PHONOLOGICAL RESTRUCTURING IN CREOLE:
THE DEVELOPMENT OF PARAGOGE IN SRANAN

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1.   Introduction

It has frequently been observed that many creole languages tend to add non-etymological vowels to words that end in a consonant in their lexifier language (e.g. Holm 1989). A few examples from different creoles are given in (1a), accompanied in (1b) by a number of examples from the language that is in the focus of this article, Sranan:

(1)		FORM	ETYMON	LANGUAGE
	a.	dioso	dios	Palenquero
		hopi	hoop	Papiamentu
		dipu	diep	Berbice Dutch
		cleary	clear	Kittitian (18th cent.)
		dancee	dance	Bajan (19th cent.)
		kipi	keep	Liberian English
	b.	bikasi	because	Sranan
		nofo	enough	
		taki	talk	
		pramisi	promise	
		waka	walk	
		wasi	wash	

This phenomenon is known as vowel paragoge, or paragoge for short. Although paragoge is wide-spread there are few systematic studies available (Smith 1977, Tinelli 1979, Singler 1996a, 1996b, Singh and Muysken 1995, Lipski in press). The most common explanation for the emergence of paragoge in creoles is substratum influence, as suggested unanimously by the authors of the aforementioned studies. But things are not as straightforward as it seems.

By and large, the relevant substratum languages favor consonant-(consonant)-vowel (henceforth CV) syllable structure. However, CV is the universally unmarked syllable structure (Blevin 1995), so that in principle a universal explanation is also conceivable. Another fact unexplained by the substratum transfer account is that French-based creoles uniformly do not exhibit paragoge,

although very often the same substratum languages were involved as with their English-based relatives, which, strangely enough, seem to have been much more prone to the addition of word-final vowels, at least in their early stages (e.g. Plag 1998). Furthermore, it may be asked why the final consonant was not simply deleted in order to achieve substratum-like syllable structure. Muysken and Smith (1995) take the preference for paragoge as against deletion as the chief argument against the universalist explanation because deletion is universally unmarked, both in terms of synchronic phonological rules and diachronic developments. Paragoge is therefore the marked case, which is a powerful argument for substratum influence. However, a closer look at the substrate languages reveals that paragoge is not part of their inventory of phonological rules. Advocates of substratum transfer (e.g Singler 1996a, 1996b, Lipski in press) have therefore suggested that it is not rules that are transferred, but *constraints*. Thus, there might be a constraint against the occurrence of coda consonants in the substrate languages. If this constraint is transferred to the creole, consonant-final words from the lexifier language either have to lose their final consonant, or a final vowel has to be added to the word in order to satisfy the no-coda- constraint. These considerations illustrate another area of research to which the study of paragogic vowels can potentially contribute, namely the concept of 'rule' in phonological theory.

In this paper we will shed some new light on these issues by investigating the historical development of paragoge in Sranan. Smith (1977) describes the distribution of paragogic vowels in Modern Sranan and reconstructs the earliest system of Sranan (what he calls Proto-Sranan) on the basis of comparative evidence from the modern varieties of Sranan and its neighboring relatives Saramaccan, Ndjuka and Boni. For the present investigation we use the earliest available Sranan sources dating from 1718 onwards (Herlein 1718, van Dyk 1765, Nepveu 1770 and Stedman 1790/Ms. 1773-1777) to test Smith's claims about Early Sranan. It turns out that Smith's reconstruction of the Early Sranan syllable structure is quite accurate but that the quality of the paragogic vowels in the early sources substantially differ from those predicted by Smith. On the basis of these results we reconsider the question of possible substratum influence. It is shown that paragoge (as such and as against deletion) is a widespread phenomenon in loanword adaptation and second language acquisition and that only constraint-based phonological theories can adequately account for this fact. Syllable structure, loanword integration and quality of epenthetic vowels in Sranan's substrate languages are examined and compared with the Early Sranan patterns. Recent findings in phonological theory, a detailed analysis of substratum phonology and the diachronic Sranan data converge on a substratum-induced account of paragoge in Sranan (and, by implication, in other creoles). It will be shown that paragogic vowels are inserted to satisfy constraints on syllabic structure and that in Sranan these constraints are primarily trans-

ferred from the substrate languages, with universals of second language acquisition and dialect mixing and dialect leveling playing an important role.

2. The historical development of paragoge in Sranan

For the early grammarians of Sranan as well as for the modern observer, paragoge is a pervasive feature of the language. Consider the statement on this topic by Wullschlägel (1856:viii):

> It is often impossible to recognize the origin of a word because the negroes did not adopt the words as they were found, but tried to adapt them to their speech organs as far as possible. In particular, ... they add a final vowel to most words that originally end in a consonant.
>
> (Wullschlägel 1856: viii, our translation)

Before we take a look at Modern Sranan and present our analysis of the 18th century data, a few remarks are in order on the historical background. 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 slaves with them. Within a few decades some form of an English-based Pidgin or Creole emerged as the main medium of communication in the colony (see, for example, Plag 1993, Arends 1995b for some discussion of the sociohistorical background). The sources used for this study are the earliest known documents in Sranan and date from 1718 to 1777. But let us first look at the modern language.

2.1.   Paragoge in Modern Sranan

Modern Sranan has five different vowels, which also form the inventory of possible paragogic vowels (see (2a) below). The syllable structure allows for certain kinds of complex onsets (cf. the word for the language itself, *Sranan*), but codas are restricted to underlying nasal consonants, which often surface as nasalization on the preceding vowels (see (2b), cf. Smith 1977, Adamson and Smith 1995):

(2)   a.   *front*   *back*

               i   u
               e   o
                    a

       b.   Only nasal codas are permitted

As already mentioned above, words that etymologically end in a consonant surface in Sranan with an added vowel. Based on Koefoed (1973), Smith develops an account of the divergent quality of the paragogic vowels which is roughly summarized in (3) below. The default vowel is /i/, which, however, surfaces only if none of the preceding rules in (3) intervenes. Thus if a given stem has the vowel /e/ and ends in /t/ or /d/, the paragogic vowel is /e/ (cf. *frede*). If the stem vowel is /u/ the paragogic vowel is also /u/. Paragogic /u/ also emerges after a labial stem-final consonant (as in *tompu*), a kind of place assimilation known as labial attraction. Words with a stem-final dorsal consonant and the stem vowel /a/ receive paragogic /a/, and the stem-vowel /o/ triggers paragogic /o/:

(3)   PARAGOGIC V   CONTEXT   EXAMPLE   ETYMON
       a.   /e/   after /e/ and /t,d/#   frede   afraid
       b.   /u/   after /u/   musu   must
                          after C_{labial} tompu   stump
       c.   /a/   after /a/ and C_{dorsal} waka   walk
       d.   /o/   after /o/   noso   nose
       e.   /i/   elsewhere   lasi   loss
                                              (e.g. Koefoed 1973, Smith 1977)

In more general terms then, /i/ paragoge is the elsewhere case, with vowel copying, and assimilation to the final consonant as additional processes. However, as mentioned by Smith (1977), there are numerous counterexamples to the generalizations in (3). I have listed some of them in (3') in corresponding order. The form in (3a'), for example, shows that contrary to the prediction in (3), /i/ surfaces as the paragogic vowel. Similar examples of violations of the predictions in (3) are the words in (3'b-3'e):

(3')   ETYMON   PREDICTED   ATTESTED
       a.   bed   *bede   bedi
       b.   bush   *busu   busi
              have   *habu   habi
       c.   talk   *taka   taki
              dog   *daga   dagu
       d.   roast   *loso   losi
              rub   *lobo/*lobu   lobi
       e.   ring   *lini   lina

god	*gadi	gado
fat	*fati	fatu

The large number of counterexamples suggests that the paragogic vowels are underlyingly present and not inserted via some kind of phonological process. In other words, paragoge is lexicalized to a large extent. The variability of the lexicalized paragogic vowels is however striking and calls for a historic explanation. As we will see, the analysis of the earliest sources provides this explanation.

2.2. *Paragoge reconstructed: Smith (1977)*

As already mentioned in the introduction, Smith (1977) reconstructs the paragogic system of Proto-Sranan through a comparative analysis of the modern varieties of Sranan, Saramaccan, Ndjuka and Boni, all of which are closely-related creole languages spoken in Surinam. The reconstructed Proto-Sranan syllable structure is identical to Modern Sranan (see Smith 1977:)

(4)   a. $*C_{[- nasal]}\#$
        b. $\emptyset \rightarrow$ /i/   /   V $C_{[- nasal]}\#$ ____

Only nasal codas are permitted and /i/ is inserted as the default paragogic vowel after non-nasal word-final consonant. Smith also proposes a number of rules that change the quality of the paragogic vowel from /i/ to one of the other vowels. In essence, Smith's rules for Proto-Sranan are largely the same as those proposed for Modern Sranan (see (3) above). As we will show in the next section, the analysis of the historical sources does not fully support Smith's scenario.

2.3. *Paragoge in the earliest Sranan sources*

2.3.1. Methodology

For the study of the development of paragoge we have chosen the four earliest available Sranan sources: Herlein (1718; 110 types, 194 tokens), van Dyk (1765; part 2: 733 types, 7028 tokens) and Nepveu (1770; 262 types, 615 tokens) and Stedman (1790/1773-1777; 108 types, 172 tokens). The original manuscript by Stedman dates back to the years 1773-1777 and we will therefore use this date in this paper. The oldest text, Herlein (1718), is a small collection of Sranan words and phrases, aimed at the traveler to Surinam. Nepveu (1770) is designed as a revision and extension of Herlein's list. Van Dyk (1765) provides the largest corpus of all, consisting of two parts, a list of words and

phrases in part 1 and a fictional play which describes the life on a plantation in part 2. Only part 2 has been included in our corpus so far while the first part is still waiting for an analysis. Stedman (1773-77) is a narrative in English with some Sranan utterances scattered throughout the text. A collection of all Sranan utterances in this source is provided by Arends (1996), the other sources are published in Arends & Perl (1995).

Apart from van Dyk, the sources are quite small and vary considerably in size, but we will see that with regard to paragoge it is nevertheless possible to arrive at significant results. All sources have been used in a number of large-scale studies (Arends 1989, Bruyn 1995, Plag 1993, Smith 1987) and they have been found to be linguistically reliable (see Arends 1995a, Bruyn 1995, Plag 1993 for detailed discussion).

First the texts were computerized, using a regular word processor, and then analyzed with a standard text retrieval program (TACT 2.1), which provided concordances, word lists, and some lexical statistics. On the basis of the word lists, pertinent forms were coded according to relevant features and subjected to a statistical analysis, using the software packages SPSS and S-Plus.[1]

2.3.2. When paragoge?

The first question we want to answer is when paragoge occurs. We then turn to the problem of which kind of vowel is chosen under which circumstances. The Sranan words from the sources were categorized according to the final segment of their etyma, assuming that this has an effect on the occurrence vs. the non-occurrence of paragoge. We created three lists of words with three kinds of etyma: vowel-final, nasal-final, and consonant-final (non-nasals).

We only classified words as featuring paragoge if this could be done rather unambiguously. For the vast majority of items classification is unproblematic, but a small minority of words proves difficult to judge. Thus, there are a few verbs in the early records that are derived from Dutch verbs and which have final /e/. In these cases, it is impossible to decide whether the consonant-final Dutch stem received a paragogic vowel, or whether the verb was simply borrowed into Sranan in its infinitive form, since the Dutch infinitive ending *-en* is frequently realized as schwa. Second, there are cases in which it is not clear whether we are dealing with paragoge or metathesis, e.g. *masra* < 'master'. Third there are some cases such as *wanto*, which could be *want* plus paragogic vowel or *want* plus infinitival marker *to*. For all these doubtful cases we took the more conservative decision not to treat them as paragogic items. Having clarified some of the methodological problems we may now turn to the results of our analysis.

The first firm generalization that emerges for vowel-final etyma is that, across sources, vowel-final stems from the input languages never end up with a paragogic vowel. With consonant-final stems, the distinction between nasals and non-nasals also proved significant. Let us first consider the latter group of words. The tables in (5) list what happens to etymologically non-nasal-consonant-final words in Sranan. (5a) lists the results of the type count, (5b) the results of the token count. Due to rounding, the percentages in all tables given below do not always add up to 100%.

(5)   a. Behavior of C-final etyma (excl. nasal-final), types

source	total number of types	total p.c.	paragoge p.c.	C-final p.c.	deletion p.c.
Herlein 1718	32	100	77	21	3
van Dyk 1765	290	100	83	14	2
Nepveu 1770	76	100	85	14	-
Stedman 1773-77	36	100	83	17	-

b. Behavior of C-final etyma (excl. nasal-final), tokens

source	total number of tokens	total p.c.	paragoge p.c.	C-final p.c.	deletion p.c.
Herlein 1718	50	100	68	30	2
van Dyk 1765	2221	100	80	8	12
Nepveu 1770	142	100	89	11	-
Stedman 1773-77	50	100	92	8	-

Both type and token analysis basically yield the same results. Overall, conso-nant-final words are strongly disfavored, and paragoge is clearly the prevalent repair mechanism used to adapt etyma to the syllable structure constraint that demands vowel-final words. Deletion, in contrast, is marginal. The empirical results thus support Smith's reconstruction.

Note, however, that a non-negligible percentage of words retain their fi-nal consonant without any further adaptation. Interestingly, the majority of all consonant-final forms are of Dutch origin. It is likely that these words were rec-ognized as loanwords by the original authors and therefore transcribed in their "correct" spelling while words derived from the English superstrate were treated as fully nativized words. Prime examples of this effect are the 15 tokens of the Dutch name *Hendrik* in Van Dyk (1765) and borrowed function words such as *of, wel, wil*. Furthermore, there are some cases where the following word begins with a vowel or /h/, which suggests that we can have resyllabification instead of paragoge (cf. *kil hem* in Herlein (1718), where *kili* is attested as well). In sum,

the attested consonant-final Sranan words seem to have the status of non-nativized words.[2]

Let us turn to the behavior of nasal-final etyma. Consider the following tables:

(6)   a. Behavior of nasal-final etyma, types

source	total number of types	total p.c.	paragoge p.c.	N-final p.c.	deletion p.c.
Herlein 1718	18	100	-	89	11
van Dyk 1765	105	100	4	90	7
Nepveu 1770	58	100	-	93	7
Stedman 1773-77	10	100	10	50	40

b. Behavior of nasal-final etyma, tokens

source	total number of tokens	total p.c.	paragoge p.c.	N-final p.c.	deletion p.c.
Herlein 1718	31	100	-	81	19
van Dyk 1765	1308	100	2	90	8
Nepveu 1770	151	100	-	86	14
Stedman 1773-77	15	100	7	67	27

Again, both token and type analyses yield roughly the same results. Nasals are largely tolerated in word-final position, paragoge is extremely marginal. It is restricted to only four types in van Dyk (1765, *boni < bon, komi < come, snyboni < snijboon, wini < wine*) and one type in Stedman (*ini < in*). But what about the proportion of words that do not seem to tolerate the final nasal and remedy this by deleting it? A qualitative investigation of these forms shows that in all sources deletion of word-final nasals occurs systematically if the stem is (a) polysyllabic, and (b) not stressed on the final syllable. For illustration, consider *fasi* (< *fáshion*) and *ope* (< *open*) while final nasals are not deleted in *krien* (< *clean*) or *dinatem* (< *dinnertime*). This pattern has already been noted in Smith (1987).

We have to add a final word on the behavior of word-final angma, i.e. [ŋ], because angma-final etyma present a curious paradox. In unstressed word-final syllables angma is deleted, whereas in stressed syllables it takes a paragogic vowel. In other words, in unstressed syllables it behaves like the other nasals, whereas in stressed syllables it behaves as if consonant-final. For the purposes of setting up the four tables above, we have therefore assigned angma-final etyma to the nasal-final etyma, if angma is deleted or no paragogic vowel is

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[2]   In many languages different lexical strata can be characterized by their differences in the application of native phonological constraints. See Ito and Mester 1995b for discussion.

added, and to the consonant-final words, if there is paragoge (see below for more discussion).

In sum, the constraints on syllabic structure as we find them in Modern Sranan already hold for 18th century Sranan. Paragoge is the prevalent repair mechanism if stems end in a non-nasal consonant. Hence, the diachronic sources confirm Smith's (1977) reconstruction.

2.3.3. Which vowel is chosen?

Let us now turn to the second problem, which is whether the quality of the paragogic vowel is determined by the same mechanisms that operate in Modern Sranan (as described above). In what follows we focus on the analysis of tokens, because the observable variation strongly suggests that patterns of paragoge were not fully lexicalized in Early Sranan. Furthermore, the token analysis has the advantage of reducing the statistical weight of isolated idiosyncratic forms.

As a first step we analyzed the overall distribution of the different paragogic vowels in the early sources. The result is given in the following table:

(7)   Quality of paragogic vowels in the early sources (tokens)

Source	total number of tokens	total p.c.	/i/ p.c.	/e/ p.c.	/a/ p.c.	/o/ p.c.	/u/ p.c.
Herlein 1718	34	100	18	82	-	-	-
van Dyk 1765	1787	100	57	41	2	1	-
Nepveu 1770	126	100	71	5	9	9	7
Stedman 1773-77	47	100	53	15	9	23	-

The distributional analysis brings out clear differences between the sources. In Herlein, /e/ is chosen frequently, with only very few instances of /i/ and no other paragogic vowels occurring. A similar pattern emerges in van Dyk, where /i/ and /e/ account for no less than 98 percent of all paragogic vowels, with a difference in distribution between the two kinds of vowel: whereas in Herlein /e/ is the default choice, van Dyk prefers /i/. In contrast, Nepveu and Stedman have only relatively few examples of /e/-paragoge attested, up to 71 % of all paragogic vowels are /i/, and the remaining vowels also occur in non-negligible quantities. Overall, there is a remarkable diachronic increase in the use of /a/, /o/, /u/ as paragogic vowels.

In order to investigate the factors that govern their choice, each form showing paragoge was coded with regard to the following variables: paragogic vowel, stem vowel, manner of articulation of the final consonant, and place of
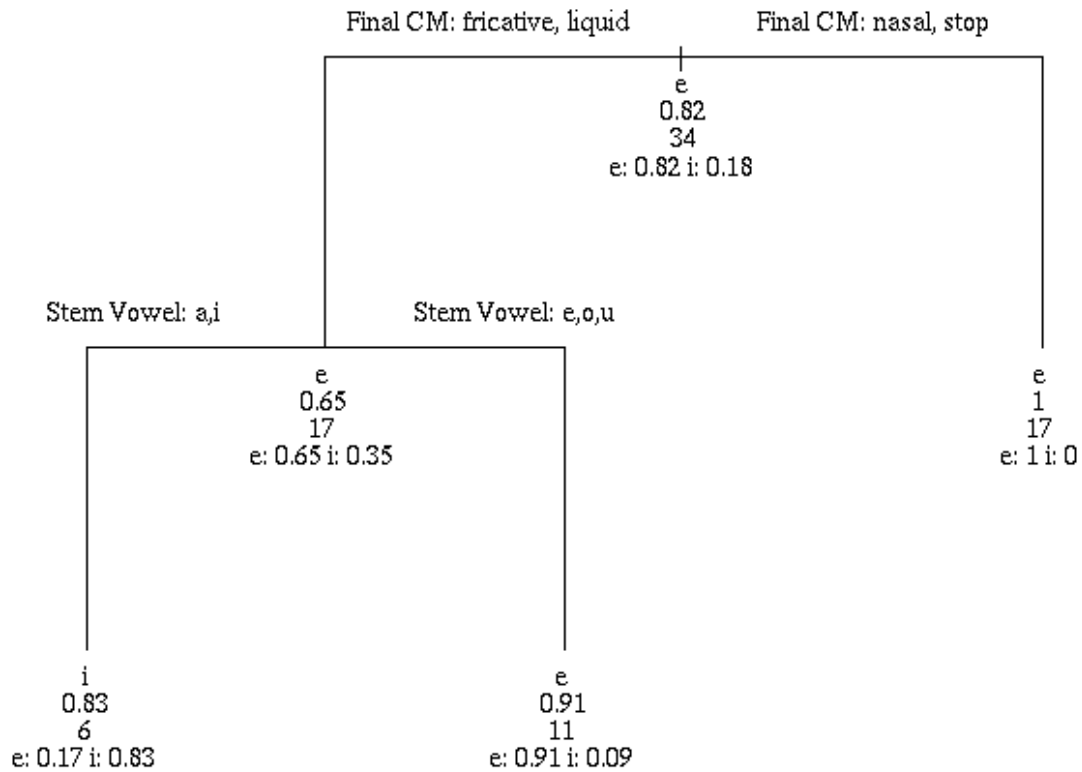
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articulation of the final consonant.[3] Following Smith's analysis, one would expect that the independent variables place and manner of articulation of the final consonant and the stem vowel have a significant influence on the choice of a particular paragogic vowel (i.e. the dependent variable). To test the interaction of the independent variables we ran a cross-validation analysis and a subsequent classification and regression analysis on all paragogic items in all sources. The results of these analyses can be plotted as so-called classification trees, which show the predictive power of the independent variables and their interaction with regard to the dependent variable.[4]

The trees should be read as follows. Below each node we give the prevalent paragogic vowel, its frequency, its percentage among all paragogic vowels of this node, and the percentages of all the other paragogic vowels of this node. "0.82", for example, means 82 %. The top node of the tree, the so-called root node, thus gives the overall number of tokens with paragogic vowels. To the left and to the right of each node, above the branches, we give the predictor variable and its relevant values. Consider, for example, the classification tree in (8) for all paragoge tokens in Herlein (all of the trees below concern the analysis of tokens, for the reasons outlined above).

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[3] We also coded the forms according to part of speech, but this turned out to have no effect on paragogic vowels.

[4] Classification trees of van Dyk, Nepveu and Stedman have been cost complexity-pruned where the cross-validation function has a clear minimum. For reasons of space, the cross-validation functions are not given here, but can be provided upon request.
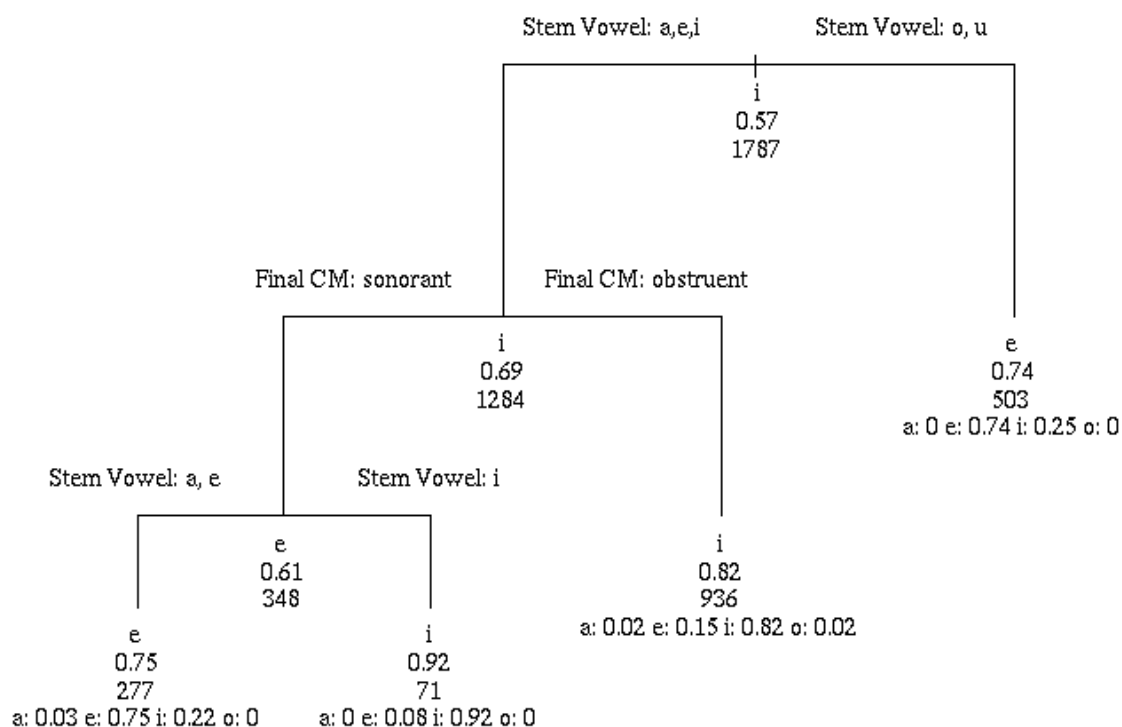
(8)　　Classification tree for Herlein

```
              Final CM: fricative, liquid          Final CM: nasal, stop
                                         e
                                       0.82
                                        34
                                 e: 0.82 i: 0.18


 Stem Vowel: a,i              Stem Vowel: e,o,u                         e
                         e                                             1
                       0.65                                            17
                        17                                        e: 1 i: 0
                 e: 0.65 i: 0.35


        i                                    e
      0.83                                 0.91
        6                                   11
  e: 0.17 i: 0.83                     e: 0.91 i: 0.09
```

Of all paragogic vowels in Herlein, /e/ is the most frequent one (see root node, 82 %), and /i/ covers the remaining 18 %. The manner of the final consonant is the best predictor for the distribution of /e/ vs. /i/, since of all stems which end in nasal or stop (the right branch spreading from the root node) 100 % take /e/ (i.e. 17 tokens). The left branch of the tree in (8) shows us the interaction of the two types of independent variables (stem vowel and final C): of all stems ending in a fricative or liquid, 65 % prefer paragogic /e/. If the stem vowel of the fricative/liquid ending stems is also taken into account, a more important effect comes to the fore. If the stem vowel is /i/ or /a/, /i/ can be predicted to be the paragogic vowel (83 %), whereas other stem vowels trigger with paragogic /e/ (91 %). The place of articulation of the stem-final consonant has no significant influence on the stem vowel.

　　　Let us turn to the largest source, van Dyk. The large amount of observations (N = 1787) allows a much more fine-grained analysis. The stem vowel emerges as the best predictor in this source, followed by the manner of the final consonant, and again the stem vowel. Just as in Herlein, the place of articulation does not play a role in the choice of the paragogic vowel. Consider (9):
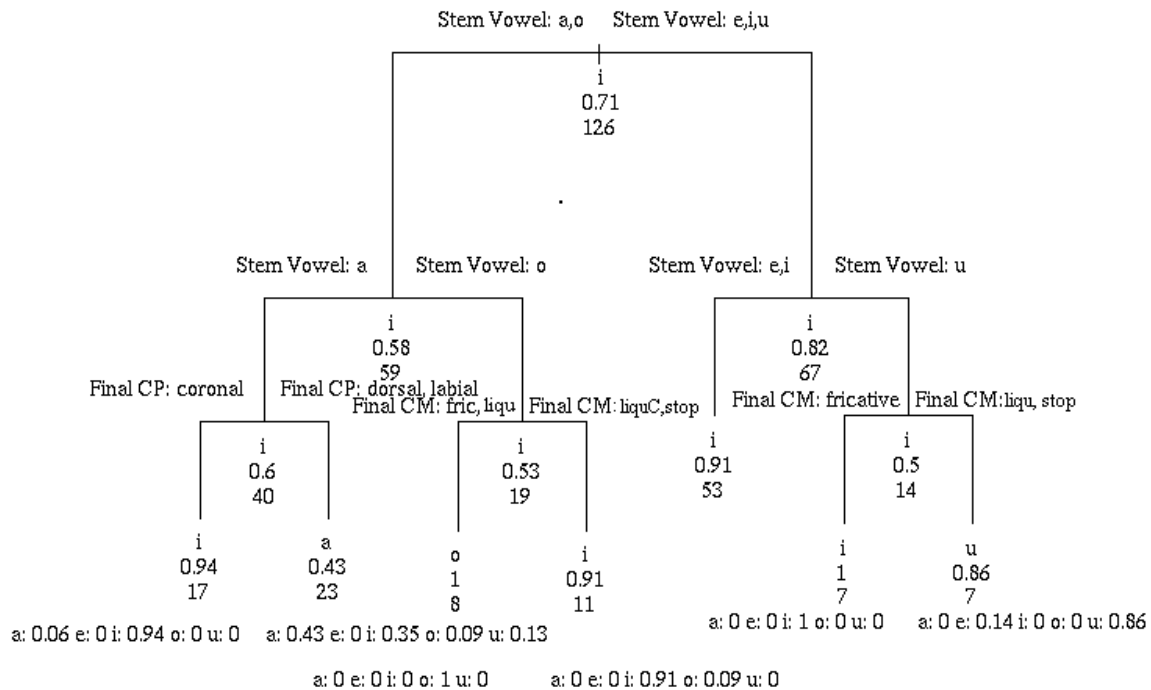
(9)   Classification tree for van Dyk

```
                               Stem Vowel: a,e,i              Stem Vowel: o, u
                          ┌──────────────────┴──────────────────────────────┐
                                              i
                                            0.57
                                            1787

                    Final CM: sonorant       Final CM: obstruent
                   ┌──────────────┴──────────────┐
                                  i                                          e
                                0.69                                       0.74
                                1284                                        503
                                                                a: 0 e: 0.74 i: 0.25 o: 0

         Stem Vowel: a, e      Stem Vowel: i
        ┌──────────┴──────────┐
                     e                           i
                   0.61                        0.82
                   348                          936
                                    a: 0.02 e: 0.15 i: 0.82 o: 0.02

       e                      i
     0.75                   0.92
     277                     71
 a: 0.03 e: 0.75 i: 0.22 o: 0   a: 0 e: 0.08 i: 0.92 o: 0
```

The majority choice is /i/ which is chosen in 57 % of the cases. As is already clear from the table in (7) above, /a/ and /o/ play only a marginal role as paragogic vowels and their numbers are too small to make any predictions about their occurrence. The stem vowel, however, allows for the most important classification of the data. Of all tokens with back vowels (i.e. /o/ and /u/) in their stems, a clear majority takes /e/ (74 %), and only 25 % take /i/. Words with non-back stem vowels (i.e. /i/, /e/, /a/) have a clear preference for /i/ as their paragogic vowels (69 %). If these words have also an obstruent as their final consonant the chances to take paragogic /i/ increases to 82 %. However, if they end in a sonorant instead of an obstruent the choice of the paragogic vowel depends again on the kind of stem vowel. If it is /i/, almost all words (92 %) have paragogic /i/, whereas words with the stem vowels /a/ and /e/ in their majority take /e/ (75 %).

The third source, Nepveu, again shows that the stem vowel is the best predictor for the quality of the paragogic vowel. In addition, we find manner effects of the final consonants and, for the first time, a place assimilation effect. Consider the following tree:
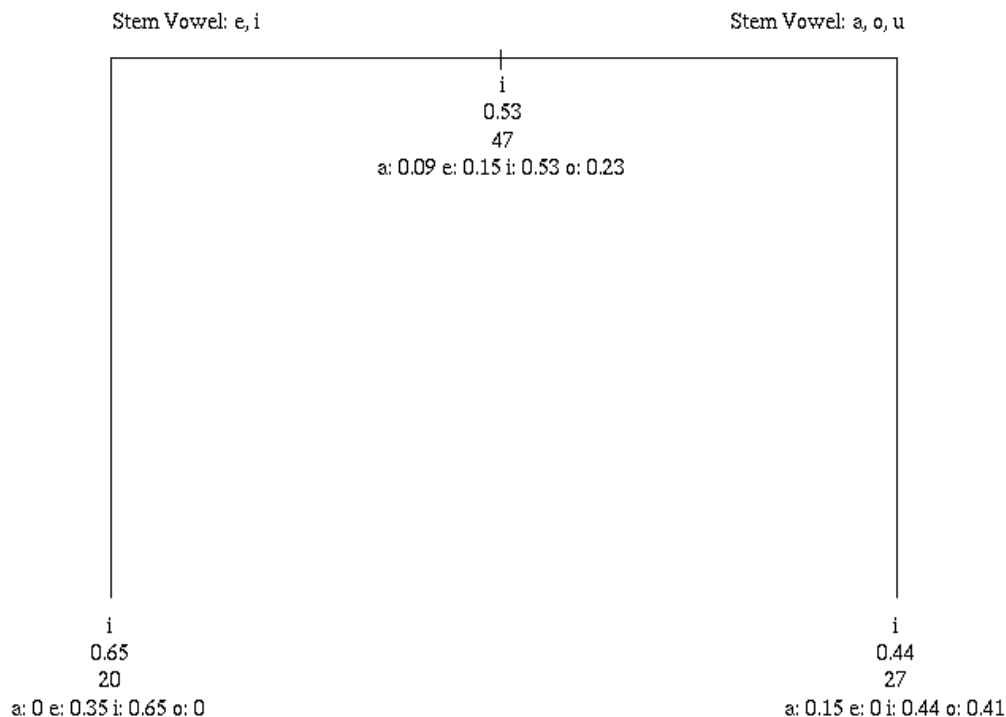
(10)   Classification tree for Nepveu:

```
                  Stem Vowel: a,o    Stem Vowel: e,i,u
                              |
                              i
                            0.71
                            126

                                  .

        Stem Vowel: a    Stem Vowel: o        Stem Vowel: e,i    Stem Vowel: u
                      i                                      i
                    0.58                                   0.82
                     59                                     67
Final CP: coronal  Final CP: dorsal, labial              Final CM: fricative  Final CM: liqu, stop
                  Final CM: fric, liqu | Final CM: liquC,stop
              i                      i                    i                   i
            0.6                    0.53                 0.91                 0.5
            40                      19                   53                  14
      i           a          o              i           i            u
    0.94        0.43         1            0.91          1           0.86
    17           23          8             11           7            7

 a: 0.06 e: 0 i: 0.94 o: 0 u: 0   a: 0.43 e: 0 i: 0.35 o: 0.09 u: 0.13   a: 0 e: 0 i: 1 o: 0 u: 0   a: 0 e: 0.14 i: 0 o: 0 u: 0.86

           a: 0 e: 0 i: 0 o: 1 u: 0      a: 0 e: 0 i: 0.91 o: 0.09 u: 0
```

The most important important effects that can be gleaned from this tree are the following: like in van Dyk, /i/ is the default vowel with an overall percentage of 71 %. Table (7) and a comparison of the above trees show that this is the first source in which there are significant proportions of paragogic /a/, /o/ and /u/. Paragogic /e/ is the least frequent choice in Nepveu. The tree also shows that the occurrence of the paragogic vowels /a/, /o/ and /u/ can be interpreted as instances of vowel copying: /a/ only occurs after stem /a/, paragogic /u/ occurs almost exclusively after stem /u/, and /o/ almost exclusively occurs after /o/. Furthermore, almost all /i/ stems take paragogic /i/. However, the occurrence of /a/, /u/ and /o/ cannot be predicted (solely) on the basis of the stem vowel. Thus, /u/ is only the majority choice (86 %) if the /u/ stem also ends in a liquid or stop. Paragogic /a/ is only preferred if the stem containing /a/ also ends in a dorsal or labial consonant. Paragogic /o/ only occurs if the stem, in addition to the stem vowel /o/ also features a fricative or a liquid as its final consonant.

The paragogic vowels in Stedman include /a/, /e/, /i/ and /o/ (no /u/), with a strong preference for /i/ (53 %). The classification and regression analysis of this source yields the tree in (11), which shows again that the stem vowel is the best (and in this case: the only) predictor for the type of paragogic vowel. With stem /i/ and /e/, only /i/ and /e/ are chosen as paragogic vowels (with a ration of 65 % to 35 %), whereas the back stem vowels also permit 41 % /o/ paragoge and 15 % /a/ paragoge. The final consonant exerts no significant influence.

(11)   Classification tree for Stedman

Stem Vowel: e, i   Stem Vowel: a, o, u

i
0.53
47
a: 0.09 e: 0.15 i: 0.53 o: 0.23

i   i
0.65   0.44
20   27
a: 0 e: 0.35 i: 0.65 o: 0   a: 0.15 e: 0 i: 0.44 o: 0.41

Let us summarize the findings across sources. In the earliest two sources, /e/ and /i/ predominate as paragogic vowels and there is no evidence for significant vowel copying effects (which would lead to the pattern of vowel paragoge similar to that in Modern Sranan). With the later sources this pattern changes significantly in the direction of Modern Sranan: /i/ acts as the default vowel, and stems with other vowels have a certain tendency to take paragogic vowels of the same kind, subject to the additional influence of the final consonant. Labial attraction is not at work in either of the sources. (12) shows in a comprehensive form the different mechanisms that are responsible for the choice of paragogic vowels in the four sources. Note that the effects mentioned are not categorical in nature, but have the character of variable rules.

(12)   Mechanisms determining paragogic vowel quality

	Herlein	van Dyk	Nepveu	Stedman
default V	/e/	/i/ and /e/	/i/	/i/
Stem V effect	no	/i/, /e/, /a/ → /i/ /o/, /u/ → /e/	V copying	[± front] V harmony
C-place effect	no	no	/a/ and dorsal C → /a/	no
C-manner effect	yes	yes	yes	no

What do these findings mean? We claim that our results can be interpreted as evidence for two things. First, there was considerable variability in the system of vowel paragoge in Early Sranan. Second, the sources show that there was ongoing diachronic change in this system during the 18th century. As just mentioned, the earliest two sources show /e/ and /i/ as default paragogic vowels, whereas in later sources and in Modern Sranan, /i/ is the only default vowel. Furthermore, the earliest two sources show no evidence of vowel copying effects, whereas in the later sources and Modern Sranan vowel copying plays a significant role. Herlein and van Dyk thus show strong similarities, and differ from the two later sources. However, there is some similarity between van Dyk and Nepveu, namely the existence of manner of articulation effects.

The differences between van Dyk and Nepveu may be irritating because of the close temporal proximity. However, the fact that these sources have been written within a period of less than a decade does not run counter to our claim of diachronic development. It has been noted by previous authors (e.g. Arends 1995a, Schuchardt 1914) that the variety recorded by van Dyk is a conservative inland plantation variety whereas Nepveu refers to the more progressive variety of Paramaribo in his description of Sranan. Thus, although written in roughly the same period, the systematic differences between the two sources can be said to represent diachronic variation. Another general argument for diachronic development comes from the fact that the investigation of these sources with regard to other linguistic sub-systems (see e.g. Arends 1995a on articles, copula, verb serialization, periphrastic constructions, question words, clefting, comparatives) has led to the same conlcusion that "numerous developments have taken place during the second fifty years (roughly 1700-1750) after the beginning of slave importation into Suriname in the 1650's" (Arends 1995a:57).

The results of the empirical diachronic analysis contradict Smith's (1977) reconstruction of Early Sranan, which was based on present-day varieties of Sranan, Saramaccan, Ndyuka and Boni. In the early sources, there are no measurable effects of place assimilation (such as labial attraction), and the two earliest sources in particular display patterns not only different from Smith's account, but also different from any present-day variety of the Suriname creoles. A measurable effect of labial assimilation is first attested in Schumann (1783),

i.e. shortly after the last sources in this paper, as the explorative analysis by Köhler and Stöhr (1998) suggests.

There is, of course, the general problem of the reliability of the data. It has already been mentioned above that different authors have used the sources successfully for different kinds of studies, syntactic, semantic and phonological. Most notably, the reconstruction of the segmental developments in Early Sranan by Smith (1987) is based on the same sources (and later ones). It would be strange to assume that the very same authors represented all kinds of sounds and sound contrasts in a reliable and consistent fashion, but failed to do so with paragogic vowels.

Let us consider this problem in more detail, i.e. the exact nature of the paragogic vowels, especially that of /e/, in the early sources. Following previous authors, Arends (1995a:22) has put forward that /e/ is to be interpreted as a reduced vowel, i.e. as schwa. This is, however, highly unlikely because there is no evidence whatsoever for the existence of schwa in the vowel system of (Early) Sranan: English schwa regularly surfaces as /a/ in Sranan (as in *liba < river*).[5] Smith (1987:378) also rejects the schwa analysis and argues that "the frequent use of *e* in early records of Sranan to represent epithetic [i.e. paragogic] and epenthetic vowels represents not schwa as various researchers have interpreted it, but a vowel of the same quality as the preceding vowel". In other words, Smith proposes that <e> represents /e/ after stem /e/, <e> represents /i/ after stem /i/, <e> represents /a/ after stem /a/, <e> represents /u/ after stem /u/, and <e> represents /o/ after stem /o/. In our view Smith's interpretation of <e> is unconvincing because there is no reason why the authors should not have used <a, i, o, u> to represent /a, i, o, u/, if they used these graphemes with non-paragogic vowels. Furthermore, Smith's interpretation presupposes that the early records are not reliable in the representation of clear phonetic contrasts. However, his own large-scale diachronic phonological study shows that this presupposition is incorrect, because he convincingly can trace all kinds of segmental phonological developments on the basis of these early records. Therefore, the only remaining option for the interpretation of the phonetic quality of the vowels as given in the early records is to take them very much at their face value, i.e. as quite accurate and natural representations of the underlying phonological contrasts. Following the conventions of the Latin script <a> most likely represents /a/, <e> represents /e/, <i> represents /i/ etc.

The reality of the variability of paragogic /i/ and /e/ is further substantiated by the fact that there are many doublets with a paragogic /e/ ~ /i/ alternation in almost all sources (*bosse/bossi, drinke/drinki, haffe/haffi, hedde/heddi, wakke/wakki* etc.). Only in later sources do some of these items show vowel

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[5]   It should be added that the development to /a/ only holds for monophtongal schwa. If schwa is part of a diphthong in the etymon, it does not leave a trace in the Sranan word. see Smith (1987) for details.

copying or assimilation effects on the paragogic vowel (e.g. *hafu, waka*). Furthermore, the same kind of /e/ ~ /i/ variability is observable even with stem vowels in a number of words in van Dyk und Nepveu (e.g. *pikin/pekin, kwetti/kwitti*), and a number of English and Dutch and English stem /e/'s end up as /i/, both in stressed position (*ibri* < E. *every*), and in unstressed position (*country* > *kondre, company* > *kompe, belly* > *bere*). In addition, in modern Ndjuka and Boni we find a number of forms ending in /e/ which end in /i/ in Sranan: *teke, leke, fénde* vs. *teki, leki, feni* (< *take, like, find*). All these facts strongly suggest that Early Sranan, the common ancestor of the modern varieties, must have had /e/ ~ /i/ variability to some extent. In sum, the patterning of /i/ and /e/ is consistent in its variability across many early sources (i.e. not only the ones dealt with in this paper), which is an additional indication for the reliability of the orthographic representations in the early sources under discussion.

Taking all these facts into account, the conclusion is inevitable that Early Sranan was characterized by a considerable variation in its vowel system, in particular with regard to paragogic vowels. We came across our final piece of evidence for this position when, somewhat disturbed by our own unexpected findings, we searched 18th and 19th century descriptions of Sranan for some information on paragogic vowels and found the following comment by the 19th century Sranan grammarian Wullschlägel, who writes in the preface of his Sranan dictionary of 1856:

> The unstressed final vowels are often pronounced differently and are often confused by the negroes. Thus, one time they may say *zwaka*, the next time *zwake* or *zwaki*. In particular, *e* and *i*; *o* and *oe* are often used one for the other.
> (Wullschlägel 1856:viii, our translation)

Wullschlägel's observation constitutes independent evidence for our claim that the variability is not only not an artefact of the sources but must have indeed lasted until at least the mid 19th century. Note that in practically all studies of Early Sranan, variation has been found to be a central property of the language system, no matter which grammatical subsystem was investigated.

Under the assumption of early variation in paragogic vowels, the frequent exceptional forms as they occur in Modern Sranan (and as illustrated in (3')) appear in a new light. These forms can now be interpreted as remnant, lexicalized forms. Of the different variants present at earlier stages of the language, only some survived in the process of dialect mixing and levelling that must have characterized the history of Sranan.

Although we hope to have convinced the reader that our findings are quite robust, they nevertheless raise a number of problems. For example, the sources suggest a rather late development of the the paragoge effects described by Smith. If true, it is somewhat strange that the different Surinamese creoles developed similar paragoge patterns independently of each other. However, it

will be argued below that substratum influence has played a major role in the development of paragoge. If so, parallel independent developments are not so unlikely, but further research is certainly called for to clarify this point.

Another problem raised by our analysis is one of phonological theory. The observed front/back effect created by the stem vowel in van Dyk and the manner effect created by the final consonant in van Dyk and Nepveu do not lend themselves to any straightforward explanation in terms of phonological feature spreading or similar devices. A solution might be thought in terms of sonority effects along the lines suggested by Pulleyblank (1998) for Yoruba, but this issue will not be pursued here.

Leaving these problems for further investigation, we now turn to the next section, in which we relate the observed patterning of the data to the substrate vs. universals debate.

3. Substrate and Universals in phonological restructuring

3.1. The issues

In order to account for the emergence of a particular creole feature, two major approaches can be taken. One is to adduce creole features to one or more of the languages involved in the contact situation in which the creole was formed. The other approach stresses the role of universal tendencies or principles of human language which are more or less directly reflected in the creole structures. Framing the problem of paragoge in terms of these two opposing theoretical approaches the following picture emerges.

CV is the universally unmarked syllable structure (e.g. Blevin 1995), which seems to speak for a universalist explanation of paragoge. However, CV ist also prominent in many substrate languages, which suggests that paragoge might well be a transfer phenomenon, perhaps supported by universal preference laws (Vennemann 1988). What speaks against the universalist explanantion is that paragoge as a phonological rule is universally marked, whereas deletion is universally unmarked (z.B. Vennemann 1988, Singh/Muysken 1995). Hence, a strictly universal approach would predict deletion of the final consonant instead of insertion of a vowel. This is Singh/Muysken's central argument for their claim that paragoge must be substratum-induced. However, in the native phonologies of the substrate languages paragoge rules are unknown, and other vowel epenthesis rules seem to be marginal at best.

In order to solve the problem of contradictory theoretical arguments pro and contra substratum or universal influence, we want to draw attention to the decisive fact that in loanword adaptation and SLA there is a universal preference of epenthesis to deletion, given pertinent constraints on syllabic structure in L1. In other words, in SLA and loanword adaptation we are confronted with

what looks like a markedness reversal. Whereas in regular language development epenthesis is marked and deletion unmarked, in language contact epenthesis is unmarked and deletion is marked. For illustration of this point consider the following cross-linguistic data from loanword adaptation and interlanguage. Consider first the loanwords in (13-16):

(13)	FRENCH	FULA (West Africa)	
	carde	[karda]	
	force	[fɔrsɔ]	
	course	[kursi]	(Paradis 1996, Paradis & Lacharité 1997)

(14)	ENGLISH	CANTONESE	
	file	[failow]	
	bus	[pasi]	
	inch	[intsi]	(Silverman 1992, Yip 1993)

(15)	ENGLISH	SHONA (Zimbabwe)	
	bus	bhazi	
	inch	inji	
	map	mepu	(Uffmann 1997)

(16)	ENGLISH	JAPANESE	
	full-time	furutaimu	
	fight	faito	
	festival	fesutibaru	(Itô und Mester 1995a, 1995b)

Whenever we look at borrowing languages with tighter syllable constraints than the donor language, we find a strong tendency to adapt the loanword to the native syllable structure not by deleting segments but by inserting vowels, especially at the end of words.[6] A similar picture emerges from interlanguage data. A few examples are given in (17-19) below.

(17)	ENGLISH	MANDARIN	
	tag	[tæg ~ tægə]	
	tub	[tɔb ~ tɔbə]	
	his	[hiz ~ hizə]	(Eckman 1981)

(18)	ENGLISH	JAPANESE	
	food	/fudo/	
	zip-code	/zippu ko:do/	
	disc	/disuku/	(Hancin-Bhatt/Bhatt 1997)

(19)	ENGLISH	SPANISH

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[6]   In general, it seems that if deletion occurs at all, it is restricted to complex onsets or complex codas, but does not affect singleton coda consonants. See Plag and Alber (in prep.) for more detailed discussion.

spring	/espringe/	
truck	/tróka/	
switch	/suítʃe/	(Hancin-Bhatt/Bhatt 1997)

Let us consider why loanword adaptation and SLA should display similar patterns. Roughly speaking, loanword adaptation involves the imposition of native phonological rules and restrictions on new words (e.g. Itô und Mester 1995a, 1995b, Paradis 1996, Paradis & Lacharité 1997, Silverman 1992, Yip 1993). If the phonological effects of loanword adaptation are very similar to the phonological effects that can be observed in SLA, 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 between loanword adaptation and SLA is that in SLA the interlanguage system may start out with more or less complete transfer and then gradually moves towards the target language, whereas in loanword adaptation the imposition of native phonological constraints is more or less static, so that even advanced second language speakers of the donor language adapt loanwords by imposing native phonology on them.

How can this transfer effect be formalized? In the past, SLA researchers have proposed interlanguage rules such as the one in (20), for Mandarin:

(20) $\emptyset \rightarrow ə$ / [-sonorant, + voice]# _____   (Eckman 1981:206)

The problem with this kind of rule is that it is neither universal nor transferred. Although schwa as epenthetic vowel is widespread in the world's languages it is by no means universal, as the Sranan data and the loanword and interlanguage data above show. Neither is rule (20) part of the native phonology of Mandarin. Hence it is unclear, how the transfer effect can be modeled in terms of insertion rules such as (20). However, the replacement of linear insertion rules by prosodic principles and constraints, as suggested in recent phonological theory (cf. e.g. Piggott/Singh 1985, Itô 1989, Prince and Smolensky 1993 on epenthesis) can help to solve the puzzle. A constraint-based approach to SLA means that we can conceptualize transfer as transfer of constraints, and not as transfer of rules.[7] A welcome consequence of the constraint-based view is that the theoretical argument against substrate influence (i.e. no paragoge rules in the substrate languages) collapses. It is the tight syllabic constraints that are transferred and which ultimately lead to the insertion of epenthetic vowels as the preferred means to satisfy these constraints.

Given that the substrate languages had tighter syllable constraints than English, we can hypothesize that the syllable structure constraints of the substrate language are responsible for the observed Sranan patterns. In the follow-

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[7]   Hancin-Bhatt/Bhatt (1997) and Broselow et al. (1998) implement this idea succesfully for SLA, Singler (1996a, 1996b) for substrate transfer in creole varieties.

ing section we will take a close look at the pertinent West African languages Kikongo, Gbe and Twi to see whether this hypothesis is tenable.

3.2.   *Syllable structure in Sranan's substrate languages*

Three major substrate languages have been discerned for Sranan: Kikongo (Bantu), Gbe and Twi (Kwa). 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 only occurred in significant numbers 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 1875 (Christaller on Twi). In addition to the phonological properties of native words we have also looked at loanwords, if available. The hypothesis was that, if transfer determines syllable structure in Early Sranan, we should find the same or at least similar effects with the loanwords in the African languages as with the English and Dutch words in Early Sranan words. We will discuss each language in turn.

From the Kikongo sources (Bal 1964, Bentley 1887, Bontinck 1978, Chatelain 1888-89, Daeleman 1966, Laman 1936, Seidel/Struyf 1910, Spa 1994, Wing/Penders 1928) the following picture emerges. Kikongo only has open syllables and a [± high]-vowel harmony in some dialects. There is no clear evidence in the sources about epenthesis as a phonological process, but the attested loanwords with consonant-final etyma consistently show paragoge. The quality of the paragogic vowel is variable, with a preponderance of paragogic /-i/ and vowel copying. A few examples of the earliest attested loanwords in Kikongo are given in (21):[8]

(21)   Pt. maïz   >   masa
        Pt. parasol   >   palasola
        Pt. cal   >   nkala
        E. letter   >   eletela
        E. book   >   ebuku
        E. boat   >   boota   (Bentley 1887:539-540)

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[8]

The spelling of the African words in (21-23) has been adapted to standard latin script under avoidance of phonetic symbols and diacritics, which tend to vary a great deal between different sources. Hence our spelling does not adequately represent tone s and secondary articulations.

Speaking of the modern language, Spa (1994) argues that /i/ surfaces after the coronals /t,d,n,s,z,j/, and vowel copying elsewhere. In his investigation of French loanwords in Kintandu, which is an inland lect of the Kikongo cluster, Bal (1964) observes the frequent use of epenthetic /i/, but /u/ and /a/ may also occur, and without harmony with preceding vowels. Bal's findings indicate that this dialect does not so much resemble the Sranan data, which is in line with claims by previous author that speakers of this lect were not so numerous.

In Gbe (see Abaglo/Archangeli 1989, Bole-Richard 1983, Capo 1991, Da Cruz/ Avolonto 1993, Henrici 1891, Lafage 1985, Westermann 1930, 1961), we find again only vowel-final words. Labial attraction is frequently observable as a phonological process, as well as a [± round]-vowel harmony. In one pertinent dialect, Fongbe, the default epenthetic vowel is /i/, which is, for example, used in reduplication. In another dialect of the Gbe cluster, Gengbe, the default epenthetic vowel is /e/. Etymologically C-final loanwords obligatorily display paragoge in Gbe. The quality of the paragogic vowel in loanwords is variable, but it seems that paragogic /i/ is preferred (22a), with labial attraction (22b) and vowel rounding harmony (22c) as additional processes. The following loanword data from Capo (1991: 130-131), Lafage (1985:195) and Westermann (1930:23-25) illustrate this:

(22)   a.   E. bed   >   bele
              E. belt   >   beleti
              E. clerk   >   klake
              E. college   >   koledzi
              E. electric   >   litriki
              F. la glace   >   laglasi
              G. Käse   >   kesu
        b.   Fr. grève   >   glevu
              Fr. gomme   >   gomu
        c.   E. force   >   fosu
              E. ball   >   bolu
              E. cook   >   kuku

The Twi sources 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. In Twi it is possible to have consonants in the coda, provided that they are nasal. There is an [± ATR]-vowel harmony (often cited in the literature on harmony systems), and there is no conclusive evidence for vowel epenthesis as a native phonological process. Again, paragoge is obligatory with borrowed words that do not satisfy the nasal coda constraint. The quality of the epenthetic vowel is variable, but /e/ seems to be the default. Occasional vowel copying effects are also observable. Consider the loanword data in (23) for illustration.

(23) glass   >   girase
      copper   >   kobere
      book   >   buku
      tub   >   topo

If we compare the syllable structure constraints of the substrate languages, the following facts strongly speak for substratal transfer effects. First, the prevalence of /i/ and /e/ (the latter only in the first sources) as default vowels can be attributed to the fact that all substrate languages favor either of these vowels as default vowel. Second, the strong preference for C(C)V and C(C)VN as the only possible syllable structures is a reflection of the constraints operative in the substrate languages. Perhaps the strongest argument for substrate influence comes from the behavior of loanwords in the pertinent substrate language, for they show properties that are very similar to Sranan words.

An independent argument for substrate influence is the variation in the quality of the paragogic vowel itself both in Modern and Early Sranan. The numerous exceptions to the generalizations in (3) are best explained as the result of dialect mixing and leveling. Of the competing variants of earlier stages, certain variants were dropped, and others survived. Thus, a Twi speaker may have preferred paragogic /e/ with a given word, whereas speakers of other backgrounds used other paragogic vowels with that word. Finally, one of the variants dropped out of use. That these mechanisms are rather common in language contact situation is shown, for example, by Siegel 1996a, 1996b, who proposes similar scenarios of mixing and leveling for many developments in different kinds of contact languages.

Our final argument for substrate transfer comes from the integration of the velar nasal [ŋ] into Sranan. As already mentioned above, coda /n/ and /m/ survive in stressed syllables without paragoge (*man* < *man*), but are deleted in unstressed word-final syllables (*fashion* > *fasi*). Word-final [ŋ], to the contrary, leads to paragoge in stressed syllables (*singi* < *sing*) and is deleted in unstressed syllables (*noti* < *nothing*). In other words, in stressed syllables, word-final angma behaves like non-nasal consonants, in unstressed syllables like a nasal consonant. This paradox can be resolved in the following way.

Unstressed English word-final *-ing* was/is realized in many dialects of English with final [n] (e.g. *nothin'*, *talkin'*). Under the reasonable assumption that the **alveolar** nasal was the input nothing needs to be explained about angma in unstressed syllables. It surfaces as [n] in the input and behaves accordingly.

In stressed syllables in English, angma can never be realized as [n], as evidenced by the impossibility of, for example, **thi*[n] for *thing*. The question now is how word-final [ŋ] can be integrated into the emerging creole system. We suggest the following account. English angma is adapted by Kikongo speakers as prenasalized /g/, i.e. [ŋg], which is, however, only allowed in onset positions (cf. *Ki.ko.ngo*). Hence, we would predict that a word like *sing* is

adapted as [si.ŋgi]. Interestingly, Smith (1987) reconstructs the stages of development given in (24) independent of any substrate explanation:

(24)   *sing > si*[ŋg]*i > si*[ŋ]*i*

Gbe speakers do not tolerate coda consonants, but syllable-initial angma occurs in the pertinent Ewe and Gen lects (e.g. Capo 1991:53). Therefore, *si*[ŋ]*i* would be the optimal form for these speakers. Twi has syllable- and word-final angma, so that no syllabic adaptation would be expected. Of course paragogic forms would be easily pronouncable for these speakers.

In sum, segmental adaptation and syllabic adaptation work in tandem with regard to the integration of angma into Early Sranan. Paragoge helps both to integrate and preserve the nasal and to satisfy the constraints on syllabic structure at the same time. The integration of angma thus constitutes another piece of evidence for substrate influence on Sranan syllable structure.

Having established that paragoge is a clear substratum feature, one question remains to be answered. Why did the speakers not simply delete stem-final consonants instead of adding a vowel? This would have equally well satisfied the syllabic constraints imposed by the substrate languages. At least two explanations can be offered. First, there might have been a constraint in the substrate languages that only disyllabic words are permitted. If this were true, we would expect deletion of the final consonant with disyllabic etyma, and paragoge with monosyllabic stems. This is the pattern in Liberian English, where this substratal constraint plays a dominant role (Singler 1996a, 1996b). In Sranan, however, disyllabic etyma generally receive paragogic vowels too (cf. *bikasi < because, pramisi < promise* etc.). It seems that we need another explanation for the preponderance of epenthesis over deletion, which brings us to the second possible explanation.

As already argued above there is a universal tendency in SLA and loan-word adaptation to preserve the segments of the non-native input as far as possible (e.g. Paradis 1996, Paradis and Lacharité 1997). Only in special kinds of environment (e.g. certain types of complex onsets) do we find deletion instead of epenthesis (e.g. *tranga < strong*, see Plag and Alber in prep.). The reason for this tendency is presently unclear but it may be another case of "the emergence of the unmarked" (Broselow et al. 1998, McCarthy and Prince 1994). That is, in loanword adaptation and SLA we notice the influence of certain constraints whose effects are unobservable with native words. Future research will show whether this explanation for the observed universal tendencies is feasible.

4. Remaining problems

We have seen that substrate transfer does not solve all problems. There are a number of facts that are not easily explained by transfer. For example, 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 rather marginal, because its speakers arrived rather late on the scene (e.g. Arends 1995b).

Furthermore, it is unclear why stem-final nasals are systematically preserved in stressed syllables (as in *man*), but systematically deleted in unstressed syllables (as in *fasi* < *fashion*). Although such effects are well-known cross-linguistically (see e.g. Beckman 1998), we do not see how this effect can emerge through substratal transfer.

Finally, one would like to have an explanation for the different assimilation and copying effects that influence the quality of the paragogic vowels. It seems that substrate transfer cannot explain the observed patterns in a straightforward way. A more careful study of pertinent phenomena in the African languages involved is certainly needed before any firm conclusions can be drawn.

5. Conclusion

The empirical analysis of the earliest Sranan sources has confirmed major parts of Smith's (1977) reconstruction of Early Sranan, but disconfirmed other parts. In accordance with Smith's reconstruction, Early Sranan adds paragogic vowels to nearly all words that end in a non-nasal consonant. Unexpectedly, however, the sources show a great deal of variation concerning the quality of the paragogic vowel. This variation disappears only very slowly in the history of Sranan in a process of mixing, leveling and lexicalization.

On a more abstract level, we have provided new evidence for the significance of transfer and universals of SLA in phonological restructuring in creole languages. Both the coda restrictions and the quality of the paragogic vowel are strongly influenced by the substrate languages. The variation in Early Sranan can be largely attributed to the differences between the different substrate languages, the preference for paragoge instead of deletion as the prevalent repair strategy reflects a universal tendency in SLA and loanword integration.

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