

## **Phonetic structures of Khonoma Angami**

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Angami is a Tibeto-Burman language spoken in the Naga Hills in the northeastern parts of India. There are several dialects, the most prominent being Chokri, Khonoma, and Kohima. The last is considered the standard variety for publications and is taught in schools. Although there is no Angami written literature, there are published translations of textbooks and religious writings (Ravindran 1974). Published descriptions of Kohima dialect include Burling (1960), Ravindran (1974) and Girdhar (1980). The various dialects are mutually intelligible but differ in tonal and segmental inventory. This study describes the phonetic inventory of one of the smaller Angami dialects, Khonoma, which is spoken by about 4,000 people in the extreme west of the Angami region. Further information about the phonology and grammar of Khonoma Angami can be found in Chase (forthcoming).

The data for this study are recordings of two female and four male adult native speakers, made in February 1992 at the Linguistics Department of Deccan College, Pune, India. All of the speakers were students at institutions in the neighborhood of Pune. The primary corpus is a list of words spoken in isolation and in the frame  $a^2 \text{ } st^3/ut^2to^3$ , "I write \_\_\_", which was recorded by all six speakers. One of the female speakers (NC) recorded the complete set of material on two separate occasions, giving us seven sets of recordings in all. There are also palatographic samples and airflow data for selected phonemes, some of which have been previously reported in Bhaskararao and Ladefoged (1991).

### **VOWELS**

Khonoma Angami has 6 vowels, which we shall transcribe as [i, e, a, o, u, ə]. Each of them can occur on any one of the four tones. The vowels occur only in open syllables, and there are no contrasting lengths. Although diphthongs do occur, they are very infrequent, and will not be discussed in this paper.

The following sets of words illustrate contrasting vowel qualities.

i	pi <sup>2</sup>	'mushroom'	mi <sup>1</sup>	'fire'
e	pe <sup>3</sup>	'to shiver'	me <sup>2</sup>	'always'
a	ta <sup>3</sup>	'to chew'	ma <sup>3</sup>	'price'
o	po <sup>4</sup>	'one'	mo <sup>3</sup>	'to moo'
u	pu <sup>3</sup>	'to bloom'	mu <sup>4</sup>	'sweet'
ə	pfə <sup>4</sup>	'to carry'	mə <sup>4</sup>	'to refuse'

The seven sets of recordings of all these words were analyzed, using the Kay CSL instrumentation, and the frequencies of the first three formants were determined. The formants were plotted on a graph of F1 and F2', a weighted average of F2 and F3, calculated by using the formula given by Fant (1973:52):

$$F2' = F2 + \frac{(F3 - F2)(F2 - F1)}{2(F3 - F1)}$$

Figure 1 shows the F1 and (F2'-F1) Hz values plotted on a Bark scale for each vowel spoken by the male speakers. Ellipses enclose all points within two standard deviations of the mean. Values for the two female speakers are shown in Figure 2.

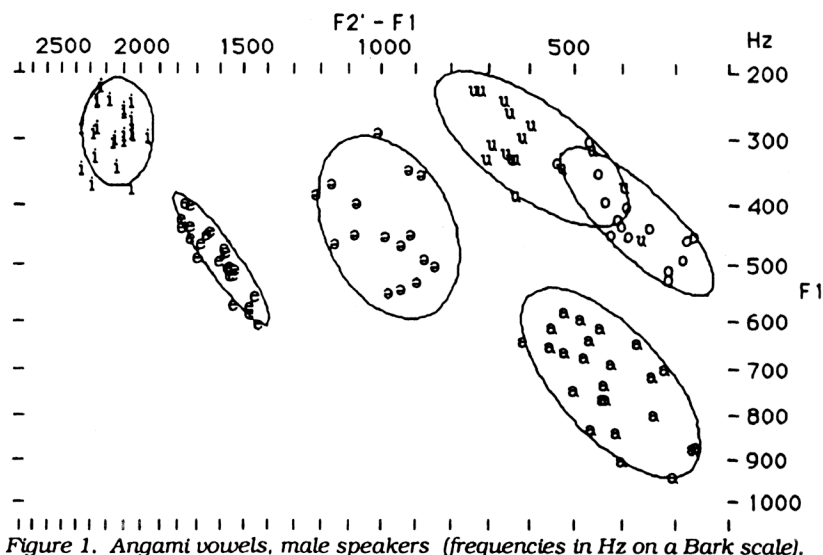


Figure 1. Angami vowels, male speakers (frequencies in Hz on a Bark scale).

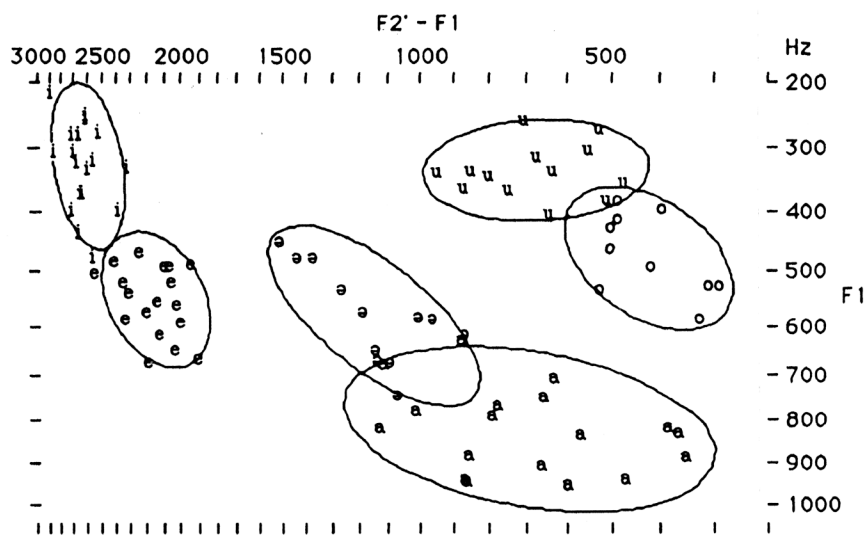


Figure 2. Angami vowels, female speakers (frequencies in Hz on a Bark scale).

The mean formant frequencies of the six vowels as spoken by the six speakers are as shown in Table 1. It is apparent from the plots and the mean formant frequencies that /i/ is a high front unrounded vowel close to cardinal [i]; /e/ is a mid-front unrounded vowel between cardinal [e] and [ɛ]; /a/ is a low central unrounded vowel between cardinal [a] and [ɑ]; /o/ is a mid-high back rounded vowel close to cardinal [o]; /u/ is a high rounded vowel near cardinal [u], but forward toward [ʊ]; and /ə/ is a mid-central vowel that covers a range from the canonical [ə] upward toward [ɪ].

Table 1. The frequencies of the first three formants of the Angami vowels.

Vowel	Male speakers			Female speakers		
	F1	F2	F3	F1	F2	F3
i	301	2403	3028	347	2703	3238
e	520	2054	2776	577	2419	3193
a	749	1187	2640	841	1365	3082
o	470	864	2618	508	814	2725
u	331	941	2374	354	855	2700
ə	457	1438	2584	603	1482	2982

Vowels vary allophonically depending on the preceding consonant. Figure 3 gives a sample for the vowel [u], which is pronounced farther forward after [s] than after the bilabials [p] and [m]. Since a complete set of consonants before [u] was not available, we do not know the full range of contexts for this process.

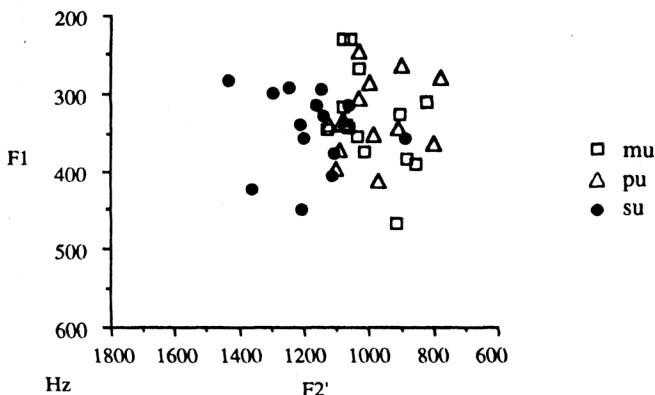


Figure 3. Distribution of [u] vowels in the contexts [mu], [pu], and [su], as spoken in isolation and in a frame by all six speakers

## TONES

Khonoma Angami has four tones. (Five tones are reported for the Kohima dialect by Burling 1960 and Ravindran 1974, although they do not characterize each of the tones in the same way.) Throughout this paper the highest tone is indicated by superscript <sup>1</sup> and the lowest by superscript <sup>4</sup>. The four tones are exemplified in the following minimal sets:

<i>gwe</i> <sup>1</sup>	'to bud'	<i>ke</i> <sup>3</sup> <i>ti</i> <sup>1</sup>	'to twist'
<i>gwe</i> <sup>2</sup>	'to occupy'	<i>ke</i> <sup>3</sup> <i>ti</i> <sup>2</sup>	'to marry'
<i>gwe</i> <sup>3</sup>	'to be thin'	<i>ke</i> <sup>3</sup> <i>ti</i> <sup>3</sup>	'to be ill at ease'
<i>gwe</i> <sup>4</sup>	'physique'	<i>ke</i> <sup>3</sup> <i>ti</i> <sup>4</sup>	'to mix'
<i>su</i> <sup>1</sup>	'to wash face'	<i>ke</i> <sup>3</sup> <i>ba</i> <sup>1</sup>	'snare'
<i>su</i> <sup>2</sup>	'in place of'	<i>ke</i> <sup>3</sup> <i>ba</i> <sup>2</sup>	'time'
<i>su</i> <sup>3</sup>	'to block (as of view)'	<i>ke</i> <sup>3</sup> <i>ba</i> <sup>3</sup>	'to place on top of each other'
<i>su</i> <sup>4</sup>	'deep'	<i>ke</i> <sup>3</sup> <i>ba</i> <sup>4</sup>	'to play, mess about in mud'