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NCs IN MOGHAMO: PRENASALIZED ONSETS OR HETEROSYLLABIC CLUSTERS?*

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This paper is concerned with the analysis of nasal-plus-oral-stop sequences in Moghamo, a Grassfields Bantu language of Cameroon. Although Stallcup [1978] tentatively analyzed these sequences as heterosyllabic clusters, the evidence suggests that they are actually prenasalized syllable onsets. First, the distribution of NCs closely parallels that of unambiguous onsets: they occur both initially and medially in words of several grammatical categories. Instances of unambiguous heterosyllabic clusters, by contrast, are rare. Second, while the nasal portion of noun-initial NCs was historically a prefix, it appears to be part of the root synchronically. Third, the nasal portion of an Niger-Congo does not appear to be phonologically tone-bearing. Finally, the contention that NCs are on-sets is supported by native speaker intuitions.

1. Introduction

Many Niger-Congo languages have word-initial clusters or units consisting of a nasal consonant followed by a homorganic oral consonant. These entities (henceforth NCs) pattern differently in different languages. In some languages, for example in many Gur [Naden 1989] and Kwa languages, tonal and distributional facts argue that the nasal consonant in such cases is a separate syllabic segment. In these languages, a word-initial NCV sequence is syllabified .N.CV, as illustrated in the Nawuri examples in (1) (from Casali [1995]). (The word-initial nasal consonants in (1a,b) are first person singular subject pronoun prefixes, while those in (1c,d) are noun class prefixes.)

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(1) a. *.m.ba.* 'I am coming'
b. *.n.sʊ.* 'I have'
c. *.n.ta.* 'alcoholic drink'
d. *.n.kɛ.* 'days'

In other languages, for example Fula, Wolof, and many Bantu languages (e.g., Ewondo, Chichewa, Kinande), the evidence demands instead that NCs be analyzed as unitary "pre-nasalized" segments which constitute a syllable onset both word-initially and intervocalically. This is illustrated in the Wolof examples in (2), drawn from Ka [1987].[1]

(2) a. *.mbaam.* 'donkey'
b. *.ndab.* 'utensil'
c. *.Njaay.* (person's name)
d. *.ngooñ.* 'cattle food'
e. *.le.mpo.* 'tax'
f. *.di.ndi.* 'to take off'
g. *.fu.nki.* 'to balloon'
h. *.go.ngo.* 'perfumed powder'

In the case of Moghamo, a Grassfields Bantu language of Cameroon, Stallcup [1978] opts for an analysis of the N and C as belonging to different syllables, as in (1), after a carefully considered comparison with an alternative, same-syllable analysis, comparable to that in (2). The aim of this paper is to show that, while Stallcup's reasoning is generally valid as far as it goes, a fuller treatment of the evidence—including some facts not available to Stallcup—actually supports treating NCs in Moghamo as unitary, "prenasalized" syllable onsets, not only in word-initial position but in intervocalic position as well.

Although a claim that the two halves of an NC are syllabified together in a single syllable onset does not logically require analyzing the NC as a single segment rather than as a consonant cluster, phonologists have in fact generally treated tautosyllabification as going hand-in-hand with monosegmental status. Here, however, I am not primarily interested in how many segments are involved, but in the question of whether or not the nasal and non-nasal portions of a Moghamo NC belong to the same syllable. In keeping with this emphasis, I will hereafter refer to a syllabification pattern like that in (1) as a heterosyllabic analysis and the pattern in (2) as a tautosyllabic analysis.

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[1] The symbols used are those of Ka. These appear to have IPA values as follows: Nj = [ɲɗʒ], ñ = [ɲ], ng = [ŋg], e = [ɛ], o = [ɔ].

The data on which this paper is based represent the Batibo dialect, which also formed the basis of Stallcup's study.[2] In general, data from our study are in very close agreement with his, although there are isolated lexical differences, e.g., the word 'dog', which is [bok] in his data, is [buk] in the speech of our consultant, Ms. Bridget Teboh.

The remainder of this paper is organized as follows. Section 2 provides background on the Moghamo phonological system. Section 3 briefly describes the inventory of attested NCs and their distribution. Section 4 summarizes Stallcup's reasons for treating NCs as heterosyllabic clusters and provides counterarguments in favor of the tautosyllabic analysis. Section 5 provides additional evidence, from native speaker intuitions, in support of the tautosyllabic analysis. The paper ends with a brief conclusion in section 6.

2. Background

2.1 Segment Inventory. Setting aside the possible monosegmental status of NCs, Moghamo has a total of eighteen consonant phonemes, as shown in (3).

(3) Moghamo consonants

p	t	tʃ	k	ʔ
b	d	dʒ	g	
m	n	ɲ	ŋ	
f	s			
		z		
		y	w	

/s/ and /z/ are often realized as alveopalatal fricatives [ʃ] and [ʒ]. This variation seems to be free rather than conditioned.

The oral vowel inventory, according to Stallcup [1978], is given in (4).

(4) Moghamo vowels

i	ɨ	u
e	ə	o
	a	ɔ

[2] Data were collected as part of a class in Field Methods at UCLA during the Winter and Spring quarters 1994 and are based on the speech of our language consultant for the class, Bridget Teboh, a UCLA graduate student majoring in African Area Studies. She is from the village of Batibo, in the North-West Province of Cameroon.

Three of these vowels, /i/, /e/, and /a/ have distinctive nasal counterparts. The status of [ə] and [ɨ] as separate phonemes is dubious, as there are few if any clear examples of contrast between these segments. Since I have not so far been able to completely predict the relative distribution of these segments, however, I will follow Stallcup in treating them as separate phonemes. Contrast between [ɔ] and [o] is limited; the former is largely restricted to closed syllables and the latter to open syllables. There are however a few examples of [ɔ] in open syllables, e.g., [nɔnɔʔ] 'many', and some possible cases of [o] in closed syllables as well. /e/ tends to be pronounced as [ɛ] in closed syllables.

2.2 Syllable Structure. Syllables have the basic structure C(w)V(C). Onsetless syllables do occur but are restricted, as in many languages, to word-initial position. The attested Cw onsets are /bw/, /tw/, /dw/, /sw/, /zw/, /tʃw/, /kw/, /gw/, and /ŋw/. Vowel length is not contrastive. Syllable codas are restricted to /p/, /t/, /k/, /m/, /n/, /ŋ/, /ʔ/, and, in a few lexical items, /d/. Setting aside cases involving word-medial NCs, which will be discussed below, closed syllables in non-word-final position are almost non-existent. Stallcup does, however, cite a few examples of non-final closed syllables, including the following:

(5) a. *bɔmɾi* 'to meet'
b. *ŋwaʔɾi* 'to read'

In Ms. Teboh's speech, these forms are [bɔmni] and [ŋwaʔaɾi], respectively.[3]

Word-final /n/ (and, less commonly, /ŋ/) are sometimes elided in fast speech, as in the examples in (6). When this happens, the preceding vowel is nasalized. (This vowel generally undergoes compensatory lengthening, although this has not been indicated in the transcriptions in (6)).

(6) a. *azet zɔn* → *azet zɔ̃*
tree this
'this tree'

b. *aben mət* → *abɛ̃ mət*
country his
'his country'

c. *mbən bo* → *mbə̃ bo*
your arm
'your arm'

[3] The form [ŋwaʔaɾi] actually means 'to write' in Ms. Teboh's speech. I assume that the gloss 'to read' given for example (5b) by Stallcup is simply an error. Ms. Teboh's form for 'to read' is [kaɾi].

/p/ is also sometimes elided word-finally, but only when followed by a word beginning with a consonant.

(7) a. *mbɔp kə gwɛ* → mbɔ kə gwɛ̃
they PERF sleep
'they slept'

b. *izɔp nəp* → izɔ nəp
their house
'their house'

In other cases, underlying word-final consonants (including some instances of final /p/) may surface with a following epenthetic vowel (generally [ə]); the underlying coda consonant is then presumably resyllabified as an onset to the syllable containing the epenthetic vowel.

(8) a. *azet mət* → *azeɾe mət*
tree his
'his tree'

b. *atuk mət* → *atuɣə mət*
head his
'his head'

c. *nəp ŋwaʔaɾi* → *nəbə ŋwaʔaɾi*
house book
'school'

d. *itum nən* → *itumə nən*
my-PL-N bird
'my birds'

Examples (8a) and (8b) also illustrate a common lenition process, in which certain intervocalic instances of /t/ and /k/ are realized as [ɾ] and [ɣ], respectively. (/p/ is sometimes realized as [β] in this same environment as well, e.g., [nəbə] in (8c) might also be pronounced [nəβə].)

The factors which determine exactly when epenthesis applies are not yet clear; it appears to be optional at least under some circumstances. Two things are reasonably clear however: First, [ə]'s resulting from epenthesis do not seem to be distinguishable in quality or duration from [ə]'s which are underlying (i.e., the epenthetic [ə]'s are not merely excrescent). Second, epenthesis does not apply utterance-finally, but only when the word-final consonant is immediately followed by a word beginning in a consonant.

2.3. Tone. The tonal system of Moghamo is complex.[4] Four tone levels appear on the surface. There are also a variety of contour tones. Evidence from tone has an important bearing on the analysis of NCs, as we shall see later.

3. Distribution and Behavior of NCs

Four NCs occur in Moghamo, all of which consist of a nasal consonant followed by a homorganic voiced obstruent: [mb], [nd], [ɲdʒ], and [ŋg].[5] These occur both word-initially, as in (9), and word-medially, as in (10).

(9) a. *mbi-tikup* [mbiɪikup] 'boxes'
b. *ndandan* 'many'
c. *ɲdʒik* 'sheep'
d. *ŋgoʔ* (person's name)

(10) a. *sambe* 'seven'
b. *kɔndi* 'think'
c. *ŋwəmbi* 'smile'
d. *taŋgi* 'make'

The word-initial NCs occur most frequently in nouns, although they are also found in two verbs, [ɲdʒɔ] 'enjoy', which is a borrowing from English, and [mbəŋənə] 'daydream'. In addition, initial /nd/ occurs in the quantifier [ndandan] 'many', while /mb/ occurs in some demonstratives (e.g., [mbɔn] 'these') and pronouns (e.g., [mbɔp] 'they').[6] Stallcup's (p.77) assertion that root-medial NCs occur only in verbs is largely correct, although we have found two exceptions, the numeral [sambe] 'seven', and the loan word [maŋgoɾo] 'mango'. Also, there are a number of personal names in which an NC is directly preceded by an initial vowel, e.g., [aŋgum] (more examples are given below). It is not clear whether these initial vowels may be analyzed as prefixes, or whether the names should be considered monomorphemic.

The word-initial NCs in (9) contrast with "near-initial" NCs that surface with a preceding vowel. Stallcup (p.76) found just two examples of these initial VNC sequences:

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[4] For an analysis of tone in the Ngambo dialect of Moghamo, see Asongwed and Hyman (1976).

[5] [ŋw] also occurs in a few words. It is not entirely clear whether this is to be treated as an NC analogous to /mb/, /nd/, /ɲdʒ/, /ŋg/, or as a Cw cluster patterning with the clearly attested Cw's /bw/, /tw/, /dw/, /sw/, /zw/, /tʃw/, /dʒw/, /kw/, and /gw/. I follow Stallcup in assuming the latter.

[6] In its occurrence in demonstratives and possessive pronouns, /mb/ functions as a separate morpheme, an "agreement consonant" which marks the noun class of the head noun. (See p. 160.)

(11) a. *à-mbǎn* 'boil' (noun)
b. *ì-ŋgɔ̄n* 'plaintain'

The word-initial vowels in both examples are noun class prefixes. In my own data, (11b) is [ŋgɔn], with no initial [i]. Our data contain a number of additional examples, including the following:

(12) a. *áŋgūm* (person's name)
b. *íŋgwàrí* (person's name)
c. *íɲdʒìkì* (person's name)
d. *í-ŋgɔ̄p* 'mother'

According to Stallcup, some word-initial NCs (those belonging to his noun gender 9/10) may be optionally realized with a prothetic vowel [i]. As examples, he gives the following (p.147):

(13) a. *mbap* ~ *imbap* 'vegetable'
b. *ndɔŋ* ~ *indɔŋ* 'horn'
c. *ɲdʒim* ~ *iɲdʒim* 'back'
d. *ŋgup* ~ *iŋgup* 'chicken'

(13a) does not occur in our own data. We have occasionally transcribed (13c) and (13d) with an initial [i], although I suspect that such pronunciations are rare at best in our consultant's speech.

4. Analysis of NCs

4.1. Distributional Evidence. One of Stallcup's reasons for analyzing NCs as heterosyllabic clusters is that they are of limited distribution. According to his data, intramorphemic NCs are basically limited to occurring medially in verb roots.[7] (The initial NCs in (13) are not exceptions to this statement from his viewpoint because he analyzes the nasal portion as a separate morpheme, a noun class prefix. The initial VNCs which occur in nouns do constitute exceptions to this statement; however, as stated above, Stallcup's data contained only two such examples, i.e., the words in (11).) It is precisely in this position that his data also contain at least a few medial CC sequences which must clearly be analyzed as heterosyllabic, as in (5) above.

[7] Stallcup notes that medial NC's in verbs (as well as the rarer CC clusters that occur in words like those in (5)) have arisen from heteromorphemic N+C sequences historically. There is, of course, no reason why this would necessarily rule out a synchronic analysis as unitary syllable onsets.

If it is in fact true that intramorphemic NCs are restricted to exactly those positions in which unambiguous heterosyllabic clusters occur, this would indeed favor a heterosyllabic analysis of these entities. It must be noted, however, that CC clusters of the type in (5) appear to be very rare. (As noted above, moreover, only one of the two forms in (5) actually contains a cluster in our consultant's speech.) Also, intramorphemic NCs in our own data are not entirely restricted to medial position in verb roots. As noted previously, we have several morpheme-medial occurrences in non-verbs, as well as at least one (discounting the loanword [ɲdʒɔ] 'enjoy') initial NC in a verb root. I argue below, moreover, that both the N and C portions of the word-initial NCs in noun like those in (13) are actually part of the noun root; the N should not be analyzed as a noun class prefix. If this is correct, then it would appear that NCs can occur in both morpheme-initial and morpheme-medial position.

4.2. Morphological and Tonal Evidence. In support of a heterosyllabic analysis of NCs, Stallcup gives a further argument based on morphological and tonal considerations:

> When NC occurs in gender 9/10 nouns [this gender includes the nouns in (13)—RC] there is a morpheme boundary between the N and the C and the N is syllabic with a low tone.

There are three potentially separate (but clearly interrelated) claims here:

1. There is a morpheme boundary between the N and the C in these cases.
2. The N is syllabic.
3. The N bears a low tone.

It is not immediately obvious how damaging the first of these claims, if true, would be to a tautosyllabic analysis of NCs, since there are languages in which linguists have argued that NCs are syllabified as single onset segments in surface representations even though the nasal constitutes a separate morpheme. This is true, for example, of Wolof [Ka 1987], Bafanji [Jun 1992] and Kindendeule [Ngonyani 1992]. The last two claims would, however, presumably be seriously damaging to the tautosyllabic analysis if their truth could be established. This is because onset consonants are not, in general, expected to bear tone, nor, of course, should they be syllabic. I will argue, however, that each of these claims is based on a problematic interpretation of the data.

Consider first the claim that the N and C portions of these word-initial NCs are separated by a morpheme boundary; more specifically, Stallcup claims that the N portion is a noun class prefix. He does not justify this claim directly, and as far as I can tell the only pieces of evidence for it are the following two facts:

1. The noun gender[8] (Stallcup's gender 9/10) to which the NC initial nouns belong (as determined by concord and other facts) is related historically to the Proto-Bantu gender 9/10, which had homorganic nasal consonants as both singular and plural class prefixes.
2. A considerable number of the nouns in Moghamo gender 9/10 begin with NCs. (Other nouns in this gender have, in Stallcup's analysis, either an /i-/ prefix or a zero prefix in both singular and plural forms.)

While this evidence is suggestive to some degree, it is not really convincing. Whatever the historical origin of the initial NCs in gender 9/10 may be, there is nothing in the present day language to suggest that they are not simply part of the root. For one thing, there are no morphological alternations: the same word-initial NCs show up in both the singular and plural forms of these nouns, in all contexts, as in the examples in (14).

(14) a. *ndɔŋ* 'horn/horns'
b. *ɲdʒim* 'back/backs'

This is not the case in general: all other genders take different noun class prefixes with their singular and plural forms.[9] Second, there are other nouns in the 9/10 gender which clearly lacks prefixes in both the singular and plural forms, e.g., [buk] 'dog'.[10] In the absence of clear evidence to the contrary, I see no reason not to assume that nouns in this same gender, like [ɲdʒim] 'back(s)', which have initial NCs, are also monomorphemic. Third, the only initial NCs which occur are those in which the C is a voiced plosive, i.e., /mb/, /nd/, /ɲdʒ/, and /ŋg/. The absence of other clusters, e.g., those in which the C portion is a voiceless obstruent, is at the very least suspicious: if N is really a noun class prefix we might expect it to occur before roots commencing in a variety of consonants. The restriction to NCs in which C is a voiced stop makes perfect sense, on the other hand, if these NCs are unitary prenasalized segments, since these are precisely those prenasalized consonants which are most favored cross-linguistically.[11]

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[8] Following Stallcup, I use the term "gender" to refer to a group of nouns which have both singular and plural class markers in common.

[9] I except from this statement a few single class genders, e.g., Stallcup's 6a, whose (non-count) nouns (e.g., [minip] 'water') do not show distinct singular and plural forms.

[10] This word is [bok] in Stallcup's data.

[11] In fairness, there are points which could be raised in response to this third argument. To begin with, Stallcup (p.151) suggests a historical explanation for the absence of NC's in which C is voiceless: the diachronic loss of homorganic nasals before voiceless consonants is common. If we assume that the nasals were not just lost absolutely before voiceless C's, but changed to [i] (perhaps via an intermediate [i̥n] stage), we could explain another surprising fact, that nouns in gender 9/10 commence with [i] (which Stallcup takes to be a prefix) if and only if the following

continued on next page...

Note moreover that even if the nasal portion of the initial NCs in nouns in gender 9/10 could be analyzed as a separate morpheme, i.e., a noun class prefix, this analysis could not be extended to the verb root [mbəŋənə] 'dream'. Demonstratives like [mbin] 'those' and [mbon] 'these' pose the same difficulty. Here the evidence is perhaps even more telling, since the general forms of demonstratives in Moghamo are /C+in/ ('those') and /C+on/ ('these'), where C is an "agreement consonant" that may be either /mb/, /w/, /z/, or /t/; the choice of which C is employed depends on the noun class of the head noun. Clearly, treating this /mb/ as a cluster is suspicious, in view of the fact that in all other cases the agreement C is an unambiguous singleton consonant.

There is a further argument to support my contention that these initial N's are not prefixes but rather part of the root. In certain contexts, nouns may appear without the class prefixes that they take in most contexts. This is possible for example following possessive pronouns, as illustrated in (15), using nouns that take the prefixes /fi-/ (singular, class 19) and /ti-/ (plural, class 13).

(15) a.	*i-fum fi-nən*	~	*i-fumə nən*	'my bird'
b.	*i-tum ti-gwire*	~	*i-tumə gwire*	'my ants'

According to Ms. Teboh, the forms without the prefixes are more likely to be used by older people, while those with the prefixes are more likely to be used by younger people. If the N portion of an NC-initial noun were in fact a prefix, then we might expect that it could also be optionally omitted. This is never possible. A word like [ɲdʒim] 'back' is never realized as *[dʒim], without the initial nasal portion, for example.[12]

Next consider the claim that the initial N's are syllabic. Presumably the main piece of evidence for this is their tone bearing status, which I discuss below. In principle, we might also look for evidence from phonological processes that are sensitive to syllable count or from extralinguistic sources such as language games, poetry, or music. Stallcup does not discuss any such evidence, however, nor do I have any of my own to offer. (See section 4 below, however, for a different type of extralinguistic evidence involving native speaker intuition.) Beyond this, a sufficiently long duration of the nasal portion of an NC would at least contribute to the auditory impression that this N constitutes a separate syllable. This kind of impressionistic evidence must be treated with some care, however, for it seems unlikely that there is anything like an invariant cross-linguistic durational threshold between an initial .N.CV. sequence and an initial .NCV. sequence. In the absence

consonant is voiceless. Note however that even if Stallcup is completely correct about how things developed historically, this does not necessarily argue against a synchronic analysis of NC's as syllable onsets.

12 I would like to thank Larry Hyman for alerting me to the relevance of this type of data by pointing out the existence of this type of situation in Aghem.

of clear evidence of syllabicity from other sources, then, it would seem that the syllabicity or non-syllabicity of the initial Ns hinges essentially on the tonal facts. It is these to which I now turn.

If the N portion of a word-initial NC does indeed bear a low tone, this would argue against analyzing NCs as unitary onsets, since onset consonants are not, in general, expected to be tone-bearing. (And in fact other onset consonants, whether voiced or voiceless, are not tone-bearing in Moghamo.) It is true that the N of an initial NC sequence is realized on a lower pitch than a following high tone. In a word like [ŋgó?] (a person's name), for example, the pitch of [o] is higher than that of the initial [ŋ]. Crucially, however, the mere fact that these Ns are realized with a low pitch does not necessarily mean that they bear a low tone in either underlying or surface phonological representation. As voiced segments, they must of course be realized with some fundamental frequency; it is conceivable that the low F0 with which they are realized might be assigned only in the phonetic component, and that the Ns are phonologically toneless. To put it differently, the claim that these Ns are tone-bearing requires a demonstration that they may bear *contrastive* pitch. As far as I can tell, no such evidence exists.

The nasal portions of word-medial NCs also fail to bear contrastive tone. Instead of being uniformly low in pitch, however, these medial Ns are always realized on the same pitch as the preceding vowel.[13]

(16) a. *tèmbá* (type of fruit)
([m] realized on same low pitch as [e].)

b. *mɔ́ kə̀ kɔ̀ndī* 'I thought'
([n] realized on same low pitch as [ɔ].)

c. *kɔ́ndí* 'think!'
([n] realized on same high pitch as [ɔ].)

d. *áŋgūm* (person's name)
([ŋ] realized on same high pitch as [a].)

Other evidence that the nasal portion of NCs is phonologically toneless comes from tonal stability. When an underlying high-toned word-final vowel directly

13 In contrast, word-final nasal consonants need not be realized on the same pitch as the preceding vowel, cf. [átʃáń] 'village' [ítáǹ] 'five', [ɲàm] 'animal', [bè?éḿ] 'carry me'. It is not completely clear that the presence of the nasal coda is what licenses the final contours in [ítáǹ] and [bè?éḿ], however, since there are words in which contours occur on final light syllables, e.g., [fîmî] 'vein', [átʃwî] 'sun'. It might, therefore, be possible to analyze these words as [ítân] and [bè?êm], in view of the fact that much of the fall/rise actually occurs on the final nasal and can be viewed as a low level coarticulatory effect. More investigation is needed in this area.

precedes a word-initial low-toned vowel, as in the examples in (17), the adjacent vowels often coalesce into a single (lengthened) vowel which bears both the original tones, i.e., it surfaces with a falling (H-L) tone.[14]

(17) a. *nàʔá àmóʔó* → *nàʔâːmóʔó*
'give the banana' (imperative)

b. *bèʔé ìŋwàʔàrì* → *bèʔêːŋwàʔárì*
'carry the books' (imperative)

When, however, a word-final high-toned vowel directly precedes a word-initial NC, as in (18), the low pitch with which the N is realized when its word is pronounced in isolation typically disappears without a trace (note in particular that it does not trigger downstep, which regularly results from floating low tones in Moghamo), and the N is pronounced instead with the same high pitch as the preceding vowel.

(18) a. *zó ɲdʒìk* → *zóɲ́dʒìk*
'buy a sheep' (imperative)

b. *àmə́ ɲdʒàbí* → *àmə́ɲ́dʒàbí*
'my sister'

c. *bèʔé ŋgóʔ* → *bèʔéŋ́góʔ*
'carry Ngoʔ' (Ngoʔ = person's name)

d. *bèʔé mbíkwá* → *bèʔéḿbíkwá*
'carry small things'

The forms in (18) do have optional variants in which the low pitch of the nasal does surface, e.g. we have the forms in (19) as alternate realizations of (18c,d).

(19) a. *bèʔé ŋgóʔ* → *bèʔéŋ̀góʔ*
'carry Ngoʔ' (Ngoʔ = person's name)

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[14] Whether or not coalescence applies depends on a number of factors, including the number of moras in the first of the two words. These are discussed in Casali [1994]. When coalescence applies to sequences of non-identical vowels, it generally involves the elision of the first vowel with compensatory lengthening of the remaining (second) vowel. Where the first vowel is mid and the second high, however, (as in (17b)) the vowel which surfaces is often phonetically identical to the second vowel.

b. *bè?é mbíkwá* → *bè?émbíkwá*
'carry small things'

Two things are relevant here however. First, the examples in (18) and (19) nevertheless contrast with those in (17), in which the low tone of the word-initial prefix vowel is *obligatorily* preserved, i.e., there is no optional form *[nà?á:mó?ó] as a variant of (17a). Second, according to Ms. Teboh, it is the forms in (18) which are more typical of normal adult speech. She describes the pronunciations in (19) as being characteristic of slow speech, like one would use in talking to a child. It is thus reasonable to assume that these variants are pronunciations which arise when each word is pronounced deliberately as a separate utterance or intonational phrase. If this is so, then the low pitch which surfaces in the forms need not be regarded as a phonologically present low tone, but may be treated as a simple consequence of producing the second word in conformity with the pronunciation that it has in isolation.[15]

I conclude that the nasal portion of NCs in Moghamo is not phonologically tone-bearing. Phonetically, it simply receives the pitch of an immediately preceding vowel if there is one; otherwise, it is pronounced with a relatively low pitch. A further source of evidence that the nasal portions of NCs are phonologically toneless comes from the patterns these words exhibit when whistled. In order to hear tonal patterns more clearly, we would often ask Ms. Teboh to whistle the tonal pattern of a word or phrase. Invariably, the result (in words not involving NCs) would show a one-to-one correspondence between the number of whistled pulses and the number of syllables in the word. For example, a two-syllable word with a L H tone pattern is whistled as a low pulse followed by a high pulse, with a very short pause between the pulses. Rising or falling tones on single syllables are whistled as unbroken rising or falling pulses. Significantly, an initial NC typically does not receive a pulse when a word is whistled, e.g., [ɲdʒɨ̀k] 'sheep' would be whistled with only a single low pulse, suggesting that the initial N, though it is pronounced with a low pitch, is not actually tone-bearing.[16] Similarly, [mbə́ŋə́nə́] 'daydream' is whistled with three high pulses; there is no pulse corresponding to the initial nasal, although in normal speech this segment is pronounced with a relatively low pitch.

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15 Here it must be noted however that the forms in (19) were produced without a noticeable pause between the two words.

16 I would like to thank Peggy MacEachern for pointing out the relevance of the whistling patterns.

5. Native Speaker Intuitions

Stallcup did not have evidence from native speaker intuition about syllable division available to him. However, he clearly recognized it's importance (p.78):

> I am not certain, however, how a native speaker would syllabify these words...[i.e., those with NCs--RC]...This would be the most cogent argument for or against a prenasalized series of consonants in Moghamo.

The purpose of this section is to present some limited evidence of this type, based on the intuitions of our Moghamo consultant, Ms. Teboh.

In order to introduce her to the kind of question I was interested in, I first asked Ms. Teboh to divide two- and three-syllable words which contained no NCs into natural parts. The words chosen were those in (20), where the dots correspond to the divisions given by Ms. Teboh.

(20)	a.	*fi.ɾi*	'black'
	b.	*ti.gwi.ɾe*	'ants'
	c.	*i.kwi.ɾi*	'yesterday'
	d.	*a.di.ŋi*	'hill'
	e.	*me.yi*	'women'
	f.	*i.mo.ʔo*	'bananas'
	g.	*mi.nip*	'water'
	h.	*fi.nən*	'bird'
	i.	*bəd* (no div.)	'people'

These divisions coincide exactly with the syllable breaks we would expect.

Ms. Teboh was then given a list of words which, in addition to containing more relatively unambiguous words without NCs, also contained three words with NCs. In each case, her divisions preserved the NC as a unit:

(21)	a.	*sa.mbe*	'seven'
	b.	*kɔ.ndi*	'think'
	c.	*ŋgoʔ* (no div.)	(person's name)

These data support the analysis of NCs as unitary segments in the syllable onset rather than as heterosyllabic clusters.

6. Conclusion

I have argued, on the basis of a variety of evidence, that NCs in Moghamo are prenasalized onsets rather than heterosyllabic clusters. In addition to being fully consistent with the distributional, morphological, and tonal facts of the language, this analysis is supported by native speaker intuitions about syllable structure.

By way of conclusion, I would like to briefly raise one further question: assuming that the tautosyllabic analysis is correct, what evidence does the child learning Moghamo use to arrive at this analysis? While it will not be possible to answer this question here, it seems useful to at least clarify what is at issue.

Setting aside my use of evidence from native speaker intuitions, both my own arguments for this analysis and Stallcup's arguments for the opposing, heterosyllabic analysis are based on criteria of the sort that have long been used to address similar "interpretation" problems that commonly arise in connection not only with NCs but with a number of other phenomena (for example, labialized and palatalized consonants) that occur in African languages. These include a consideration of well-established syllable and/or word patterns, evidence from tonal behavior, morphological evidence, and economy and symmetry of the phonemic inventory. While I believe that a sufficiently thorough evaluation of evidence based on these criteria does in fact vindicate the tautosyllabic analysis, the arguments involved necessarily involve a certain amount of subjective weighting of various criteria. As a result, the fact that two linguists employing roughly the same criteria can arrive at different conclusions is not surprising.

It seems extremely unlikely, on the other hand, that the child learning Moghamo employs the same kind of balancing of multiple criteria (each of which is suggestive but not necessarily completely determinate) which both Stallcup and I have relied upon. For while evidence based on these criteria is sufficiently subjective and subtle to permit two linguists to arrive at opposite conclusions, there is little to suggest that native speakers experience a similar indeterminacy. If they did, we might expect significant interspeaker variation and/or inconsistency of judgment on the part of individual speakers in their intuitive analysis of NCs. While I cannot be certain that this state of affairs does not in fact arise in Moghamo (having worked with only a single speaker) I am not aware of any evidence in the literature on languages with NCs which would suggest this type of variability. In the absence of such evidence, the most reasonable a priori assumption is that different native speakers' analyses of NCs in a particular language do in fact typically converge on the same representation (which in the case of Moghamo we have taken to be a tautosyllabic representation). If this is correct, we must apparently conclude that native speakers have access to some different (or further) principle(s) than the "checklist" of suggestive but not fully determinate criteria which are most commonly appealed to by linguists. I am not prepared to speculate here on what these principles might be; I note, however, that this is clearly a matter that deserves further attention.