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The phonetics of Nmbo (Nʉmbo) with some comments on its phonology (Yam family; Morehead district)

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This paper presents aspects of the phonetics and phonology of the Nmbo language as spoken by the Kerake tribe peoples of southern Western Province, Papua New Guinea. The paper is primarily concerned with the phonetics of consonants and vowels, but also presents description and audio examples of stress and clausal intonation patterns.[*]

1. Introduction[1]

Nmbo (pronounced /nʉm.bo/, also known as Nambo), is a Papuan language of the Yam family (also known as the Morehead Upper-Maro family (Wurm & Hattori 1981, Ross 2005)) (glottocode NAMB1293, ISO-639-3 code ncm). It is spoken by 700-1000 people, primarily across three villages in the Morehead district of the South-fly in Western Province of Papua New Guinea. Nmbo is a vital language, in the sense that children learn it as one of their many first languages. Due to the small speaker population, however, Nmbo is theoretically always endangered. The moniker of 'Nmbo speaker' overlaps in local ideology with the Kerake tribe, and the Nmbo language is spoken of in terms of being the language of the Kerake people (Kashima 2020b: 50-52; Williams 1936). The Kerake tribe reside primarily in the villages of Govav, Bevdvn, and Arovwe. There is a closely related variety, Namna (also confusingly known as Nambo, pronounced /nam.bo/), which is spoken by the Yarne tribe in the villages of Drdr and Fongarke. This paper is concerned with the Kerake variety of the language.

Nmbo is an under-described language, with one prior acoustic phonetic study conducted on the vowel space (Kashima et al. 2016). A sketch grammar has been produced as part of a doctoral dissertation by the author (Kashima 2020b), and this paper is a partial adaptation of the phonology section. A phonetic description of the closely related Nen has been published by Evans and Miller (2016). While Nmbo and Nen share many similarities, there are enough differences in their phonetics and phonology to warrant separate descriptions.

The majority of the recorded examples in this paper were provided by Ruscien Aniba who originates from Arovwe village. She is a long-term resident of the Nen speaking village of Bimadbn, and was about 58 years old at the time of recording in 2018. The recordings of Ruscien were made by Nicholas Evans, except for the recording of the *North Wind and the Sun* text in the final section of this paper which was made by Julia C. Miller in 2013. Additional recordings are used in this paper that are not from Ruscien,

and more details about the audio examples are provided in footnotes throughout the paper. The other examples are selected from continuous speech data which were collected by the author between the years of 2014 and 2017. I have attempted to present recorded samples to support the in-text examples, but this has not always been possible.

IPA symbols and conventional bracketing symbols are used in this paper. Any representation of words in the practical orthography will be italicised, with the phonemic level representation in slanted brackets e.g., *ag* /ɑg/ 'coconut'. Note that the practical orthography omits the overt representation of one of the central vowels, /ɐ/, when in intervocalic position (e.g., *qv* /k͡pɐβ/ 'spleen'). When /ɐ/ occurs word-initially, however, it will be orthographically represented as <á>. The other central vowel, /ə/, is orthographically represented by <é> (e.g., *qév* /k͡pəβ/ 'time').

2. Consonants

Nmbo has a consonant inventory of 28 (Table 1). This is larger compared to the neighbouring Nambu branch language Nen, which has an inventory of 23 phonemes (Evans & Miller 2016). The larger consonant inventory in Nmbo is due to its partial retention of an ancestral rounded labial series and of the bilabial fricatives (*ᵐbw, *ᵐw, *fʷ, Evans et al. 2017). Both series are absent in Nen.

Table 1. Nmbo consonant inventory

	Bilabial	**Labialised Bilabial**	**Alveolar**	**Palatal**	**Velar**	**Labialised Velar**	**Glottal**
Plosive	p b	bʷ	t d		k g	k͡p g͡b	
Prenasalised Plosive	ᵐb		ⁿd		ᵑg	ᵑg͡b	
Nasal	m	mʷ	n	ɲ			
Trill			r				
Fricative	ɸ β	ɸʷ βʷ	s [z~ʒ~dʒ]				h
Approximant				j		w	
Lateral Approximant			l				

Plosives

Nmbo has three manners of stop consonants: voiced, voiceless, and prenasalised. In addition, there is a voiced rounded bilabial stop /bʷ/ which will be discussed later with the other rounded bilabial consonants. All the voiced non-rounded bilabial stops have prenasalised counterparts: /ᵐb, ⁿd, ᵑg, ᵑg͡b/.

The regular voiced and voiceless plosives occur word-initially, but the prenasalised stops do not. Languages of the Nambu subgroup within the Yam family have lost prenasalisation word-initially. Today only the Tonda subgroup languages within the Yam family have retained this feature (Evans et al. 2017).

The alveolar and velar stops show a voicing contrast across all positions, and occur word-initially, word-finally, and intervocalically.

1. /t/ vs. /d/
    a. *tén* /tən/ 'oven heat'(001)   vs.   *dén* /dən/ 'coconut shoot'(002)
    b. *tér-tér* /tər.tər/ 'tippy toes'(003)   vs.   *Dérdér* /dər.dər/ 'The locale of Drdr/Derideri'(004)

2. /k/ vs. /ɡ/
   a. *kor* /kor/ 'again'(005) vs. *gor* /ɡor/ 'footprint'
   b. *ak-ak* /ɑ.kɑk/ 'A furry caterpiller with spikes' (006) vs. *ag-ag* /ɑɡ.ɑɡ/ 'tree of classification *Canthium cf. longiflorum*' (007)

The bilabial stop contrasts are restricted, with an asymmetry between the distributions of the voiced and voiceless incarnations. The voiceless bilabial stop /p/ occurs most noticeably in word-initial position of loan words such as *plen* (/plen/, 'plane')(008)[2], or personal names such as *Patra* (/pɑt.rɑ/) (009). It occurs as an initial onset, and word-finally, in reduplicated words such as *pitpit* (/pit.pit/, 'plant species') or *laplap* (/lɑp-lɑp/, 'sarong', which may also be a loan word from Tok Pisin). Impressionistically speaking, it seems that some Nmbo speakers pronounce these words in a form that approximates the voiceless bilabial fricative /ɸ/, e.g., /ɸlen/, /ɸa.trɑ/.

The voiced stop /b/ occurs much more frequently than its voiceless counterpart, but also has quite a restricted pattern of occurrence. It occurs word-initially, and syllable-initially in reduplicated forms, e.g., *banban* /bɑn.bɑn/ ('under', 'shadow') (010), *bérbér* /bər.bər/ ('fear') (011). It does not occur word-finally, or intervocalically. Note that the phone [β] occurs in complementary distribution with [b], but the status of [β] will be discussed in the fricatives section further on.

Finally, Nmbo has labial-velar coarticulated stops /k͡p/ and /ɡ͡b/. There is individual variation in the degree of coarticulation, either a full closure for [k͡p] or a partial closure so that the phone is closer to [kʷ] or [ɡʷ]. Ruscien's pronunciations in the recordings are very coarticulated realisations of /k͡p/ and /ɡ͡b/.

3. /k/ vs. /k͡p/
   a. *ka* /kɑ/ 'where' (012) vs. *qa* /k͡pɑ/ 'Torresian crow' (013)
   b. *kaki* /kɑ.ki/ 'grandparent', 'grandchild' (014) vs. *qéki* /k͡pə.ki/ 'vessel' (015)

4. /ɡ/ vs. /ɡ͡b/
   a. *ggn* /ɡɐ.ɡɐ.n/ 'rock' (016) vs. *ḡéḡén* /ɡ͡bə.ɡ͡bən/ 'bow', 'bamboo' (017)

The difference between the plain velar stops and the coarticulated labial-velar stops is also acoustically visible. The regular velar stop shows a stop release burst leading into the following vowel, as is indicated by the arrow in Figure 1. The coarticulated stop on the other hand shows an increase in intensity before leading into the vowel, and the stop release shows a lot less frication. The arrows in Figure 2 indicate the increase in intensity before the transition into the vowel. Also note that the release of the velar stop shows significantly less frication in contrast to the [ɡ] release shown in Figure 1.

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[2] Speaker GM, a man about 62 years old at time of recording. Segment taken from the recording WSEK1-G20151014-01BoggedPlaneGM
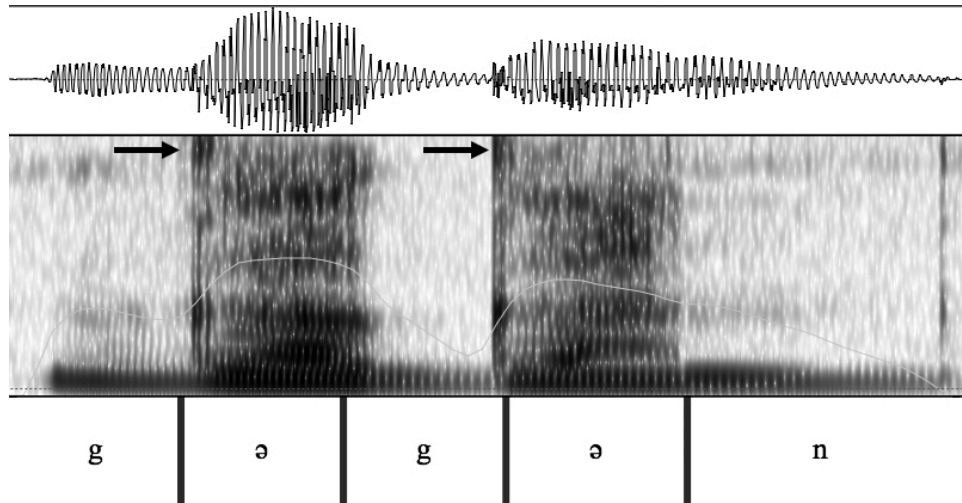
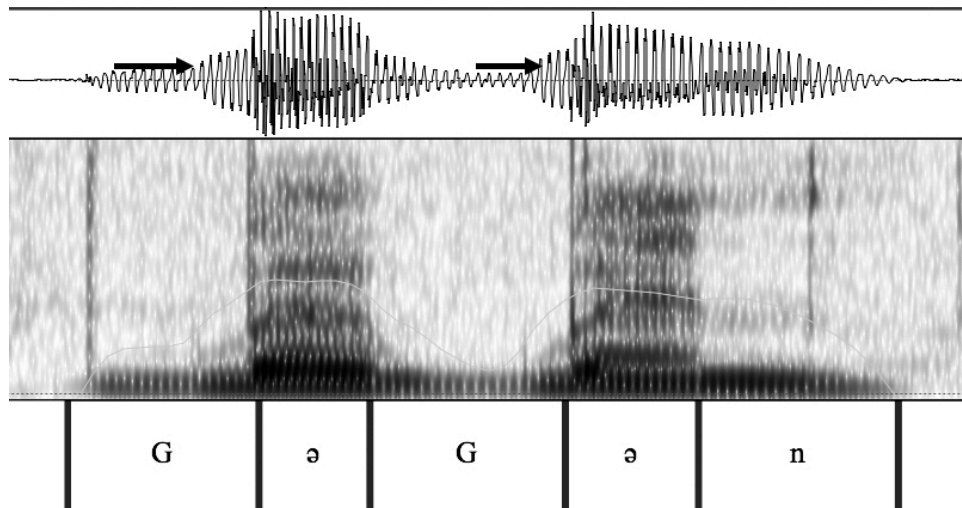**Figure 1.** Acoustics of [ɡɐ.ɡɐn] 'rock'. Contrast with Figure 2 below.

Figure 2. Acoustics of [ɡ͡bə.ɡ͡bən] 'bow, bamboo'.

Labial-velar stop consonants are cross-linguistically uncommon, but when they occur tend to be concentrated around certain parts of the world such as West-Africa (Cahill 2000: 71), and Vanuatu (Billington et al. 2018). Nmbo shows a phonemic contrast between voiced and voiceless labial-velar stops. This makes Nmbo, and the closely related Nen for which this distinction is also present (Evans and Miller 2016: 3), two of the few Papuan languages known to have labial-velar coarticulated plosives.

The near-minimal pairs presented below for /k͡p/ vs. /ɡ͡b/ show a distinction in the following vowels. The voiceless stops are followed by the short back vowel [ɐ], while the voiced stops are followed by the short central vowel [ə]. Cahill (1999) notes that labial-velars are known to have restrictions on following vowels (p. 163), so it is possible that the Nmbo examples here are showing a systematic phenomenon where the voicing of labial-velar coarticulation results in the co-occurrence with specific central vowels.

5. /k͡p/ vs. /g͡b/
   a. *qrqr* /k͡pɐr.k͡pɐr/ ('bushfire') (018) vs. *ḡér ḡér* /g͡bər.g͡bər/ 'plant of species *Acronychia'* (019)
   b. *dqn* /dɐ.k͡pɐn / 'black anthill' (020) vs. *dégén* /də.g͡bən / 'joint' (021)

All voiced stops except /bʷ/ have prenasalised counterparts: / ᵐb, ⁿd, ᵑg, ᵑg͡b /. Prenasalised stops occur in all positions except in word-initial position. At non-word-initial syllable boundaries, the nasal portion of the stop syllabifies as the coda of the preceding syllable, and the stop will form the onset of the following syllable, e.g., *band=an* (land=LOC) > /bɑn.dɑn/. The minimal pairs below contrast the prenasalised stops with their non-prenasalised counterparts in this position.

6. /b/ vs. / ᵐb /
   a. *bérbér* /bər.bər/ 'fear' (022) vs. *bérmbér* /bərm.bər/ 'mouth' (023)

7. /d/ vs. / ⁿd /
   a. *kudu* /ku.du/ 'Southern Crowned Pigeon' (024) vs. *kundu* /kun.du/ 'drum type'[3] (025)

8. /g/ vs. / ᵑg /
   a. *Igara* /i.gɑ.rɑ / Male personal name (026) vs. /iŋ.gɑ.rɑ.iŋ.gɑ.rɑ/ 'plant type' (027)

Rounded bilabials

Nmbo has four rounded bilabials: /bʷ/, /mʷ/, /ɸʷ/, and /βʷ/. They occur word-initially and intervocalically, but not word-finally. The bilabial and labiovelar parts are analysed as a single segment rather than two sequential segments since there are no other onset clusters where the second segment is labiovelar [w]. The coarticulated labiovelars /k͡p, g͡b/ are the only segments that could arguably be analysed as a velar + labial-velar sequential segment, but I have argued above that these segments be analysed as single segment based on their distribution, and acoustic properties of their realisation.

Rounded bilabial consonants rarely occur, and exhibit variable realisations when they do. The variation is likely due to coarticulatory effects. A common phonological context of variation is preceding the vowels [i] or [e]. For example [mʷ] is variably realised with less rounding, e.g., [mɑ.mʷi ~ mɑ.mi] 'pig' (028, this example from Ruscien exhibits a clear case of rounding). The reverse also happens, where the nasal consonant in words that are typically unrounded is labialised, e.g., [mi jɐm ~ mʷi jɐm] 'It is still so', [æᵐbæᵐbe ~ æᵐbæᵐbʷe] 'sometimes'. Some words, such as the village of Arovwe [ɑ.ro.βe ~ ɑ.ro.βʷe] vary so much by speaker, a more systematic study is necessary to determine what patterns the variation.

Minimal pairs contrasting rounded vs. unrounded bilabials are rare. So far there is only one minimal pair for /bʷ/ contrasting with /b/, and /βʷ/ with /β/. Minimal pairs contrasting /mʷ/ and /m/, / bʷ / and /ɸ/ have not been found. I have found one minimal pair showing a contrast between /βʷ/ and /ɸʷ/.

9. /bʷ/ vs. /b/
   bwe /bʷe/ 'seed', 'round thing' (029) vs. *be* /be/ 2.DAT (030)

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[3] This is technically a loan word from Tok Pisin.

10. /βʷ/ vs /β/
    kavwe /kɑ.βʷe / 'tree branch' (031) vs. *kave* /kɑ.βe/ 'cockatoo' (032)
    bavwa /bɑ.βʷɑ / 'Singaporean Taro' (033) vs. *bava* /bɑ.βɑ/ 'sister's children; mother's brothers' (034)

11. /bʷ/ vs /ɸʷ /
    bwe /bʷe/ 'seed, round thing' (035) vs. /ɸʷe/ 'tape worm' (036)

The current evidence for postulating /mʷ/ as a phoneme comes from comparison with Nama and Nen (Table 2). Nama is one of the more phonologically conservative Nambu languages with a retention of prenasalised stops, including the prenasalised rounded bilabial /ᵐbʷ/ (Evans et al. 2017). Nmbo, like Nama, retains word-initial /mʷ/ from proto-Nambu, while this has been lost in Nen. Interestingly there are very few shared cognate words with /mʷ/ between Nama, Nmbo, and Nen. For example, Nmbo /mɑmʷi/ 'pig' in both Nama and Nen is an entirely different word, *kiemb*. While the linguistic justification I have presented here is based on a diachronic comparison of Nama, Nmbo, and Nen, synchronically speakers of these languages are also sensitive to the difference between rounded and unrounded bilabial nasals, i.e. Nmbo speakers have a strong awareness that Nen speakers will say *miti* for 'exchange cousin', while in their own language they will say *mwite*.

Table 2. Cognates of /mʷ/ words in Nama, Nmbo, and Nen. Proto-Nambu reconstructions from Evans and colleagues (2017)

	Proto-Nambu	Nama	Nmbo	Nen
exchange uncle		/mʷitareɸ/	/mʷitɑreβ/	/mitarbe/
exchange aunt		/mʷitartəm/	/mʷidædem/ (037)	/mitadma/
exchange cousin'	*mʷiti	/mʷite/	/mʷite/ (038)	/miti/
jaw	*ɸətkamʷe	/ɸət/	/ɸətkamʷe/ (039)	/bətkam/

Nasals
There are three nasals: /m/, /n/, and /ɲ/. There is no velar nasal, except as the prenasalised part of the voiced velar stop /g/, e.g., /ᵑg/. All nasals can occur in all positions. As mentioned in the section on labialized stops, /m/ is realised by some speakers as [mʷ] when followed by the vowels [i] or [e].

12. /n/ vs /ɲ/
    a) *men* /men/ 'bird' (040) vs. *meñ* /meɲ/ 'nose' (041)
    b) *wén* /wən/ 'tree' (042) vs. *wñ* /wɐɲ/ 'cheeky, scoundrel'

Fricatives
Fricatives have three places of articulation: bilabial, alveolar, and glottal. The bilabial and alveolar fricatives show a voicing contrast.

    The bilabial fricatives, much like bilabial stops, show an asymmetry in distribution. The voiceless bilabial fricative [ɸ] occurs word-initially (e.g., *fan* /ɸɑn/ 'savannah'(043), *firo* /ɸi.ro/ 'naked'(044)), and occasionally intervocalically (e.g., *drfn* /dɐr.ɸɐn/ 'bat'(045), *ynfiak* /jɐ.nɐ.ɸi.jɑk/ 'Whistling Kite'(046)). The voiced [β] never occurs word-initially, but occurs intervocalically and word-finally. The current analysis is that [β] is an allophone of /ɸ/ word-finally, though how to distinguish this from [β] as an allophone of /b/ in word-final position is yet to be determined.

13. /β/ vs /ɸ/
    a) *gova* /go.βɑ/ exclamation, 'oh gosh!'(047) vs. *gofa* /go.ɸɑ/ 'name of a malevolent spirit'(048)
    b) *däfi* /dæɸi/ 'immigrant' vs. *sävi* /sæβi/ 'law'(049)[4]

Unlike the bilabial fricatives, the alveolar fricatives /s/ and /z/ show regular behaviour. There is a voicing contrast, and they can all occur word-initially, -finally, and intervocalically.

14. /s/ vs. /z/
    a) *site* /si.te/ 'white, light'(050) vs. *zite* /zi.te/ 'afternoon'(051)
    b) *su* /su/ 'stomach'(052) vs. *zu-zu* /zu.zu/ 'rubbish'(053)

The fricative /z/ shows variation in its realisation, with pronunciations varying between [z ~ ʒ ~ dʒ]. Some words, such as *zv* /zɐβ/ 'hair, fur'(054) are varyingly pronounced as [zɐβ] or [dʒɐβ]. Word-list data I collected in 2017 from two Nmbo villages shows 23 (76.7%) speakers pronouncing *zav* /zɑβ/ ('cloud') with [z]. The remaining 9 (23.3%) speakers produced [dʒ]. I do not have quantitative results to support it, but my impression is that other words such as *zi* /zi/ 'word, story'(055) are almost always realised as [zi]. One possibility is that /z/ is more likely to be realised as [z] when followed by a high front vowel, while words with /z/ preceding other vowels are slightly more likely to show the variation of [z ~ ʒ ~ dʒ].

The glottal fricative /h/ occurs in all positions, and is variably realised as [h], [ʔ], or is dropped entirely. For example the word *hamba* /hɑm.bɑ/ 'village'(056) may be realised varyingly as [ʔɑm.bɑ] or [ɑm.bɑ](057).[5] A corpus study of word-initial [h] in natural speech data shows that speaker age predicts propensity of [h]-drop: speakers born after 1975 are much more likely to drop [h] compared to speakers born before this year (Kashima 2020a). [h] was dropped almost all the time by the majority of speakers who were born after 1980. The prediction is that [h] will soon cease to be realised in word-initial position by Nmbo speakers.

Trills and approximants

Nmbo has one trill phoneme /r/, and three approximants: /j, w, l/. /r/ and /l/ are phonemically contrastive, as are /j/ and /w/. All four phonemes can occur word-initially and -finally, and intervocalically. /j/ and /w/ can also occur after the vowels /æ, ɑ, o/ to form phonetic diphthongs.

15. /r/ vs. /l/
    a) *áreh* /ɐ.reh/ 'to look for'(058) vs. *äleh* /æ.leh/ 'to hunt'(059)
    b) *férh* /ɸə.rɐh/ 'to become'(060) vs. *félh* /ɸə.lɐh/ 'to put something in something'(061)

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[4] Speaker MY, a man about 65 years old at time of recording in 2017. Segment taken from the recording WSEK1-G20170707-03MY02MQhm
[5] Speaker JY, a 31 year old woman at time of recording in 2017. Segment taken from the Nmbo Wordlist Corpus.

16. /j/ vs. /w/[6]
    a) *yao* /jɑw/ 'no'(062) vs. *wao* /wɑw/ 'ripe'(063)
    b) *ym* /jɐm/ 's/he/it is'(064) vs. *wm* /wɐm/ 'I am'(065)

Table 3. Occurrence of Nmbo consonants + orthographic symbol

IPA	Grapheme	Word/Syllable Initial	Word/Syllable Final
p	p	*plen* /plen/ 'plane'(066)	-
b	b	*bä* /bæ/ '3.ABS'(067)	-
t	t	*tnd* /tɐⁿd/ 'hand'(068)	*tot* /tot/ 'nail'(069)
d	d	*deve* /de.βe/ 'father'(070)	*qd* /k͡pɐd/ 'spleen'(071)[7]
k	k	*kkv* /kɐ.kɐβ/ 'there'(072)	*ynfiak* /jɐ.nɐ.ɸi.jɑk/ 'Whistling Kite'(073)
g	g	*got* /g͡ot/ 'back', 'bone'(074)	*ag* /ɑg/ 'coconut'(075)
k͡p	q	*qa* /k͡pɑ/ 'Torresian crow'(076)	*séq* /sək͡p(ə)/ 'canoe'(077)
g͡b	ḡ	*ḡéḡén* /g͡bə.g͡bən/ 'bow'(078)	
mʷ	mw	*mwil* /mʷil/ 'nipa fruit'(079)	-
bʷ	bw	*bwe* /bʷe/ 'seed'(080)	-
ɸʷ	fw	*fwe* /ɸʷe/ 'tapeworm'(081)	-
βʷ	vw	*kavwe* /kɑ.βʷe/ 'tree branch'(082)	-
ᵐb	mb	-	*gumb* /guᵐb/ 'pool'(083)
ⁿd	nd	-	*tnd* /tɐⁿd/ 'hand'(084)
ᵑg	ng	-	*bwerang* /bʷe.rɑ ᵑg/ 'fly'(085)
ᵑg͡b	nḡ	-	*ynḡ* /jɐ ᵑg͡b/ 'bag'(086)
m	m	*men* /men/ 'bird'(087)	*yam* /jɑm/ 'custom'(088)
n	n	*non* /non/ 'why'(089)	*wén* /wən/ 'tree'(090)
ɲ	ñ	*ñareh* /ɲɑ.reh/ 'to share'(091)	*meñ* /meɲ/ 'nose'(092)
r	r	*raiya* /rɑy.jɑ/ 'incoming tide'(093)	*mer* /mer/ 'good'(094)
ɸ	f	*fan* /ɸɑn/ 'savannah'(095)	-
β	v	-	*zv* /zɐβ/ 'hair, fur'(096)
s	s	*sn* /sɐn/ 'tooth'(097)	*fras* /ɸrɑs/ 'plant species used as poison root'(098)
z	z	*zi* /zi/ 'word', 'story'(099)	*moz* /moz/ 'leech'(100)
h	h	*hamba* /hɑᵐ.bɑ/ 'village'(101)	*wingoh* /wiŋ.goh/ 'to see'(102)
j	y	*ynd* /jɐⁿd/ '1.ABS'(103)	*wai* /wɑj/ 'again'(104)
w	w	*wiwi* /wi.wi/ 'mango'(105)	*wao* /wɑw/ 'ripe'(106)
l	l	*lmänh* /lə.mæ.nɐh/ 'to pull'(107)	*mwil* /mʷil/ 'nipa fruit'(108)

3   Vowels

Nmbo has eight phonemic monophthongal vowels: /i, e, æ, ɑ, o, u/, and two central vowels: /ə, ɐ/ (Figure 3). Nmbo also has marginal nasal vowels [ẽ] and [æ̃]. The nasal vowels are often used as "non-lexical conversational sounds" (Ward 2006) such as [ẽ:] for affirmation, or "repair initiators" (Dingemanse et al. 2013) such as [æ̃]. The exception

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[6] Note that both the audio examples for (b) comprise two words. For (064) it is *bä ym* /bæ.jɐm/ 'It is'; the second monosyllabic unit is the relevant word for this example. For (065) it is *ynd wm* /jɐⁿd.wɐm/ 'I am', again the second monosyllabic unit is the relevant word for this example.
[7] Govav dialect.

is the expression *gihẽ* [ɡɪhẽ]₍₁₀₉₎[8] meaning 'right here' or 'look at this thing close to me', usually accompanied with a pointing gesture.

The full vowels can occur word-initially and -finally, and function as the nucleus of a syllable. The realisation of these vowels shows some variation, such as /e/ being realised akin to [ɛ], /o/ to [ɔ]. The central vowels have a more limited distribution with specific behaviour, and will be discussed in the central vowel section further on.
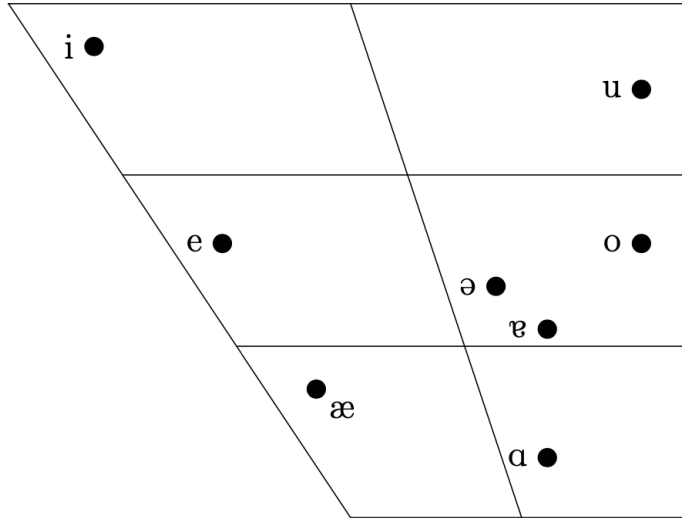
Figure 3. Community mean values of F1 and F2 per vowel, Lobanov transformed. The means are from 61 speakers of the Nmbo Wordlist Corpus from the years 2014 and 2015 (i = 981 (n), e = 1818, æ = 1089, ɑ = 1524, o = 1221, u = 606, ə = 615, ɐ = 2622).

Nmbo does not have phonemic diphthongs. Sequences of phonetic diphthongs end in a high vowel off-glide, and are analysed as a VC sequence (e.g., *yao* [jɑʊ]~[jɑʉ]~[jɑw] /jɑw/ 'no, NEG'₍₁₁₀₎, *kai* [kɑɪ]~[kɑj] /kɑj/ 'tomorrow, yesterday'₍₁₁₁₎[9]). In the practical orthography, vowel + high vowel sequences are represented as two vowels, e.g., <ai, ao>.

Phonetic diphthongs in a single syllable are rarely followed by an additional consonant. The words that may have consonants following phonetic diphthongs in the same syllable are either proper nouns (e.g., *Kaog* [kɑwɡ]₍₁₁₂₎[10]), or loan words (e.g., *faol* [ɸɑwl] 'chicken' (from English *fowl*)₍₁₁₃₎[11]. The one common noun that looks like it may be an exception is *ḡaiñ* 'mosquito' and other words that contain it (e.g., *enḡaiñ* 'a type of fresh water creek fish'). These words are analysed as a case of palatal assimilation of the palatal nasal <ñ> [ɲ], giving the monophthong [ɑ] a palatal off-glide. Orthographically, *gaiñ* looks to be a closed syllable with a diphthong nucleus, but it is phonemically /ɡ͡bɑɲ/ and phonetically [ɡ͡bɑʲɲ].

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[8] Speaker ZG, a man 58 years old at time of recording. Segment taken from the recording WSEK1-G20170706-03ZG04Retell. Note that the short [ɪ] is used here not to indicate a phoneme, but to approximate the phonetics of that central vowel following the velar consonant.

[9] Speaker KSae, a man 40 years old at time of recording. Segment taken from the recording WSEK1-B20150817-02DimbanKSaehm.

[10] Speaker WZ, a woman 60 years old at time of recording. Segment taken from the recording WSEK1-B20150924-HuntingWZhm.

[11] Speaker MZ, a man 32 years old at time of recording. Segment taken from the recording WSEK1-B20150909-MissingMoneyMShm.

Central vowels as phonemic and epenthetic

Nmbo has two central vowels [ə] and [ɐ], which have a shorter duration compared to the other vowels in the inventory (Figure 4). These short, centralised vowels have been attested for many, if not all, Yam languages, but their phonemic status differs between branches. Nen's [ɪ] and [ə] have been identified as being phonemic in some instances (Evans and Miller 2016: 10). In the Tonda languages these central vowels have been analysed as mostly epenthetic for Ngkolmpu (Carroll 2016: 45–46), but emergently phonemic in Komnzo (Döhler 2018: 58). Similar kinds of vowels have been variously described in the Papuanist literature as "transitional vowels" (Foley 1986), "predictable vowels" (Blevins & Pawley 2010), or merely as "epenthetic."

Below are some of the characteristics of Nmbo [ə] and [ɐ]:
- They are phonemically contrastive, both with other peripheral vowels, and with each other.
- They function as syllable nuclei, and such syllables can take stress.
- Their realisation is not dependent on the quality of the surrounding consonants.
- They can occur word-initially in verb roots. They can also occur word-finally, but it is unclear whether this is phonemic or merely a tendency for some individuals when releasing final consonants.
- Nmbo speakers are comfortable with the orthographic non-representation of central vowels.
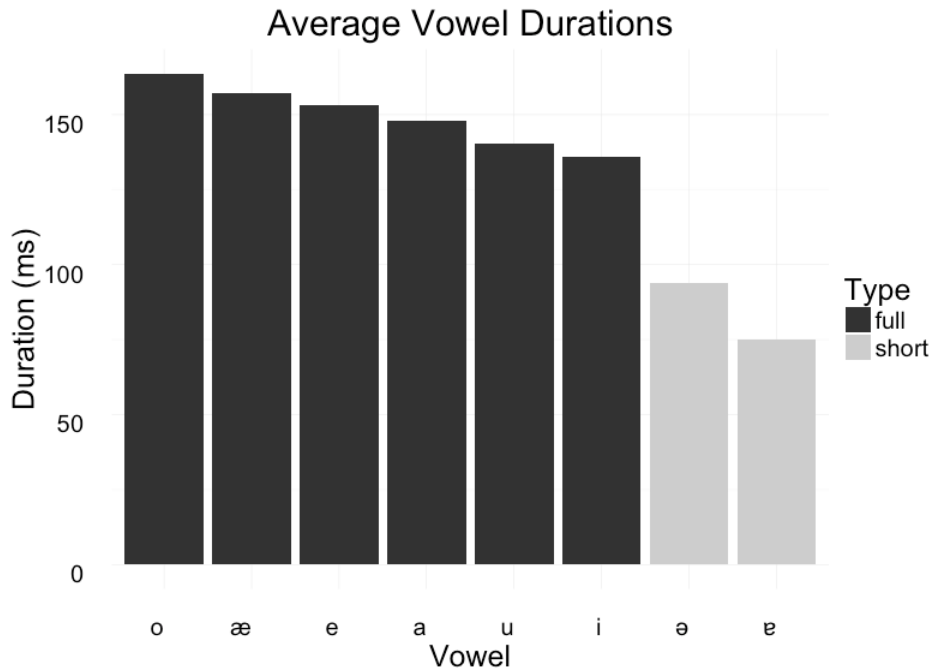
Figure 4. Nmbo vowel space. Average vowel duration of speakers from the 2015 subset of the Nmbo Wordlist Corpus (NWC) consisting of 36 speakers aged 19 ~ 60+ from Bevdvn and Govav villages (i = 252 (n), e = 432, æ = 252, ɑ = 396, o =324, u = 144, ə = 180, ɐ = 684.

There are a number of minimal pairs between central and peripheral vowels in Nmbo. Minimal pairs between the two central vowels [ə] and [ɐ] have also been attested, warranting two distinct central vowel phonemes.

17. Full vowels vs central vowels minimal pairs
    a) *sin* /sin/ 'pot'(114) vs. *sén* /sən/ 'tooth' (115)
    b) *wem* /wem/ Kerake: Yam type; Yarne: 'food, yam' (116)[12] vs. *wm* /wɐm/ 'I am'
        (117)[13]
    c) *mär* /mær/ 'spectator' vs. *mr* /mɐr/ 'brain'
    d) *muta* /mutɑ/ 'yam type' vs. *mtar* /mɛtɑr/ 'quickly'
    e) *rusa* /rusɑ/ Indonesian loan of 'deer' vs. *rsah* /rɐsɑh/ 'to carry'
    f) *fok* /ɸok/ 'bad omen' vs. *fék* /ɸək/ 'loose'
    g) *hakr* /hɑ.kɐr/ 'boy'(118) vs. *hkr* /hɐ.kɐr/ 'yam cake'(119)
    h) *kanam* /kɑ.nɑm/ 'snake'(120) vs. *knm* /kɐ.nɐm/ imperative 'come'(121)

18. /ə/ vs. /ɐ/
    a) *yém* /jəm/ 'gumtree'(122) vs. *ym* /jɐm/ 's/he/it is'(123)
    b) *qév* /k͡pəβ/ 'time'(124) vs. *qv* /k͡pɐβ/ 'hole'(125)

19. Full vowel vs. /ə/ vs /ɐ/
    a) *yam* /jɑm/ 'to look for; the way' (126) vs. *yém* /jəm/ 'gumtree' (127) vs. *ym* /jɐm/
       's/he/it is' (128)
    b) *sov* /soβ/ 'wave' (129)[14] vs. *sév* /sɐβ/ 'hoop' (130)[15] vs. *sv* /sɐβ/ 'bundle' (131)[16]

Central vowels can form the nucleus of a syllable. The central vowels are visible in spectrograms, and their realisations do not appear dependent on the quality of the surrounding consonants. Figure 5 shows a slice of natural speech *mna kt* 'because there'(132),[17] and the voicing is visible between the two voiceless stops [kʰ] and [tʰ]. Note also the presence of a central vowel between the nasals [m] and [n] in the word *mna*.

    The word-final phonemic status of the central vowels is less clear. Some speakers will produce a residual echo after a monosyllabic word (contrast speaker LS(133)[18] with RA(134)). A similar phenomenon has been observed in Nen, and is described as "a voiceless echo" whose quality may differ (Evans and Miller 2016: 10), e.g., not necessarily [ɐ]. So far no minimal pairs of word-final central vowels have been found.

    Syllables with a central vowel nucleus appear to take stress. Nmbo stress is obligatory, and tends to fall on the penultimate syllable. Many multisyllabic Nmbo words that take stress do not contain full vowels, e.g., *ytqn* [jɐtk͡pɐn] 'name'(135)[19], *kkv* [kɐkɐβ] 'garden'(136).

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[12] Speaker SZ, a man 69 years old at time of recording. Segment taken from the recording WSEK1-B20170614-04DrumSZhm.

[13] Speaker FY, a woman 62 years old at time of recording. Segment taken from the recording WSEK1-G20170724-01FY11Fhm.

[14] Speaker JY, a woman 30 years old at time of recording. Segment taken from the recording WSEK1-B20170627-02DingyJYhm.

[15] Speaker YZ, a man 64 years old at time of recording. Segment taken from the recording WSEK1-B20150731-02SagoCakeYZ1

[16] Speaker MZ, a woman 65 years old at time of recording. Segment taken the recording WSEK1-B20150813-05PlaneMZhm. Note that this is the reduplicated form, sv-sv, where the reduplication is functioning as a pluraliser.

[17] Speaker AT, a woman 26 years old at time of recording. Segment taken the recording WSEK1-B20150721_01marriageAThm.

[18] Speaker LS, a man 50 years old at time of recording. Segment taken from the NWC, file sfbaWZ-30-sq (2016)

[19] Speaker AN, a woman 47 years old at time of recording. Segment taken from the recording WSEK1-G20170617-01Alqi02MQhm.
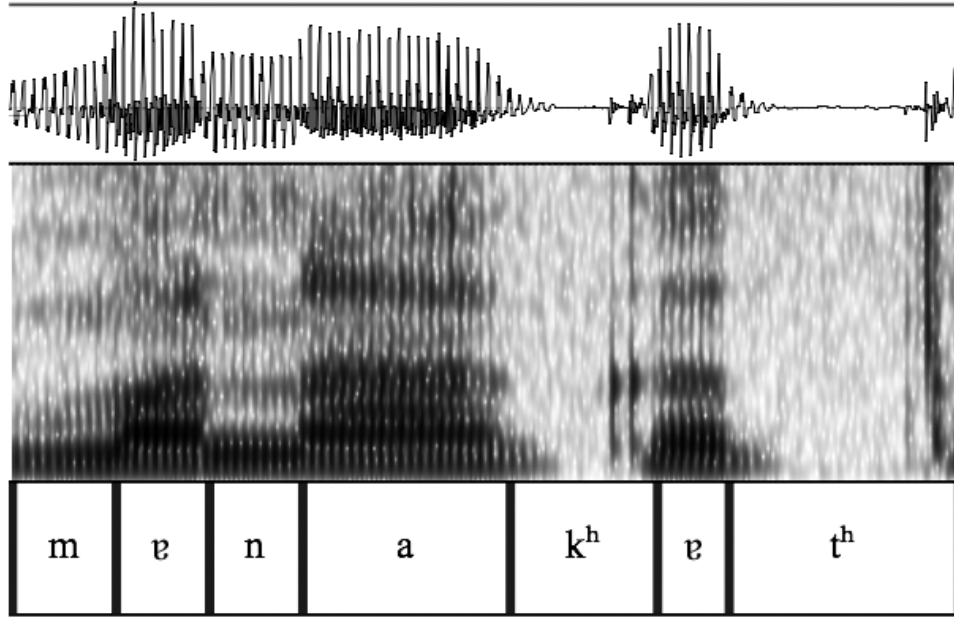
Figure 5. Spectrogram of *kt* 'there'. Speaker AT, a woman 26 y.o at time of recording. Segment taken the recording WSEK1-B20150721_01marriageAThm.

It has been argued for Komnzo that the main function of central vowels is to provide a syllable nucleus where there is none underlyingly (Döhler 2018: 57−58). Döhler argues that syllabicity alternations are affected by affixation in Komnzo, and provides the example of the syllabification of the verb *ttü-si* [tɔ̃.tʏ.si] 'print/paint-NOM'. The central vowel [ɔ̃] occurs between the two voiceless stop consonants [t] and [t], but when the verb is inflected with the undergoer prefix *y-*, the central vowel is inserted in a different place: *yttünzr* [jɔ̃t.tʏ.ⁿdzɔ̃ɾ] 's/he paints him'. In the Nmbo sketch grammar I made a similar argument for Nmbo (Kashima 2020b: 109), using an example of *gmeh* /gɐ.meh/ 'to hit'(137)[20] syllabifying as *ygmetam* [jɐg.me.tam] 'we hit it' when inflected. Closer inspection of audio recordings, however, shows this is not the case. The central vowel between [g] and [m] in the root form is retained when inflected: [yɐ.gɐ.me.tam](138)[21] (139)[22]. This evidence makes it harder to argue that the [ɐ] is not underlyingly present in Nmbo.

Central vowels can occur word-initially in verb roots. When inflected, these verb roots syllabify the vowel with the consonant of the prefix (/ɐ.wih/(140) → /nɐ.wi.jej/(141)[23]). When verb roots with word-initial full vowels are prefixed, the full vowels are completely audible (e.g., *ovarh* /o.βɑ.ɾɐh/ 'to arrive'(142)[24] → *novaryn* /no.βɑr.jɐn/ 'I arrived'(143)[25]). When the initial vowel is short, however, it sounds shorter compared to

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[20] Speaker TS, a man 62 years old at time of recording. Segment taken from the recording WSEK1-B20150805-01NinyiTS

[21] Same as above. Speaker TS, a man 62 years old at time of recording. Segment taken from the recording WSEK1-B20150805-01NinyiTS

[22] Speaker WZ, a woman 60 years old at time of recording. Segment taken from the recording WSEK1-B20150924-HuntingWZhm.

[23] Speaker KSae, a man 40 years old at time of recording. Segment taken from the recording WSEK1-B20150817-02DimbanKSaehm.

[24] Speaker DS, a woman 65 years old at time of recording. Segment taken from the recording WSEK1-G20170707-04DS02MQhm.

[25] Same as above. speaker DS, a woman 65 years old at time of recording. Segment taken from the recording WSEK1-G20170707-04DS02MQhm.

peripheral vowel verbs when prefixed (again, /ɐ.wih/ 'to fall'(144) → /nɐ.wi.jej/ 's/he fell'(145)[26]). All verb roots that begin with vowels are intransitive verbs in Nmbo, including the verb roots that begin with central vowels. Since central vowels occur word-initially only in verb roots, it may be that they are performing some kind of phonotactic repair function to maintain the rule that intransitive verb roots begin with vowels.

A piece of evidence which somewhat supports the analysis of central vowels as mainly epenthetic, comes from the use of the Nmbo orthography. Nmbo has two practical orthographies. One convention is to represent the full vs. central vowel contrast by double vs. single vowels, e.g., [a] as <aa>, and [ɐ] as <a>, *kaanaam* /kanam/ 'snake' vs. *kanam* /kɐnɐm/ 'you come'. The other convention is the one used in this paper, where the central vowel [ɐ] is not overtly represented, *kanam* /kanam/ vs. *knm* /kɐnɐm/. The second convention was adopted for the duration of my fieldwork, and Nmbo speakers were happy to use it in transcription work. One could argue that the seeming ease with which Nmbo speakers are able to omit the central vowels suggests they are underlyingly absent in most cases, i.e. epenthetic. A similar case has been made by Blevins & Pawley (2010: 15−16) for Kalam (Trans-New Guinea; PNG).

In summary, the phonological status of [ə] and [ɐ] thus appears to be two-fold: to function as a fully-fledged phonemic vowel in some instances, and to function as a phonetically visible epenthetic vowel in others. Further work must be done on the syllabification process of Nmbo to paint a clearer picture of the phonological role played by these central vowels.

Table 4. Occurrence of Nmbo vowels

IPA	Grapheme	Word/syllable initial	Nucleus of closed syllable	Word/syllable final
i	i	*ingaraingara* /iŋ.gɑ.rɑ.iŋ.gɑ.rɑ/ 'plant type'(146)	*wim* /wim/ 'scent'(147)	*zi* /zi/ 'word, story'(148)
e	e	*eg* /eg/ 'fog'(149)	*men* /men/ 'bird'(150)	*de* /de/ 'honeyeater'(151)
æ	ä	*är* /ær/ 'man'(152)	*däv* /dæβ/ 'when'(153)	*bä* /bæ/ '3.ABS'(154)
ɑ	a	*ag* /ɑg/ 'coconut'(155)	*kal* /kɑl/ 'wound'(156)	*ka* /kɑ/ 'where'(157)
u	u	*ur* /ur/ 'bushfowl'(158)	*gumb* /guᵐb/ 'pool'(159)	*gu* /gu/ 'great billed heron'(160)
o	o	*onda* /oⁿda/ 'dream'(161)	*non* /non/ 'why'(162)	*daro* /dɑro/ 'butterfly'(163)
ə	é	*évermeh* /əβermeh/ 'to cross over'	*yém* /jəm/ 'gumtree'(164)	[unclear]
ɐ	á[27]	*áwih* /ɐwih/ 'to fall'(165)	*sn* /sɐn/ 'tooth'(166)	[unclear]

4   Prosody

The first part of this phonetic-phonological description of Nmbo has resulted in an analysis of its segmental characteristics. A proper analysis of Nmbo's suprasegmental characteristics would require a dedicated research design with appropriate methodology (e.g., as outlined by Jun & Fletcher 2014, Himmelmann & Ladd 2008). Nonetheless, I have included this impressionistic section on stress and intonation as part of the documentation endeavour, with the conviction that some preliminary sketches with audio are preferable to the complete absence of any description.

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[26] Speaker KSae, a man 40 years old at time of recording. Segment taken from the recording WSEK1-B20150817-02DimbanKSaehm.

[27] Word-initial; otherwise, omitted.

Stress

Stress is typically defined as detectable through a combination of pitch, intensity, and duration (Gussenhoven 2004: 14–15), although there is cross-linguistic variability as to how these correlates combine. As mentioned earlier, given that Nmbo central vowels with their short duration can also take stress, it seems that duration is not a major characteristic of Nmbo stress.

While I describe Nmbo as having stress, it should be acknowledged that this is based on my own perception. Instrumental studies have not been conducted. Stress ghosting is a well-known phenomenon among speakers of predictable stress languages (e.g., Tabain et al. 2014; see Cutler 2012 for projection of L1 prosody on L2 perception), and what I auditorily detect may be an artefact of my dominant language, English. Having said so, it seems that stress falls on the first syllable for two- and three-syllable words. Four-syllable root words are unusual in Nmbo; words greater than four syllables are morphologically complex.

Stress seems to be attracted by the first syllable with an open vowel, and appears to be assigned at the syllable level. Both characteristics suggest that intensity is a relevant factor in the definition of Nmbo stress. Komnzo is described as having stress where higher pitch may be a relevant phonetic factor, while vowel duration is not (Döhler 2018: 83). This seems true for Nmbo also. The central vowels in Nmbo can also take both primary and secondary stress, suggesting that vowel duration is not a relevant phonetic feature of stress.

At this stage of description, it is unclear how central stress is in the morphophonemics of Nmbo. Stress shift occurs when words are inflected, though the systematicity of this process has not been tested.[28] For example, when the trisyllabic word *Bevdvn* /beβ.dʉ.βɐn/ 'village name'[(167)] is inflected with the closed syllable originative clitic /-mɐn/, the stress shifts from the first syllable to the third: /ˈbev.dʉ.βɐn/ → /beβ.dʉ.ˈβɐn.mɐn/[(168)].
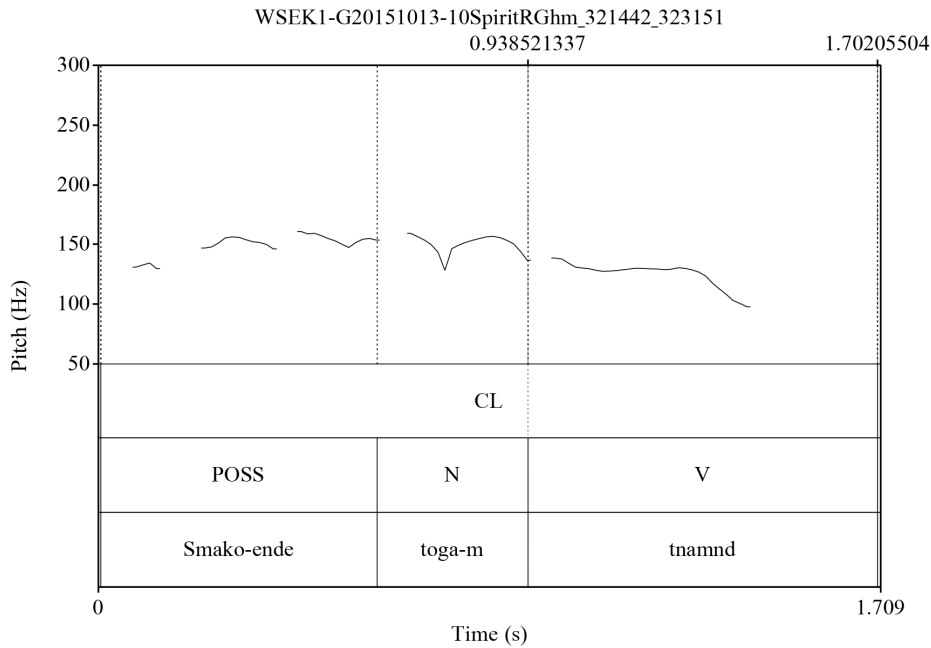
Intonation

The intonation contour of a declarative utterance follows a typical decline of fundamental frequency. The pitch is relatively consistent through most of the utterance, until it clearly drops towards the end. The utterance shown in Figure 6[(169)] shows a clear case of a pitch drop to mark an utterance-final boundary.

Nmbo also seems to have a variety of non-falling final intonation boundaries. There is what I call a "flat final boundary" (Figure 7[(170)]). The pitch shows a shallow decline at the end of the utterance which can dubiously be characterised as a fall. In the example shown in Figure 7[(170)], the discourse topic of the following clause is different to that of this particular utterance. This suggests that the boundary is marking a transition in discourse topic, in which case the boundary is functioning in more-or-less the same way as a final fall boundary marker. Figure 8 is a pitch contour of a continuing boundary marked utterance[(171)]. This utterance cannot be taken as the end of a conversational topic, as the speaker continues to talk about hot water.

There is also a "raised final boundary." In terms of discourse and content, however, this boundary marks the end of a clause and IU. We may expect to find a final falling boundary marker in such cases, yet sometimes there is a raised end that resembles a continuing boundary marker. Figure 9 [(172)] shows the pitch of a raised final boundary, where the speaker raises the pitch at the end of the clause. In the original narrative, there

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[28] An anonymous reviewer has suggested that the stress shift could be due to foot structure, where binary feet that are left-headed have stress shift on the right-most foot. Given my lack of expertise in the area, I have included this comment here as a footnote for reference.

is a pause of approximately four seconds before the speaker continues on with the narrative. Notice the relative lack of pitch movement across the entire IU.

Figure 6. Pitch contour of intonation unit, marked by a final fall boundary marker at the end. The utterance can be translated as "Smako's child shot [the animal]." (Speaker GM 33 y.o male, G20151013-10SpiritRGhm 321442 - 323151)(169)
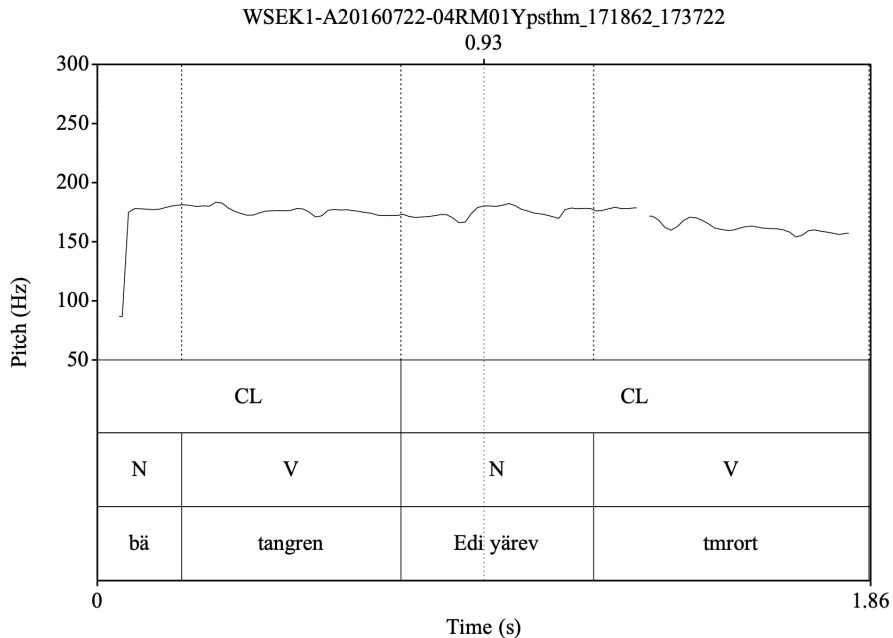
Figure 7. Pitch contour of intonation unit, marked by a "flat final" marker at the end. Notice the relative lack of pitch range across the entire IU. The utterance can be translated as 'Those two argued with Eddy's father.' (30 year old female, A20160722- 04RM01Ypsthm , 00:02:51.136 - 00:02:53.673)(170)

Cont-WSEK1-A20160722-04RM01Ypsthm_189902_191456
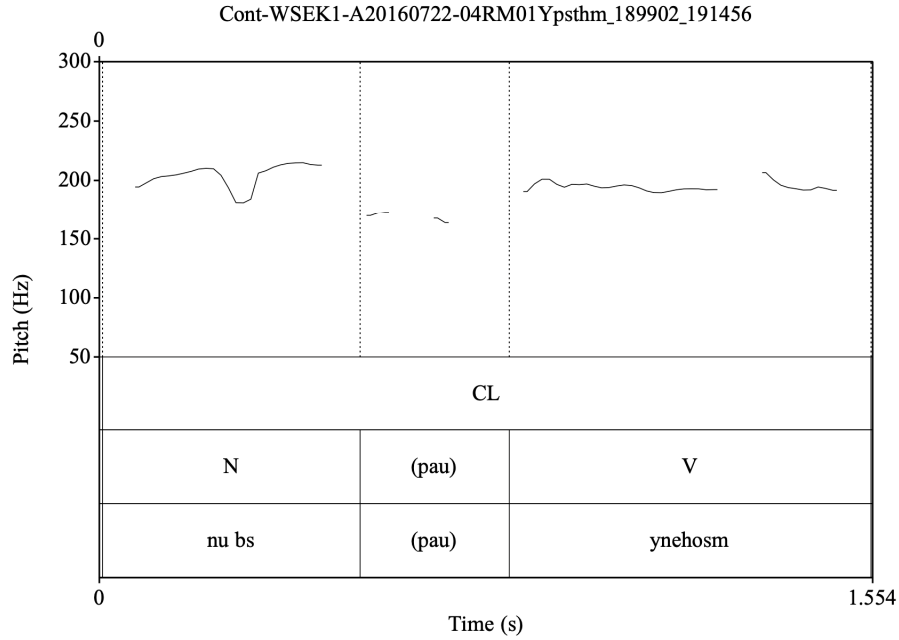
Figure 8. Pitch contour of intonation unit, marked by a continuing boundary marker at the end. The utterance can be translated as 'The hot water, we boiled it.' (30 year old female, A20160722-04RM01Ypsthm, 00:03:09.902 - 00:03:14.131)(171)

WSEK1-B20150907-01MarriageKS2hm_82201_86185

Figure 9. Pitch contour of intonation unit, marked by a "raising final" marker at the end. The utterance can be translated as 'I was waiting, in darkness she came' (37 year old male, B20150907-01MarriageKS2hm_82201_86185, 00:01:23.690 - 00:01:25.751) (172)
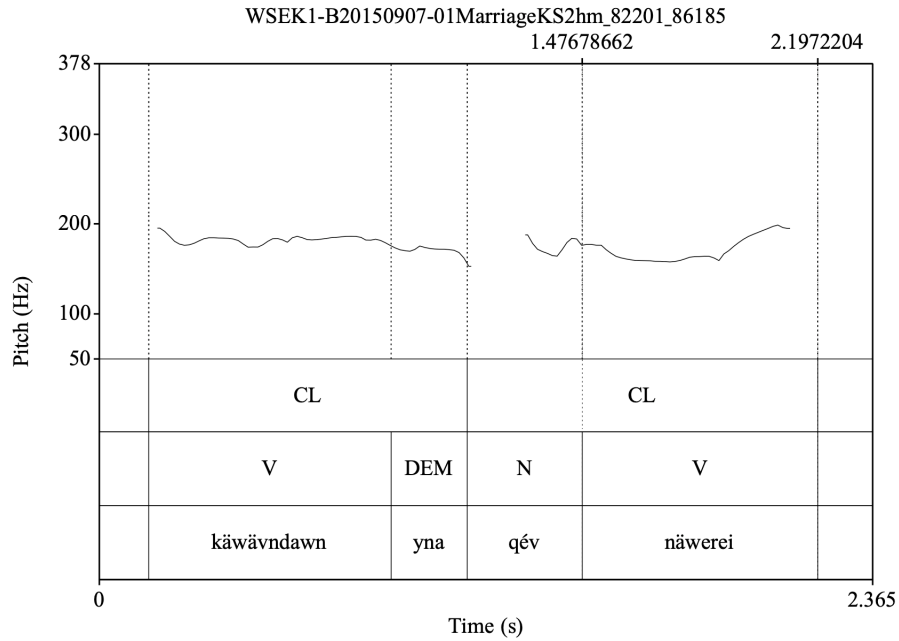
An observation made by other linguists in the Southern New Guinea area is that question intonation often does not have a rising final boundary (Gregor, this volume; Lindsey 2021). Both polar and content questions often have a downward trajectory of F0 across the clause with a final falling boundary marker at the end of the utterance. Nmbo also exhibits this tendency on occasion (see Figure 10 for a polar question(173), Figure 11 for a

content question₍₁₇₄₎) but there is much work to be done in order to understand the phenomenon in greater detail.
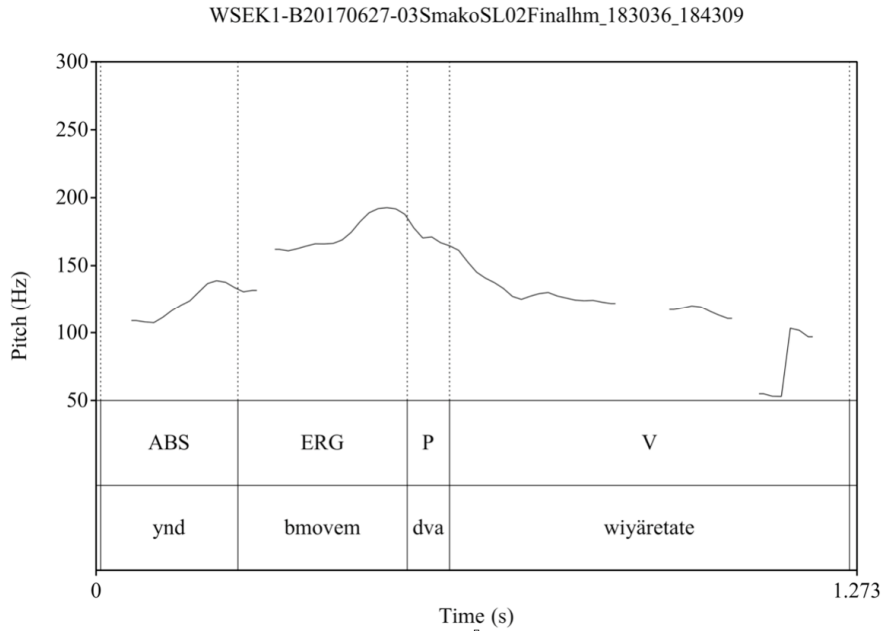
Figure 10. Pitch contour of a polar question, 'Did you all just hear me?'. ABS = absolutive pronoun, ERG = ergative pronoun, P = particle, V = verb. (Speaker SL, 25 year old male, WSEK1-B20170627-03SmakoSL02Finalhm)₍₁₇₃₎
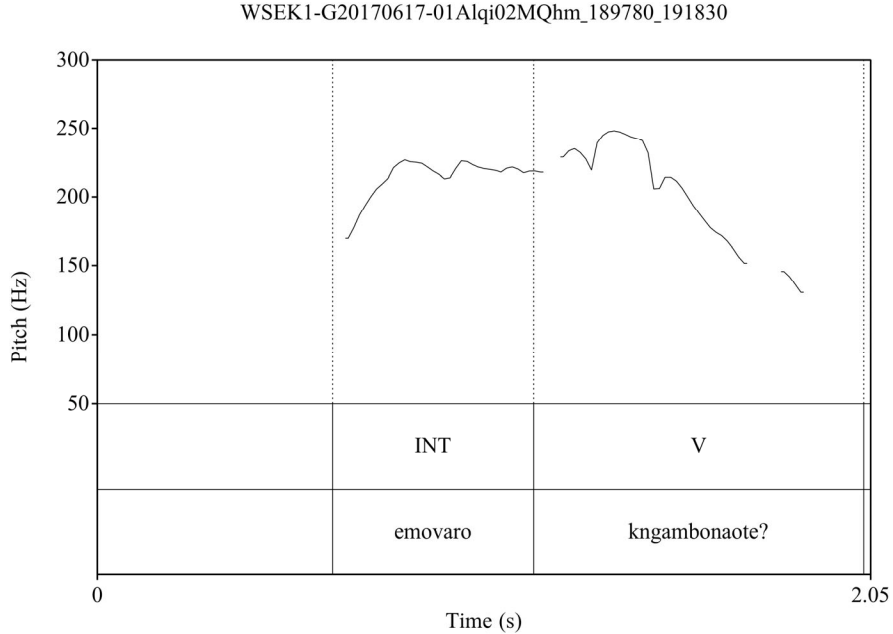
Figure 11. Pitch contour of an interrogative clause, 'Who did you play with [when you were a child]?'. INT = interrogative pronoun (30 year old female, WSEK1-G20170617-01Alqi02MQhm)₍₁₇₄₎

5 Transcription of recorded passage

The following is a transcription of a localised *North Wind and the Sun* passage. The essence of the story is the same as the European version, but the character of the north wind has been changed to a locally relevant wind known as *bolmbol,* the powerful westerly wind that blows in December to herald the wet season. The speaker is Ruscien Aniba, and the linguist eliciting the passage is Julia C. Miller. The recording session was conducted with a Nen speaker, Mary Dibod. Mary's utterances are omitted from the recording submitted here, but is audible in the original recording (Miller 2013). Miller read out an English passage, Mary translated the passage into Nen, then Ruscien translated into Nmbo. Ruscien is a highly competent English speaker, as well as a Nen speaker, so it is not entirely clear whether her Nmbo passage was influenced more by the original English, or the Nen speaker's translation of the original English. Note that some of Ruscien's pronunciations in the passage contain elements that strike me as Nen-like (such as pronouncing *fsah* /ɸᵾsah/ 'to increase' → [pʰᵾsah]), which may be due to her long-term residence in a Nen speaking village. The broad transcription below does not mark this level of detail.

The transcription and translation below are, unfortunately, done by the author alone. These were done after my fieldwork had concluded in 2017, without consultation with any Nmbo speakers. I have tried to do the transcription and translation to the best of my ability and knowledge of Nmbo, supported by a draft dictionary produced in conjunction with Nmbo speakers. I also consulted the Nen word utterances by Mary Dibod, with additional consultation of the Nen dictionary (Evans 2019). Uncertainties in translation and transcription are marked in the following texts.

There are four lines of glossing. The first line is a broad phonetic transcription of the passage. The second line, transcribed in the practical orthography, shows the morphology on non-verbal elements. Verbs are given a unified gloss for readability. The third line is the interlinear gloss done in line with a Yamist adaptation of the Leipzig Glossing Rules (Comrie et al. 2015).[29] The fourth line is the English translation.

(1)   [æᵐb eβhon bolᵾᵐbol ah eβᵾh]
        ämb   evh=on   <...>   bolmbol   a <…> evh   <...>
        some   day=LOC   west.wind.ABS CONJ   sun.ABS
        'One day… Bolmbol [the west wind] and… the sun…'

(2)   [bæ   kowaβʷᵾt eβe mujaβɑ jᵾm]
        bä   kowavt   eve   muya=va
        3ABS   3DU.IPFV.NPHD.speak   who.ABS strength=COM
        ym.
        3SG.IPFV.NPHD.COP
        'The two spoke about who is stronger [lit. who is with strength]'

(3)   [ær nᵾnᵾwanoj wumɑnhere]
        är   nnowanoi   wumanhere
        man.ABS   3SG.PFV.PRET.arrive ?[30]
        'A man arrived,'

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[29] Non-standard glosses include: DEM.FW = forward manner demonstrative, DEM.PROX = proximal demonstrative, DEM.V = preverbal demonstrative, NPHD = non-prehodiernal TAM, POSSC = close possessive, PRIM = primordial TAM,
[30] Translation unknown, but this is an agent nominalised verb root *wumanh.*

(4)   [sælæme tærβær nɐnomanetɑm]

        säläme   *tärvär-e*   *nnomanetam.*

        clothes.ABS   many-DAT   3SG.IPFV.PRIM.be.dressed

        'He was adorned with many clothes.'

(5)   [bolɐ^mbol ɑ eβɐh bæ nowɑ nowɑβtɑ^ŋgeɑjɐn]

        bolmbol   *a*   *evh,*   *bä*   *nowa-*

        west.wind.ABS   CONJ   sun.ABS   ?FUT   [false start]

        nowavtangeaen.

        1SG.PFV.PHAB.say

        'Bolmbol and the sun would have said,'

(6)   [mɑto æ nuβuwɐm]

        mato   *ä*   *nuvuwm.*

        perhaps   FUT   1DU.IPFV.NPHD.intend.to.do

        "Perhaps we two will do something

(7)   [eβe mujɑβɑ jɐm mɐnɑt]

        eve   *muya=va*   *ym*   *mna=t,*

        who   strength=COM   3SG.IPFV.NPHD.COP   DEM.FW=ALL

        'to see who is stronger,'

(8)   [jɐna æruende sælæme ge jə^ŋgɐβtɐnɑ]

        yna,   *är-uende*   *säläme*   *ge*

        DEM.PROX   man-POSS   cloth.ABS   DEM.V

        yngvtrna.

        3SG>3SG.IPFV.IMP.take.off

        'you take away his clothes from him.'"

(9)   [bol^mbol æ nowɑnoy ɸroⁿde]

        bolmbol   *ä*   *nowanoi*   *fronde....*

        west.wind.ABS   ?3ABS   3SG.PFV.PRET.depart   first

        'Bolmbol departed first…'

(10)   [ær ɸɐsah jɑβ^ŋgoj]

        är.   *fsa-h*[31]   *yavngoi.*

        man.ABS   increase.intensity-NMLZ   3SG>3SG.PFV.PRET.begin

        'He began increasing [in intensity].'

(11)   [tɐβsɑw tɐβsɑw tɐβsɑw]

        tvsao, tvsao, tvsao,

        3SG>3SG.IPFV.REM.increase

        'He increased it, he increased it, he increased it,'

(12)   [jɑw æ^mb jɐβtrærjɐ^ŋg]

        yao   *ämb*   *yvträryng.*

        NEG   some   3SG>3SG.PFV.PRET.strip.off

        'he could not strip any of it off.'

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[31] I have inferred the meaning of the root *fsah* as "to increase". This inference is made on the Nen word *wpnas* meaning "to multiply, increase in number", which appears to be the word Mary Dibod is using in the Nen portion of the same recording (inflected as *dpnze*).

(13)　　[wɐⁿdede ærum ɟjɐm]
　　　　wndede　är-um　　　　gym,
　　　　CNTF　man-ERG　　　　TOP
　　　　'however the man's clothes, ok…'

(14)　　[wɐⁿdede ærueⁿde sælæme ɟjɐmɐn]
　　　　wndede　är-uende　　　säläme　　　　gymn…
　　　　CNTF man-POSS　　　　cloth.ABS　　　TOP
　　　　'however the man's clothes you see…'

(15)　　[sælæme tærβær mɐ tɐtimgotaw]
　　　　säläme　　　　tärvär　　mé　　　ttimgotao[32],
　　　　cloth.ABS　　　plenty　　CONT　　3SG>3SG.IPFV.REM
　　　　'he continued to have the clothes,'

(16)　　[jɐna sælæme tokɐn]
　　　　yna　　　　　　säläme　　　　tok=n.
　　　　DEM.PROX　　　cloth.ABS　　　up=LOC
　　　　'have on these clothes.'

(17)　　[bolᵐbol ædi naβraⁿgoj]
　　　　bolmbol　　　　ädi　　　navrangoi…
　　　　west.wind.ABS　INTS　　3SG.PRF.PRET.give up
　　　　'Bolmbol truly gave up.'

(18)　　[jɐna ɸoɑ wej eβhende]
　　　　yna　　　　　　foa　　　wei　　evh-ende…
　　　　DEM.PROX　　　after　　again　sun-POSS
　　　　'Then next the sun's…'

(19)　　[eβɐh aβlɐh novⁿgoj kaβlaw kaβlaw]
　　　　evh　　　　avl-h　　　　　novngoi, kavlao, kavlao,
　　　　sun.ABS　move.in-NMLZ　　3SG.PFV.PRET.move.in [repeat]
　　　　'the sun began moving in, he moved in, he moved in,'

(20)　　[waβta kitoⁿgova nɑmdoj]
　　　　wavta　　kitong=ova　　namdoi.
　　　　heat　　　big=COM　　　3SG.PFV.PRET.become
　　　　'he became very hot,'

(21)　　[ærum jænzu sælæme dæβ ɸɐtrærɐh jaβɐⁿgoj]
　　　　är-um　yänzu säläme　däv　　fträr-h　　　　yavngoi.
　　　　man-ERG POSSC cloth.ABS　when　strip.off-NMLZ　3SG>3SG.PFV.PRET.begin
　　　　'the man then began to strip off his own clothes.'

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[32] The root form and its meaning are not known. A possible root is *ttimgoh*. Another possibility is that this is in fact *te timgotao* , a variant of *de timgotao* where *de* is a temporal/iamitive particle meaning 'already.' In the translation I have put "have on" following Mary Dibod's Nen expression *dngawasngron*, meaning for something 'to be in a state of having on.'

(22)   [bolᵐbol dæβ æ nɑmi nowɑβtɑj,]

        bolmbol   *däv*   *ä*   *nami*   *nowavtai,*

        west.wind.ASB   when   ?3ABS   ?   3SG.PFV.PRET.say

        'Bolmbol then said,'

(23)   [mɑto bɐm eβɐh mujɑβɑ ɸiβi ædi nɐm]

        mato   *bm,*   *evh*   *muya=va*   *fivi*   *ädi*

        perhaps 2ABS   sun.ABS strength=COM   INTS   INTS

        nm.

        2SG.IPFV.NPHD.COP

        '"Perhaps you, the sun, you are the strongest."' [lit. perhaps you, the sun with strength, truly you are]

6 Conclusion

This phonetic-phonological description has focussed on the segmental aspects of Nmbo. In the spirit of language documentation, I have made some preliminary comments about some suprasegmental characteristics, but this is an area where future work would be highly beneficial. In particular, the related elements of the central vowels and stress need much attention, as they are deeply related to understanding lexical, morpho-phonemic, and morphosyntactic aspects of Nmbo.

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