ON THE PRE-NASALIZED CONSONANTS OF CAPE VERDEAN CREOLE

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Abstract: The status of pre-nasalized consonants of basilectal Cape Verdean Creole (the Santiago variety) is a matter of some debate in the literature, between proponents of bisegmental analyses and of a monosegmental one. This paper critically reviews bisegmental analyses and adduces synchronic and diachronic data in favour of an interpretation of pre-nasalized consonants as single phonological units. This analysis is further supported by comparative evidence from other creoles.

Keywords: Cape Verdean Creole, pre-nasalized consonants, bisegmental, monosegmental

1. Introduction

Cape Verdean Creole has a large number of phonetically pre-nasalized consonants (Quint 2003: 18, do Couto and de Souza 2006: 144, Pereira et al. 2006, Rodrigues 2007: 175). While the existence of these phonetically pre-nasalized consonants is widely accepted, their phonological interpretation is subject to ongoing controversy. What is at issue is their phonological status, either as clusters of consisting of a nasal and an obstruent (the bisegmental/biphonemic analysis) or rather as single phonological units, i.e. pre-nasalized phonemes (the monosegmental/monophonemic view).

The paper is organized as follows. In section 2, I critically review two recent bisegmental analyses of the pre-nasalized consonants of Cape Verdean Creole. In section 3 I adduce further evidence in support of a monosegmental analysis of pre-nasalized consonants. Section 4 looks at the various factors conducive to the occurrence of pre-nasalized consonants in Cape Verdean Creole. In addition, circumstantial evidence is provided from other creoles, with various lexifier languages. Finally, in section 5, I summarize the findings and some of their implications.

The examples from Cape Verdean Creole are rendered, unless otherwise specified, in the orthography or in the system of transcription used in the sources mentioned. In all other cases, the nasal component of a pre-nasalized consonant is transcribed with superscript[1]. Relevant segments appear in bold characters.

2. Arguments against bisegmental analyses

2.1 Do Couto and de Souza (2006)

In their paper on the phonological status of the pre-nasalized consonants of Cape Verdean Creole, do Couto and de Souza (2006) argue that these should be analyzed as underlying clusters, made up of a nasal and an obstruent.

Do Couto and de Souza's analysis can be summarized as follows. There is a nasal consonantal phoneme /N/, underspecified with respect to its place of articulation, and

[1] For a discussion of the transcription of pre-nasalized consonants see Mwita (2007: 65-66).

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characterized by a single distinctive feature, namely [+nasal][2]. As far as its distribution is concerned, the phoneme /N/ only occurs in coda position. On this analysis, the frequently occurring word-initial pre-nasalized consonants are derived from a sequence made up of an underlying vowel, which may not surface, and /N/. More specifically, the pre-nasalized consonants of Cape Verdean Creole "have to be interpreted as alternative pronunciations of underlying, phonological forms, which consist of an oral vowel (generally /i/) followed by a nasal element of a consonantal nature which occupies the coda position of the syllable whose nucleus is /i/" (do Couto and de Souza 2006: 144). Therefore, phonetic complexes consisting of a nasal consonant and an obstruent are clusters of two phonemes.

Central to do Couto and de Souza's analysis of the phonological status of the pre-nasalized consonants of Cape Verdean Creole are several claims[3]. Thus, according to do Couto and de Souza (2006: 139) "the strongest argument in favour of a biphonemic interpretation is the existence of countless words in which a pre-nasalized form alternates with another which contains a vowel before the nasal element, with which it forms a syllable of the VC type". This claim is illustrated with a number of forms, some of which are listed below (slightly adapted from do Couto and de Souza 2006: 139, and with the indication of syllabic boundaries):

(1) a. /iN.pa.rɐ/ → [^{m}**p**a.rɐ] ~ [**im**.**p**a.rɐ] 'to pick up'
b. /iN.fɛr.nu/ → [^{ɱ}**f**ɛr.nu] ~ [i**ɱ**.**f**ɛrnu] 'hell'
c. /iN.teN.di/ → [^{n}**t**en.di] ~ [**in**.**t**en.di] 'to understand'
d. /iN.ʃi.nɐ/ → [^{ɲ}**ʃ**i.nɐ] ~ [i**ɲ**.**ʃ**i.nɐ] 'to teach'
e. /iN.ʤu.ri.ɐ/ → [^{ɲ}**ʤ**u.ri.ɐ] ~ [i**ɲ**.**ʤ**u.ri.ɐ] 'to insult'
f. /iN.kaN.ta/ → [^{ŋ}**k**an.tɐ] ~ [i**ŋ**.**k**an.tɐ] 'to charm'

Do Couto and de Souzo (2006) thus suggests that the forms with word-initial pre-nasalized consonants appear in onset position occur in free variation with alternative forms in which the nasal is in the coda of a syllable with /i/ as its nucleus whereas the obstruents are in the onset of the following syllable. This is further justified by the claim that "speakers feel that […] there is a prosthetic vowel, which is sometimes omitted in the concrete realization" (do Couto and de Souza 2006: 140).

This line of argumentation is objectionable on several counts. First, the assumption of free variation as an explanation for the occurrence of the alternative forms in (1) above is off track. In reality, the two sets of forms illustrate the phenomenon of inter-dialectal variation. Thus, the forms with word-initial pre-nasalized consonants occur in the basilectal variety of Cape Verdean Creole while those with [i-], closer to the Portuguese etyma, are attested in its acrolectal varieties[4]. In other words, the two sets of forms under (1) are not illustrative of the phonology of one and the same variety.

Secondly, as shown by Lang (2007: 519), speakers sometimes restore the "wrong" vowel when trying to use a variety closer to Portuguese, i.e. an acrolectal one. Consider the following example of an attempt at producing an acrolectal form:

[2] According to do Couto and de Souza (2006: 133), the phoneme /N/ "reminds [us] of the archiphoneme of the Prague School of phonology".
[3] The reader is referred to Lang (2007) for an extremely detailed discussion of other issues in do Couto and de Souza's (2006) paper.
[4] See also Lang (2007: 519).

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(2) [**a**ntõ][5] 'then' (< P *então*) (Lang 2007: 519)

The expected acrolectal reflexes of Portuguese *então* would be [**i**ntõ] or [**e**ntõ]. If the vowel /i/ or /e/ were indeed part of the underlying representation, as claimed by do Couto and de Souza (2006), the fact that the vowel which actually surfaces is [a] remains unaccounted for.

Thirdly, consider another of the pairs of allegedly alternative pronunciations listed by do Couto and de Souza (2006: 139)

(3) /iN.za.mi/ → [^{n}**z**a.mi] ~ [**i**.za.mi] 'exam'

Here again [izami] is actually an acrolectal form, closer to its Portuguese etymon *esame* 'exam'. Note also that there is no nasal in this form.

A second argument adduced by do Couto and de Souza (2006: 140) in support of their bisegmental analysis is the existence of what they call "other alternations of the type *studa* ~ *istuda*, *skóla* ~ *iskóla*". On the basis of such examples, do Couto and de Souza (2006: 140) conclude that "here as well it seems that the best underlying, phonological representation would be the form with the prothetic /i/". In their view, "the phenomenon would be included in the general group of alternating forms, which exist for avoiding complex syllables, more specifically, complex onsets" (do Couto and de Souza 2006: 140). To further bolster their case, do Couto and de Souzo (2006: 140) also write that "there are alternations even when the underlying vowel is not /i/, as in *nton*/*ton* ~ *inton*/*anton*".

This argument, which essentially boils down to claiming that forms in which the underlying vowel surfaces thus avoid complex onsets, does not fare any better. The examples given do not illustrate alternative pronunciations since they occur in different varieties of Cape Verdean Creole. On the one hand, the forms with [i-] are attested only in acrolectal varieties: forms such as *istuda* and *iskóla* are closer to their respective etymon, Portuguese *estudar* 'to study' and *escola* 'school'. On the other hand, forms with other word-initial vowels, e.g. [a-] in *anton* 'then' occur, as shown above, only in attempts at producing acrolectal forms.

Moreover, if the word-initial vowel were prothetic, the same vowel would be expected to occur. Languages which resort to vowel prothesis usually select one and the same vowel.

Further, the parallel between e.g. *istuda* 'to study', *iskóla* 'school' and *inton*/*anton* is misleading. While the word-initial vowel [i] in the former does break up a complex onset [st-] or [sk-], the occurrence of [i-] or alternatively [a-] in the latter cannot be attributed to the phenomenon of avoiding complex onsets. On do Couto and de Souza's own account, Cape Verdean Creole has phonetically pre-nasalized consonants. The form *nton* therefore does not contain a complex onset, but a simplex one, namely [^{n}t].

Finally, in Cape Verdean Creole avoidance of complex onsets does not involve the use of prothetic [i]. Both diachronically and synchronically, the only repair strategies for breaking up a complex onset are consonant deletion or epenthesis (Avram 2008: 160). Consider the following examples:

(4) a. P ***esp****antar* 'to frighten' > [pantɐ] 'to chase away' (Quint 2001: 277)
b. P ***esc****uro* > [sukuru] 'dark' (Quint 2001: 277)
c. P ***bl****usa* > [buluzɐ] 'blouse' (Avram 2008: 160)
d. P ***cri****oulo* > [kiriolu] 'creole' (Avram 2008 : 160)

[5] The basilectal forms are [^{n}**t**õ] and [tõ].

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The third major claim of do Couto and de Souza (2006: 141) runs as follows: "an argument that we consider decisive is the existence of the pronoun for the first person singular, especially in its subject form". Thus, "a strong argument in support of the separability of *N* […] is the fact that other forms can occur between it and the verbal radical" and that "sometimes even more than one morpheme can intervene between them" (do Couto and de Souza 2006: 141). Consider the examples below (adapted from do Couto and de Souza 2006: 141):

(5) a. /**N**/ + /ʧoreˑ/ → [ᵑʧoreˑ] 'I wept'
I weep
b. /**N**/ + /sata/ + /ʧoreˑ/ → [ᵑ**s**atatʃoreˑ] 'I'm weeping'
I PROG weep

Indeed, since the nasal is separated by a morphemic boundary from the following obstruent the surface pre-nasalized consonant [ᵑʧ] and respectively [ⁿs] can only be derived from an underlying nasal + obstruent cluster.

While this conclusion is indisputable, note that the occurrence of underlying nasal + obstruent clusters in a given language does not necessarily rule out the existence of underlying word-initial pre-nasalized consonants in other forms. In other words, the fact that in examples such as those under (5) the pre-nasalized consonants are underlyingly clusters does not entail that all phonetically pre-nasalized consonants of Cape Verdean Creole are amenable to the same biphonemic interpretation.

More importantly, and more damaging for do Couto and de Souza's (2006) bi-segmental analysis, there is no justification for positing any vowel preceding /N/ in the underlying representation of the subject form of the Cape Verdean Creole personal pronoun for the first person singular. Consequently, the surface pre-nasalized consonants in (5) cannot be derived from a sequence made up of an underlying oral vowel and /N/.

2.2 Rodrigues (2007)

In her PhD dissertation on the phonology of Cape Verdean Creole, Rodrigues (2007) analyzes word-initial pre-nasalized consonants as clusters, both underlyingly and on the phonetic level.

Rodrigues (2007: 175) writes that "in the initial syllable there occurs a CCV type characteristic of Cape Verdean: that of pre-nasalized consonants". More specifically, "the CCV type involves /N/ […] in the C_1 position followed by a stop as C_2" (Rodrigues 2007: 175). The examples provided are *ngat*a 'to tie' and *nxina* 'to teach'. Note, first of all, that in the second form, where *x* stands for [ʃ], C_2 is occupied by a fricative, not by a stop. Second, it is not clear why the term pre-nasalized consonants is used with reference to what is said to be a type of consonant cluster.

Using an optimality-theoretic framework, Rodrigues (2007) analyzes output forms such as those under (6) as incurring violation of *COMPLEX^{ONS}, the constraint militating against the occurrence of complex onsets:

(6) a. [**nt**a.la] no gloss provided (Rodrigues 2007: 175)
b. [**ntr**a.da] 'entrance' (Rodrigues 2007: 178)

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On this analysis, the form in (6b) contains the three-consonant onset cluster [ntr-]. However, the only three consonant onset clusters of the Santiago variety of Cape Verdean Creole mentioned by Rodrigues (2007: 164) are exclusively of the type /sCC-/, as in the only example given in her own list of possible syllables:

(7) CCCV /'**str**etu/ 'tight' (Rodrigues 2007: 164)

Moreover, if pre-nasalized consonants are clusters, the following forms contain a /CCCC-/ onset:

(8) a. [**nstr**ui] 'to instruct' (Quint 1998, Anon. 2007)
b. [**nstr**usõ] 'instruction' (Quint 1998, Anon. 2007)

All descriptions of the Santiago variety of Cape Verdean Creole phonology (e.g. Pereira et al. 2006) are agreed on a maximum number of three consonants in the onset. Rodrigues (2007: 164) herself lists CCCV as the syllable type containing the maximum number of consonants in onset position that can occur in this variety. Consequently, in forms such as those under (8) above, and *mutatis mutandis* in the examples under (6) as well, the nasal and the following consonant do not constitute a cluster.

3. Further evidence in favour of a monosegmental analysis

3.1 Pre-nasalized consonants in language games

As is known, language games often provide insights into the phonological status of sounds (Hombert 1986: 177) and are therefore accepted as external evidence in support of a particular phonological analysis.

Quint (2006: 81-82) reports on *grégu*, a language game practiced in Santiago. *Grégu* is "a sort of coded language used for cryptic purposes by young people or by certain socio-professional categories (for instance merchants who speak among themselves and want to avoid being understood by their customer(s)". According to Quint 2006: 82), the *grégu* forms are built by applying the following rule: "each syllable is repeated and the onset consonant (or consonant cluster) is replaced by [p]". Consider first the *grégu* equivalents of words starting with onsets consisting of a single consonant:

(9) a. /**k**u/ → [**k**u.**p**u] (Quint 2006: 82)
with
b. /**ʤ**õ/ → [**ʤ**õ.**p**õ] (Quint 2006: 82)
Djom

Consider next an example involving the subject form of the personal pronoun for the first person singular:

(10) /**N**/ + /**k**õ.trɐ/ → [ᵑ**k**õ.**p**õ.trɐ.pɐ] (Quint 2006: 82)
I meet

As shown by Quint (2006: 82), if word-initial pre-nasalized consonants were derived from an underlying vowel + nasal sequence, the expected outcome in the first syllable of the *grégu* form would be a different one:

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(11) /**iN**/ + /**k**õ.trɐ / → *[**ĩ.p**ĩ.kõ.põ.trɐ.pɐ]

On the basis of the evidence provided by *grégu*, Quint (2006: 81) concludes that "it seems that the pre-nasalized [consonants] of Cape Verdean […] must be interpreted (at least in word-initial position) as single phonemes (the monophonemic hypothesis)".

One could still argue, perhaps, that the evidence from *grégu* is inconclusive since the /N/ the subject form of the personal pronoun for the first person singular is indisputably underlying, as in (10), since it is separated by a morphemic boundary from the following obstruent[6]. Quint (2006) does not have any other examples, but similar *grégu* forms presumably obtain when the word-initial pre-nasalized consonant would be underlying under the monosegmental analysis. Compare (12a) and (12b):

(12) a. /**mp**a.rɐ/ → [$^{\mathbf{m}}$**p**a.**p**a.rɐ.pɐ]
b. /**iN**.pa.rɐ/ → *[**ĩ.p**ĩ.pa.pa.rɐ.pɐ]

3.2 Syllabification of pre-nasalized consonants

Syllabification tasks performed by native speakers also provide clues as to the phonological status of sounds in a language.

Lang (2007) reports that according to his collaborator, a native speaker of the Santiago variety of Cape Verdean Creole, the syllabification of *kánta* 'to sing' is as follows:

(13) [ka.$^{\mathbf{n}}$**t**ɐ] (Lang 2007: 534)

This suggests that [^{n}t] is the phonetic realization of a single phoneme /^{n}t/. As shown in subsection 2.1, on the analysis of do Couto and de Souza (2006), phonetically pre-nasalized consonants are derived from a sequence made up of an underlying vowel and /N/ in coda position. Since the underlying vowel /a/ does surface the nasal should appear in the coda of the first syllable of *kánta* 'to sing'. In other words, the expected syllabification would be:

(14) /kaN.tɐ/ → *[ka**n**.**t**ɐ]

Another consequence of the syllabification exemplified in (13) is that, at least for some speakers, pre-nasalized stops function as single phonemes in word-medial position as well. If so, this disconfirms a claim by Rodrigues (2007: 176), according to whom, "all consonants […] can occur in […] word-medial position, except for the pre-nasalized".

3.3 Pre-nasalized consonants in forms containing another nasal

As shown by Lang (2007: 520), "in the Santiago variety cases of variants uniquely distinguished by the oral vs. pre-nasalized character of the initial consonant are frequent". Consider the examples listed below[7]:

(15) a. *pintxera* ~ ***np****intxera* 'plant species' (Lang 2007: 520)
b. *bónji* ~ ***nb****ónji* 'type of grain' (Lang 2007: 520)

[6] As in example (5) in subsection 2.1.

[7] Where <a> = [ɐ], <ó> = [ɔ], <tx> = [ʧ] and <nh> = [ɲ].

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c. *fanhi* ~ ***nf****anhi* ‘to make scornful faces’ (Lang 2007: 520)
d. *ganhóma* ~ ***ng****anhóma* ‘coffee beans’ (Lang 2007: 520)

In the alternative forms with pre-nasalized consonants, the nasal element cannot be derived from a sequence consisting of an underlying vowel and /N/.

Several other words exhibit phonetically pre-nasalized consonants. One such form, with a word-initial pre-nasalized consonant is independently recorded in different sources:

(16) ***nz****ámi* ‘exam’ (do Couto and de Souza 2006: 139, Lang 2007: 519)

As noted by Lang (2007: 519), in do Couto and de Souza’s (2006: 139) pair of alleged alternative forms *nzámi* and *izámi* ‘exam’[8], from Portuguese *esame*, “the variant to be explained is […] *nzámi* instead of the expected **zámi*”. Here again the nasal component of the phonetically pre-nasalized consonant cannot be derived from an underlying vowel followed by /N/.

Moreover, if, as shown in subsection 3.2, some speakers may have pre-nasalized stops in word-medial position as well, two other forms can be added:

(17) a. *formi****ng****a* ‘ant’ (Anon. 2007)
b. *indimi****ng****u* ‘enemy’ (Anon. 2007)

Since the underlying vowel preceding it surfaces, [^{n}g] cannot obtain from /i/ followed by /N/ in coda position.

Note, finally, that all the forms under (15), (16) and (17) contain another nasal.

3.4 Pre-nasalized consonants in forms containing no other nasal

There is a different set of forms with word-initial pre-nasalized consonants that alternate with others starting with obstruent:

(18) a. ***b****áxa* ~ ***nb****áxa* ‘to lower’ (Lang 2007: 520)
b. ***b****era* ~ ***nb****era* ‘to scream’ (Lang 2007: 520)
c. [**b**rugɐ] ~ [$^{\mathbf{m}}$**b**rugɐ] ‘benign tumor’ (Quint 2006: 81)
d. ***s****olbe* ~ ***ns****olbe* ‘to sip’ (Lang 2007: 520)
e. ***s****olda* ~ ***ns****olda* ‘to solder’ (Lang 2007: 520)

Consider also the following basilectal form:

(19) ***nz****eda*[9] ‘to make sour’ (Lang 2007: 520)

The surface pre-nasalized consonant cannot be derived from a sequence consisting of an underlying vowel and /N/ in any of these words or variants.

In contrast to the examples analyzed in subsection 3.3, the characteristic shared by the forms with pre-nasalized word-initial consonants in (18) and (19) is that there is no other nasal in the word.

[8] See example (3) in subsection 2.1.
[9] The acrolectal equivalent is *azeda* (Lang 2007: 520).

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3.5 Pre-nasalized consonants in loanwords from the substrate languages

Pre-nasalized consonants also occur in loanwords from the African substrate languages of Cape Verdean Creole.

The substrate languages of Cape Verdean Creole include Mandinka, Wolof and Temne (Lang 2006, Quint 2006 and Rougé 2006, Baptista 2007). As shown, among others, by Tinelli (1981: 9), Diem (1995a: 3), Parkvall (2000: 41), Quint (2006: 81), do Couto and de Souza (2006: 135), Rodrigues (2007: 217 and 219)[10], pre-nasalized phonemes are attested in all these languages. Under the circumstances, it is hardly surprising that pre-nasalized consonants also occur in loanwords from these. Consider e.g. the following borrowings from Wolof:

(20) a. ***mb****ipu* 'trap' (Quint 1998, 2003: 19, and 2006: 90)
b. ***nd****or* 'fish species' (Quint 1998, and 2006: 90)
c. ***ng****ori* 'wasp' (Quint 1998, 2003: 19, and 2006: 81)
d. *ba****mb****u* 'to carry on one's back' (d'Andrade and Kihm 2000: 101)

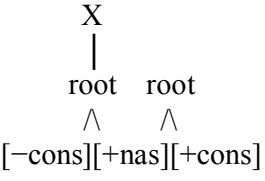
In none of these cases is there any justification for analyzing the pre-nasalized consonants as clusters.

4. Emergence of pre-nasalized consonants

4.1 Reinterpretation of Portuguese nasal vowel + obstruent sequences

The overwhelming majority of the Cape Verdean Creole forms with pre-nasalized consonants can be traced back to Portuguese etyma containing a nasal vowel + obstruent sequence.

The analysis outlined below assumes the representation of nasal vowels proposed by Paradis and Prunet (2000). On this analysis, nasal vowels consist of two root nodes, one vocalic [−cons] and the other consonantal [+cons], sharing the feature [+nasal], and the consonantal root node lacks a skeletal position, i.e. it is not linked to an X slot. The feature geometrical representation of nasal vowels (with omission of irrelevant structure) is given below:

(21)


As for pre-nasalized consonants, in the analysis adopted here, these consist of two root nodes sequenced under a single skeletal position (Piggott 1988, Rosenthal 1988, Clements and Hume 1995: 254). On this view, a pre-nasalized consonant is represented as a sequence of two root nodes, the first one characterized as [+nasal] and the second one as [–nasal]. This representation assumes the *No Branching Constraint* barring branching structure under the root node (Clements and Hume 1995: 255):

[10] For the situation in Wolof see also Cisse (2006) and Lang (2007: 534, f.n. 2)

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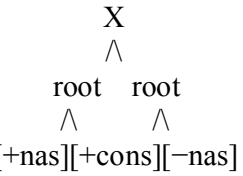
(22) Configurations of the form



are ill-formed, if *A* is any class node (including the root node), *A* immediately dominates *B* and *C*, and *B* and *C* are on the same tier

Pre-nasalized consonants are represented as follows (irrelevant structure has been omitted):

(23)

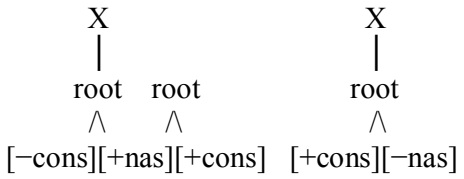


Childs (2003: 62) summarizes the process whereby pre-nasalized consonants arose in African languages as follows: "the typical pattern is for nasality to spill over from a neighbouring (nasal) vowel or consonant onto a following segment". The diachronic scenario conducive to the emergence of e.g. /^{m}b/ is illustrated below

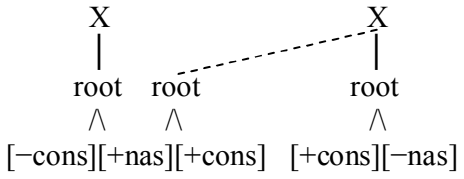
(24) ãb → ã^{m}b (Childs 2003: 62)

Assuming the feature geometrical representations of nasal vowels in (21) and respectively of pre-nasalized consonants in (23), the formation in Cape Verdean Creole of pre-nasalized consonants etymologically derived from Portuguese nasal vowel + sequences can be formally expressed as follows (irrelevant structure has been omitted):

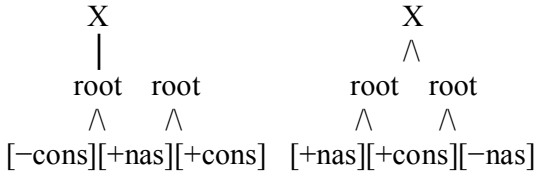
(25) a.



b.



c.



As can be seen in (25b), the [+cons] root node of the nasal vowel, which lacks a skeletal position, is linked to the X slot of the following [−nas] consonant. Consequently, the originally [−nas] consonant is now characterized by the ordered sequence [+nas][−nas], i.e. it turns into a pre-nasalized consonant, as in (25c).

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On this analysis, Portuguese nasal vowel + oral consonant sequences were reinterpreted as nasal vowel + pre-nasalized consonant sequences, under the influence of the substrate languages of Cape Verdean Creole.

As is well known, in the history of Cape Verdean Creole unstressed vowels are frequently subject to aphesis (Lang 2007: 523, Rodrigues 2007: 216, Avram 2008: 161). Consider the examples below, illustrating aphesis of oral vowels:

(26) a. P ***a****lugar* > *luga* 'to rent' (Avram 2008: 161)
b. P ***e****conomia* > *kunumia* 'economy' (Rodrigues 2007: 216)
c. P ***i****maginar* > *majina* 'to imagine' (Rodrigues 2007: 216)
d. P ***o****pinião* > *pinion* 'opinion' (Rodrigues 2007: 216)

Aphesis also affected nasal vowels. Rodrigues (2007: 216), for instance, explicitly states that "in the passage from European Portuguese […] to Cape Verdean" aphesis of unstressed nasal vowels yielded "the so-called pre-nasalized [consonants]".

The combined effect of pre-nasalized consonant formation and of aphesis of nasal vowels accounts for the shape of Cape Verdean Creole forms with word-initial pre-nasalized consonants, etymologically derived from Portuguese nasal vowel + obstruent sequences:

(27) a. P /**ẽg**ulir/ > [$^{\eta}$**g**uli] 'to swallow'
b. P /**ĩp**edir/ > [^{m}**p**idi] 'to hinder'
c. P /**ãt**oniu/ > [^{n}**t**ɔni] 'Anthony'
d. P /**ũ**.bi.gu/ > [^{m}**b**igu] 'navel'

All such Cape Verdean Creole forms involve resyllabification. In addition, their overwhelming majority also involves reanalysis of morphemic boundaries. The productive Portuguese morphemes *em-* and *im-*, were reanalyzed and the morphemic boundary was shifted to the left, as in (27a) and (27b). However, this is not always the case, as illustrated by the forms in (27c) and (27d).

Also, pre-nasalized consonant formation and aphesis led to the emergence of a large number of forms with a CV syllable structure. As shown by Avram (2008: 166-167), early Cape Verdean Creole had a strong tendency towards CV syllable structure. Pre-nasalized consonant formation and aphesis yielded forms exhibiting this unmarked syllable structure.

Finally, circumstantial evidence in support of the scenario outlined above can be adduced from other Atlantic Portuguese-based creoles, known to have pre-nasalized phonemes (and a clear preference for CV syllables):

(28) a. P /**ãd**ar/ > Sãotomense ***nd****a* 'to walk' (Valkhoff 1966: 106)
b. P /**ĩd**agar/ > Sãotomense ***nd****aga* 'to investigate' (Valkhoff 1966: 90)
c. P /**ãd**ar/ > Fa d'Ambu ***nd****a* 'to walk' (Post 1995: 194)

4.2 Spread of nasality

Another mechanism whereby pre-nasalized consonants emerged in Cape Verdean Creole is spread of nasality from another nasal in the word, either a nasal vowel or a nasal consonant. This process accounts for all the forms discussed in 3.3.

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Spread of nasality is also attested in other Atlantic creoles (with various lexifier languages), known to have pre-nasalized phonemes. Consider the following examples from Portuguese-based Sãotomense and respectively Spanish-based Palenquero:

(29) a. P ***pão*** > Sãotomense /**mp**õ/ 'bread' (Parkvall 2000: 40)
b. P ***g**alinha* > Sãotomense /**ŋg**aɲa/ 'hen' (Parkvall 2000: 40)
c. P ***g**alinha* > Fa d'Ambu /**ŋg**aɲia/ 'hen' (Parkvall 2000: 40)
c. S ***g**rande* > Palenquero /**ŋg**ande/ 'big' (Parkvall 2000: 40)

4.3 Pre-nasalization

As shown in 3.4, pre-nasalized consonants also occur in forms containing no other nasal. In such cases, the Cape Verdean Creole reflex of a Portuguese obstruent is a pre-nasalized consonant.

Not surprisingly, pre-nasalized reflexes of etymologically oral consonants are also attested in Mandinka and Wolof, the two main substrate languages of Cape Verdean Creole, both of which have pre-nasalized phonemes. This can be seen in e.g. borrowings from French or English:

(30) a. F ***b**outique* > Mandinka ***mb**itikoo*[11]
b. F / E ***b**iscuit* > Wolof ***mb**iskit* (Diem 1995b: 26)

Pre-nasalization of etymologically oral consonants is found in other Atlantic creoles (with various lexifiers), known to have pre-nasalized phonemes. The examples below are from Fa d'Ambu and Sãotomense, Palenquero, Portuguese- and English-based Saramaccan and English-based (Jamaican) Maroon Spirit Language:

(31) a. P *fe**d**er* > Fa d'Ambu /fe**nd**e/ 'to stink' (Parkvall 2000: 40)
b. P ***g**ato* > Fa d'Ambu ***ng**atu* 'cat' (Post 1995: 194)
c. P ***g**abar* > Sãotomense /**ŋg**aba/ 'to praise' (Parkvall 2000: 40)
d. P ***já já*** 'immediately' > Sãotomense ***nja**nja* 'quickly' (Holm 2000: 156)
e. S ***b**olsa* > Palenquero ***mb**osa* 'purse' (Holm 2000: 156)
f. S ***d**uro* > Palenquero ***nd**ulo* 'hard' (Holm 2000: 156)
g. E ***b**oil* > Saramaccan /**mb**ói/ 'to boil' (Parkvall 2000: 40)
i. E *pi**g*** > Saramaccan /pí**ŋg**u/ 'pig' (Parkvall 2000: 40)
j. E ***b**lood* > Maroon Spirit Language /**mb**lada/ 'blood' (Bilby 1983: 79)

4.4 Pre-nasalized reflexes of nasal consonants

Occasionally, the Cape Verdean Creole reflex of an etymologically nasal consonant is a pre-nasalized consonant, as in the following example:

(32) P *i**n**imigo* > *i**nd**imingu* 'enemy' (Anon. 2007)

The phenomenon is also documented in other Atlantic creoles (with various lexifiers), known to have pre-nasalized phonemes:

[11] This is a variant of *bitikoo*, the only form recorded by Colley (1995: 8).

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(33) a. E ***m****eat* > Saramaccan /**mb**eti/ ‘meat’ (Parkvall 2000: 40)
b. E ***n****ight* > Saramaccan ***nd****éti* ‘night’ (Holm 2000: 156)
c. E ***in*** > Maroon Spirit Language /i**nd**i/ ‘in’ (Bilby 1983: 81)

4.5 Loanwords from the substrate languages

One last source of pre-nasalized consonants in Cape Verdean Creole is represented by loanwords from its substrate languages. Consider the Wolof etyma of three of the borrowings discussed in 3.5 and repeated below for ease of exposition:

(34) a. W ***mb****ëpp* > ***mb****ipu* ‘trap’ (Quint 1998, 2003: 19, and 2006: 90)
b. W ***nd****or* > ***nd****or* ‘fish species’ (Quint 1998, and 2006: 90)
c. W ***ng****uri* > ***ng****ori* ‘wasp’ (Quint 1998, 2003: 19, and 2006: 81)

5. Conclusions

The findings of this paper can be summarized as follows. Cape Verdean Creole appears to have pre-nasalized phonemes. However, the monosegmental analysis of phonetically pre-nasalized consonants does not apply across the board. It does not rule out the possibility that some consonants which are pre-nasalized on the phonetic level are actually derived from underlying nasal + obstruent clusters, e.g. when they are separated by morphemic boundaries. On this view, the phonetically pre-nasalized consonants of Cape Verdean Creole are either underlyingly single segments – in most cases – or derived from underlying nasal + obstruent clusters.

The monosegmental analysis of the pre-nasalized consonants of Cape Verdean Creole has several implications. Thus, according to previous work on the segmental typology of African creoles (Klein 2006), Cape Verdean Creole does not have pre-nasalized phonemes. In light of the data examined in this paper, Cape Verdean Creole should actually figure among the African creoles whose inventory of phonemes includes pre-nasalized consonants.

The role of the substrate and of the superstrate languages respectively is also in need of reevaluation. Do Couto and de Souza (2006: 145) conclude that their bisegmental analysis of the pre-nasalized consonants of Cape Verdean Creole “shows that, on the phonetic level, pre-nasalization points to the African substrate, but their phonological representation points to the superstrate”, i.e. Portuguese. This claim is disconfirmed by the monosegmental analysis outlined in this paper, which traces both the phonetic realization and the phonological representation of the pre-nasalized consonants of Cape Verdean Creole to its substrate languages.

Finally, the influence of the substrate languages may have been underestimated. In his discussion of pre-nasalized stops, Parkvall (2000: 40) writes that “prenasalised stops prototypically occur in words of African origin, but African phonological rules have evidently in *some* [emphasis added, A. A. A.] cases been extended to European-derived lexical items as well”. On the contrary, most of the pre-nasalized consonants of Cape Verdean Creole occur in words of Portuguese origin. Parkvall (2000: 41) further states that in the case of other Atlantic creoles “substrate influence appears to be a plausible explanation, and more called for than in the case of the Upper Guinean Creoles”, to which Cape Verdean Creole belongs. The account of their emergence proposed in the present

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paper suggests that substrate influence may be an equally plausible explanation for the pre-nasalized consonants of Cape Verdean Creole as well.

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