condition (candidate (e)). Internal epenthesis as in (c) or deletion as in (b) are no solution either, since both violate the strong contiguity requirements. The only possibility to satisfy all high ranked constraints is to delete the base-final consonant, as in (a).

3.3.3 Word-internal cluster simplification

As already mentioned in section 2, when consonant clusters appear word-medially, a number of patterns can be observed. In those cases where the first consonant is a nasal followed by one or more other consonants (e.g. *candle, hundred*), the cluster survives, with a syllable boundary

between the nasal and the following consonant(s): *kan.de.ra, hon.dro*. In those cases, where the cluster cannot be broken up into well-formed Sranan syllables, one of the two consonants is deleted, as shown in the data in (4), repeated here for convenience as (26). Epenthesis does not occur.

(26)		ENGLISH		SRANAN	
	a.	doctor	>	datra	kt > t
		goodmorrow	>	kumara	dm > m
		goodnight	>	kuneti	dn > n
	b.	master	>	masra	st > s
		nasty	>	nasi	st > s
		softly	>	safri	ft > f
		sister	>	sisa	st > s

The data seem to indicate that it is always the plosive that is deleted. This may suggest that deletion makes reference to the feature [continuant], which distinguishes plosives and fricatives. However, nasals share the [- continuant] feature specification with plosives, so that the preservation of nasals (s. 26a) would be unaccounted for. Alternatively, one may think that sonority is the key factor here, since it is always the less sonorous element of the cluster that is deleted.[13] The grammar developed so far yields two optimal candidates for words such as those in (26):

Tableau 4

Base: *nasty*	SSP	CODACOND	NO INTRUDE	NO SKIP	MAX	DEP
☞ (a) nasi				*	*	
(b) nasiti			*!			*
(c) na.sti	*!					
(d) nas.ti		*!				
☞ (e) na.ti				*	*	

Notably, the two optimal candidates are those which show deletion of either the first or the second consonant. Due to NOINTRUDE outranking NOSKIP, epenthesis is not allowed by this grammar to break up the cluster, which is in accordance with the patterning of the data. In this respect, our grammar makes the right predictions for word-internal clusters. However, the problem remains that both candidates (a) and (e) do equally well on the given constraint hierarchy, but only one of them (*nasi*) is actually attested. With the words given in (26a) the opposite problem arises, since only the forms with the first consonant deleted are attested. One could hypothesize that indeed two variants of each form were present at one time and that only one form survived the process of leveling that is characteristic of creolization. There are, however,

[13] An additional problem emerges with *doctor* > *datra*, where both segments are unvoiced plosives. We are unaware of any claims concerning sonority differences within the class of voiceless plosives.

very few data which exhibit the pertinent clusters ((26) is an exhaustive list), so that it is impossible to evaluate this hypothesis.

Given the generalization from above that there is a preference of deleting less sonorous segments over deleting more sonorous ones one could think of modeling an OT analysis along one of these lines. However, it is unclear to us, what kind of constraint would be responsible for the observed effect. Above all, it is doubtful whether any firm conclusions can be drawn from barely a handful of pertinent forms. We therefore prefer to leave open this problem rather than introducing an *ad hoc* constraint deciding between the deletion of C_1 and C_2 in word-medial contexts.[14]

3.4 Summary

In the foregoing sections we have proposed an optimality theoretic account of syllable restructuring in early Sranan. We have argued that the different deletion and epenthesis effects can be uniformly explained by the operation of a number of universal phonological constraints with a specific hierarchical ranking. English base words are restructured under the pressure of structural constraints that demand relatively unmarked syllabic structures. These constraints interact with different kinds of faithfulness constraints to yield the specific kinds of pattern we find in early Sranan.

4 SUPERSTRATE, SUBSTRATE AND UNIVERSALS IN PHONOLOGICAL RESTRUCTURING

Let us now consider our analysis of deletion and epenthesis in the light of the three major approaches to creole genesis outlined in section 1, the superstratist, substratist, and universalist view. In terms of these approaches the following picture emerges with regard to the problem of syllable optimization in the genesis of Sranan.

First of all, a strictly superstratist account of the emergence of the Sranan syllable is unconvincing because of the massive restructuring that English syllable structure underwent in the creolization process. In view of the restructuring going on, the role of the superstrate is to provide output representations to which faithfulness constraints can refer and on which structural constraints operate to derive a new prosodic structure.

Let us turn to the other possible factors, the substrate and universals. CV is the universally unmarked syllable structure (e.g. Blevins, 1995), which seems to speak for a universalist explanation of the phenomena under discussion. However, CV is also prominent in many of the creole's substrate languages. What is even more important, the substrate does not make use of a completely unmarked CV-structure but allows for (marked) complex onsets of a

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[14] It could be tempting to extend an explanation in terms of sonority to all cases of cluster simplification. Could the contiguity account be completely replaced by an analysis where generally less sonorous elements are deleted? It seems that it cannot, because such an analysis would run into problems with word-initial clusters where it is more often the more sonorous element that is deleted.

certain type: those that do not violate the sonority sequencing principle (see below for details). Sranan allows for exactly these types of onsets as well. It is only the syllables violating the SSP, and not other onset clusters, that are simplified in Sranan. This is an important clue that the seemingly universal syllable structure is the result of a transfer from the substrate grammar.[15]

Independent evidence for phonological transfer in the emergence of Sranan is presented in Plag & Uffmann (in press). The quality and the kind of variation of the paragogic vowel in the early sources and the integration of velar nasals into Sranan strongly point towards transfer as a driving force in shaping the Sranan syllable.

One last argument in favor of interpreting the Sranan syllable structure as the result of pressure from the substrate language and not, for instance, as the result of a natural historical process is the fact that epenthesis as a diachronic phonological rule has been claimed to be universally marked, whereas deletion is said to be universally unmarked (e.g. Vennemann, 1988, Singh & Muysken, 1995). Hence, the universalist approach would predict deletion in all environments and not deletion in certain environments and epenthesis in others. However, this is exactly what occurs in Sranan: consonants are deleted in certain contexts, vowels are epenthesized in others.[16]

For these reasons we will endorse the view that the seemingly universally unmarked syllable structure of Sranan is really the result of the pressure of the grammars of its substrate.

In this respect, creolization as involved in the creation of Sranan is very similar to the process of integrating loan words and to second language acquisition. In loan word adaptation and acquisition of L2 massive and systematic restructuring of the syllable only occurs if the native language has tighter restrictions on syllable structure than the target language. For instance, German learners of English generally do not simplify complex onsets or delete codas since these particular syllabic structures are also allowed in their mother tongue (minor differences not counted). The same holds for English learners of German. Only in those cases where the phonotactic restrictions of the target language are indeed tighter than in L1 do we find epenthesis or deletion. Consider, for example, the pronunciation of the name *Knivel* by many speakers of English as *K*[ə]*nivel*. In German this onset cluster is legal, hence German speakers do neither epenthesize nor delete when they pronounce this name. Similar cases from a wide variety of language pairs are documented in the loan word and second language acquisition literature (e.g. Silverman, 1992; Yip, 1993; Itô & Mester, 1995a, 1995b; Paradis, 1996; Paradis & Lacharité, 1997; Uffmann, 1997 on loan words; Eckman, 1981; Hancin-Bhatt & Bhatt, 1997; Broselow et. al., 1998 on second language acquisition).

Let us consider why loan word adaptation, second language acquisition and creolization should display similar patterns. Roughly speaking, loan word adaptation involves the imposition of native phonological rules and restrictions on new words, as unisono argued by the above-mentioned authors. If the phonological effects of loan word adaptation are very similar to the phonological effects that can be observed in second language acquisition, one can assume that the same kind of imposition of native phonology on non-native word material is at work. In other words, in both cases we are confronted with transfer effects. We hypothesize that the difference

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[15] cf. Sabino (1990) for a similar argument as to substrate influence in Negerhollands.

[16] This is Singh & Muysken's central argument for their claim that paragoge must be substratum-induced.

between loan word adaptation and second language acquisition is that in second language acquisition the interlanguage system may start out with more or less complete transfer (of the native language constraint ranking) and then gradually moves towards the target language by reranking the constraints (e.g. Broselow et al., 1998). In loan word adaptation, the imposition of native phonological constraints (perhaps with some institutionalized peculiarities, see Itô und Mester, 1995a, 1995b) is more or less static, so that even advanced second language speakers of the donor language adapt loan words by imposing native phonology on them.

We claim that in creolization we see the same transfer mechanisms at work, with the additional complication that we are dealing with a process that works not only on the level of the individual but also on the level of speech community. That is, we have numerous speakers with sometimes different native languages that might impose slightly different constraints on the English base words.[17] The similarities between loan word adaptation and second language acquisition on the one hand and creolization on the other might even go further. It could well be, as we illustrate below, that a creole in its first stage imposes tighter restrictions, due to the substrate, on the material offered by the lexifier language (resembling in this loan word adaptation), while a prolonged contact with the superstrate will result in a relaxing of these restriction (in parallelism to second language adaptation).

We thus argue that the observed effects of syllable optimization must be a transfer effect: the substrate languages must have had tighter syllable constraints than English, which were then imposed on the English base words. In the following we will take a look at the pertinent West African languages Kikongo, Gbe and Twi to see whether this hypothesis is born out by the facts.

According to the most accurate account of the early Surinamese demographic development, Arends (1995b), Kikongo and Gbe influence must have been the most important, because Twi speakers were present in significant numbers only after c. 1720, whereas Kikongo and Gbe speakers were predominant among the slaves during the first century of the colony (roughly 1650-1740). Unfortunately, we do not know exactly how these languages looked like in the 17th and 18th century, but in order to accumulate the most relevant and accurate information about their syllabic structure we have used the earliest sources available to us, the oldest of which dates back to 1856 (Schlegel on Gbe).

In Gbe (see Abaglo & Archangeli, 1989; Bole-Richard, 1983; Capo, 1991; Da Cruz & Avolonto, 1993; Henrici, 1891; Lafage, 1985; Westermann, 1930, 1961), we find only vowel-final syllables and no violations of the SSP.[18] Onset clusters are allowed in this language - as long as the cluster increases in sonority towards the syllable peak (see 27a below). The Kikongo sources (Bal, 1964; Bentley, 1887; Bontinck, 1978; Chatelain, 1888-89; Daeleman, 1966; Laman, 1936; Seidel & Struyf, 1910; Spa, 1994; Wing & Penders, 1928) tell us that this language exclusively allows open syllables, with no violations of the SSP in the onset. The possibility of onset clusters is more restricted than in Gbe (the second consonant has to be a glide) but they do occur (see 27b). Prenasalized stops are possible and are best analyzed as single segments. The Twi sources

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[17] The eventual emergence of a given Sranan form, for example, must therefore be accompanied by a process that levels out possibly different variants. This process is usually referred to as dialect leveling and has been argued to operate on all levels of grammar in creolization (e.g. Siegel, 1997a, 1997b; Lefebvre, 1999; Plag & Uffmann, in press).

[18] Coarticulated consonants, as they occur in the name of the language itself, *Gbe*, are possible.

we consulted (Christaller, 1875; Hess, 1992; Schachter & Fromkin, 1968; Warren, 1976) draw a picture that is somewhat different from that of the other two substrate languages. Onset clusters do occur as long as they respect the SSP. However, differently from Gbe and Kikongo, in Twi it is possible to have consonants in the coda, provided that they are nasal (cf. 27c).[19]

(27) a. Gbe (Schlegel, 1856, his notation)

dro	'put down'
flo	'rise'
bla	'bind'
tšro	'spoil'

b. Kikongo (Seidel & Struyf, 1910, their notation)

kwiza	'come'
fwa	'death'
twika	'send'
engyuvu	'question'

c. Twi (Christaller, 1875, his notation)

osram	'moon'
ogya	'fire'
mutwam	'you pass'
trãbére	'a place to sit'

A comparison of the Sranan syllable and the syllable as found in the substrate languages thus reveals their close similarity. Onset clusters respecting the SSP do occur in Sranan as well as in its substrates, codas are not allowed at all in Kikongo and Gbe and very restricted (to /n/) in Sranan and Twi.[20]

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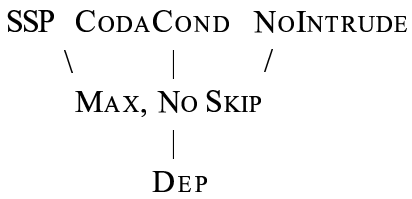
[19] All three languages employ rather consistently paragoge with consonant-final loan words, but the loan word data that can be gleaned from the above-mentioned sources are too scarce for a systematic investigation of epenthesis and deletion as interrelated processes.

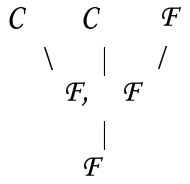
[20] It is unclear why Sranan permits nasal codas at all, since such codas are only allowed in one out of three substrate languages, Twi. Above all, this is the language whose influence has been considered as least important, because its speakers arrived rather late (e.g. Arends, 1995b). Furthermore, final /n/ must have still been preserved by the time of the majority of Twi speakers' arrival, because the English superstrate had already been removed and there was little or no access to the English base words any more. This can only mean that the earliest creators of Sranan (i.e. Kikongo and Gbe speakers) must have been able to preserve final /n/ inspite of the fact that their native language did not allow it. In other words, in this case the speakers were able to rerank the relevant constraints in such a way that syllables with final /n/ (and only those) did not undergo deletion or epenthesis. How can this be? Obviously certain types of rerankings are more easily done than others. Apart from geminates, syllable-final /n/ is among the least marked codas (Itô, 1986), which, in OT terms, means that the constraint against nasal codas is lowest in the universal markedness hierachy. Consequently, reranking faithfulness constraints above the lowest of the Coda constraints is the least difficult reranking.

In terms of constraint ranking this means that the grammar of the creole as well as the grammar of its substrate languages are characterized by high ranked markedness constraints. We can illustrate this clearly for Sranan if we represent the constraint hierarchy worked out in the previous sections in a more schematic way. Let us substitute for every constraint *F*, if it is a faithfulness constraint and *C*, if it is a structural constraint. The overall constraint hierarchy for Sranan deletion and epenthesis repeated below as (a) is translated in the *F*/*C* hierarchy (b):

(28) a.



b.



The hierarchy, except for NOINTRUDE, is characterized by high-ranked structural constraints: syllables must not have codas other than nasals and they must respect the sonority sequencing principle. We argue that it is this overall structure that is responsible for the observed effects: structural constraints dominate faithfulness constraints.

The grammar of the substrate languages must look similar. Since it is most important in these languages to obtain an unmarked syllable structure the markedness constraints will dominate whatever faithfulness constraints could disturb this picture. But there is one important difference between creole and substrate grammar: since speakers of Kikongo, Gbe or Twi - outside of the native lexicon - are never confronted with an input that contains clusters not conforming to the SSP or with coda consonants,[21] there is no need (and no evidence) for them to rank the faithfulness constraints among them. But whenever such an ill-formed cluster meets the native grammar e.g. in the form of a loan word or, in our case, in creolization, an important decision has to be made: it has to be decided which strategy will be used in order to get rid of the marked sequence. The strategies, in principle, can be various: clusters can be broken up through epenthesis, or segments can be deleted. What eventually happens depends on the ranking of faithfulness constraints between them. If DEP (the anti-epenthesis constraint) is ranked below MAX (the anti-deletion constraint), epenthesis will be better than deletion. If, as in Sranan, yet some contiguity constraint (banning domain internal epenthesis/deletion) is ranked above MAX, in certain contexts at least, it is better to delete. In the substrate languages themselves there is no evidence for the ranking between contiguity constraints, MAX and DEP. The speakers of Kikongo, Gbe or Twi are never confronted with the problem whether they should choose epenthesis or deletion in the case of, e.g., an [st] onset cluster simply because they are never presented with such an input cluster. Hence, the creation of a creole crucially involves the work of ranking faithfulness constraints among them.

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[21] Of course it is also necessary that no such clusters arise through morphological affixation. We didn't find any cases where e.g. a root-final fricative met a suffix-initial consonant in the grammars of Kikongo, Gbe and Twi we consulted.

We cannot see any *a priori* reason why one faithfulness constraint should be ranked over the other instead of the other way round. If the contiguity constraints had a subordinate position in the ranking, Sranan would not only have vowel paragoge, but also a process of breaking up clusters through epenthesis. It would thus have a different strategy of restructuring syllables, but the result would be the same: syllables without (non-nasal) codas and onsets that conform to the SSP. If it is true that the ranking of faithfulness constraints among them is arbitrary, then we predict that in loan word adaptation or in the creation of other creoles with similarly restrictive substrate languages other strategies of satisfying the restrictions on syllable structure imposed by the substrate will be employed. This is indeed the case, as the cursory data from loan word adaptation in (29) show.

(29)	a.	Gbe			
		school	>	sukulu	(Capo, 1991: 131, Lafage, 1985: 195)
		belt	>	beleti	(Lafage, 1985: 195)
		strict	>	sitrik	(Lafage, 1985: 194)
	b.	Kikongo			
		Cristine (French)	>	Kidisitini	(Bal 1964: 53)
		Pedro	>	Peetelo	(Bal 1964: 53)
		portugues (Portuguese)	>	mputulukeesu	(Bal 1964: 54)
	c.	Twi			
		silk	>	sírikyì	(Christaller, 1975: 13)

The scarceness and heterogeneity of the data does not allow us to draw any definite conclusions on the pattern of loanword adaptation in Gbe, Kikongo and Twi. But we see from the cited examples that word medial epenthesis is an option in Gbe, Kikongo and Twi loan words, while it was excluded by highranking contiguity constraints in Sranan. This means that the reranking of faithfulness constraints in the loanword adaptation can take different paths from the one it took in the emergence of Sranan. In the examples in (29) a grammar is active where epenthesis is the default repair strategy (hence MAX >> DEP) even word-medially (hence MAX >> CONTIGUITY).

The reranking of faithfulness constraints among them is an absolutely necessary move when speakers of a language with tight restrictions on syllable structure are confronted with a language as English. But we might rightly ask why reranking of faithfulness constraints with markedness constraints is not considered as an option. In other words, why is Sranan not immediately completely faithful to the superstrate abandoning the strict Kikongo/Gbe/Twi syllable structure? It seems that there is another kind of faithfulness at play here, faithfulness to the overall structure of the substrate grammar, with its high ranked markedness and low ranked faithfulness constraints. Sranan sticks to this structure as much as possible, deviating from it only in the (necessary) ranking of faithfulness constraints. In this sense reranking of previously unranked constraints (the faithfulness constraints) seems to be less costly than reranking of already ranked constraints (the ranking of markedness over faithfulness constraints).

Our discussion so far predicts that reranking between faithfulness constraints and markedness constraints is not excluded in principle. In fact, it does occur - when the pressure of the superstrate grammar persists. Continually confronted with a superstrate grammar that exhibits a ranking of faithfulness over markedness in the domain of syllable structure the creole

can give way to this pressure and allow for a reranking that will lead to an output that is more faithful to the superstrate, in other words, that allows for more marked syllable structures than what we know from Sranan. The influence of the English superstrate on Sranan was removed after a very short period, when the Dutch took over the colony, but this is a rather exceptional case. In a creole such as (now extinct) Negerhollands, for example, the creators of the creole had a much better access to the Dutch/Danish/English superstrates and continued to be under the influence of these languages for a much longer time (cf. Sabino, 1990). As a result, the syllable structure of Negerhollands allows for syllable codas (cf. (30a)), and for onsets that violate the sonority sequencing principle (cf. (30b)), just as its superstrates, even though the substrate languages (mainly Kwa, cf. Sabino, 1990) impose similar restrictions on syllables as the substrate languages of Sranan:[22]

(30)	a.	bes	'beast'
		blif	'please'
		mOskit	'mosquito'
		Otkwek	'earthquake'
	b.	skilpat	'tortoise'
		skrif	'write'
		spel	'play'
		strOp	'snare'

Thus, in Negerhollands we are dealing with a grammar where faithfulness constraints have been ranked above markedness constraints that ban codas and marked types of onsets. Nevertheless, Sabino (1990) describes very interesting relics of what once must have been a 'markedness-over-faithfulness' ranking and convincingly argues for transfer from the substrate languages. Thus, she counts 34 words in her corpus with invariant initial sC(C)-clusters. However, she finds 7 words where there is optional deletion of *s* in this context. Deletion is variable in the sense that not all speakers delete *s* in these words and some speakers even variably use both the deleted and the non-deleted forms. Here we quote some of them:

(31)	krew ~ skrew	<	schreuwen (Dutch)	'scream'
	kit ~ skit	<	schieten (Dutch)	'shoot'
	tOp ~ stOp	<	stoppen (Dutch), stop (English)	'stop'

Thus, Negerhollands displays a similar pattern as the one we observed in Sranan, with the difference that in this creole the process is relegated to very few words and was variable among speakers at the point of time when the data was elicited. The same is true for other processes

[22] All data are from the Negerholland corpus described and analyzed in Sabino (1990), which consists of a written corpus collected by the anthropologist J.P.B. de Josselin de Jong and an oral corpus collected by Sabino herself in work with the last native speaker of Negerhollands. We maintain Sabino's transcription where short, lax vowels are transcribed with capitals.

which are reminiscent of what we found in Sranan. We find relics of vowel paragoge[23] and deletion in final clusters (cf. *haste* > *hesi* in Sranan) in single words:

(32)	a.	lastu ~ last	'last'
		futu ~ fut	'foot'
		Abiti ~ Abit	'out'
	b.	tOm ~ stOmp	'stump'
		ǰum ~ ǰump	'jump'

Negerhollands, and with it many other creoles, therefore exemplify the case where we reach a second stage in creolization, more similar to second language acquisition than to loan word adaptation. Through the continuous influence of the superstrate a demotion of markedness constraints has taken place and leads to a syllable structure that is more similar to that of the superstrate than that of the substrate languages.

Sranan is exceptional in this respect since it is the crystallized manifestation of an early stage in the life of a creole language. This is a stage in which the main characteristic of the substrate grammars - high ranking markedness constraints, low ranking faithfulness constraints - is still fully present in the creole. This overall structure can persist because of the removal of the superstrate after a very short period of time.

5. CONCLUSION

Let us summarize our findings. In this article we have investigated the restructuring of syllables in creolization, using one particular language, English-based Sranan, as a test case. We systematically compared early Sranan words with their English etyma in order to detect the non-uniform patterns of deletion and epenthesis that lead to Sranan's syllabic structure. These patterns were then analyzed in an optimality theoretic framework. It was shown that the observed phenomena can be accounted for in a unitary fashion by the complex interaction of violable ranked constraints. None of the two processes under investigation can be said to be the default mechanism. The non-uniformity of the effects, i.e. epenthesis in some environments, deletion in others, results from the complex interaction of markedness and faithfulness constraints.

It was argued that high-ranking universal structural constraints are responsible for the emergence of rather simplex syllables, which gives the phenomena their universal flavor. The high

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[23] There are also words where deletion of a final consonant instead of paragoge occurs (*ki* ~ *kik* 'see', *ne* ~ *nem* 'take', *tu* ~ *tut* 'close'). Sabino notes that the choice between paragoge and deletion in part depends on the phonological context. Paragoge is more likely to occur when resyllabification of the final consonant into the onset of the following word would create an illicit onset cluster (e.g. *saut fɛs* 'salt fish'). Deletion of a final consonant is unlikely to occur when the following word begins with a vowel. Since both processes lead to a syllable structure without codas they could both have been triggered by the pressure of the substrate grammar. Since the words exhibiting paragoge and deletion are so few it is not clear if one process historically precedes the other or if they conspired in creating a substrate-like (C)CV syllable.

ranking of structural constraints in the hierarchy is transferred from the substrate languages, to the effect that aspects of African grammar are imposed on the English base words. However, when syllable structure constraints allow it, the English output is faithfully preserved. The superstrate thus provides the segmental material on which structural constraints and faithfulness constraints operate.

The basic insight that superstrate, substrate and universals all contribute their specific share in creole genesis is in line with recent findings by Lefebvre (1999) concerning the emergence of creole syntax. Discerning these respective influences more clearly in different areas of creole grammar will certainly help to overcome all too simple explanations of creolization we may have adhered to in the past.

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