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Wushi (Babessi): A Phonological Sketch

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This manuscript concerns the Wushi language, spoken in Babessi in the Ngoketunjia Division of Northwest Cameroon. ISO 693-3 language code: bse

Table of contents

1 Introduction

1.1 Babessi: the place and its people

Babessi is one of thirteen villages situated on the Ndop plain in the Northwest region of Cameroon. Statistics from the last census (in 2005) cite the population of the village to be 7320 for 'Babessi town' and 5246 for 'Babessi rural', giving a total population of 12,566 (BUCREP 2005: 321). The population has no doubt increased significantly since then. It is uncertain when the next census will take place.

The village of Babessi is the administrative centre for a subdivision. This subdivision, known as Babessi subdivision, comprises four villages; Babessi, Baba, Babungo and Bangolan. Each village has its own language. The Babessi subdivision is one of three subdivisions making up the division of Ngoketunjia, i.e. the Ndop plain (BUCREP 2005: 321-322).

Besides this official governmental presence, the village of Babessi has traditional leadership in the form of its Fon (king). The seat of residence of the Fon is his palace, which is located just beside the village market place. There is much social and religious significance attached to activity here. Most villages in Northwest Cameroon have their own Fon. It is widely attested that vocabulary related to the Fon's palace forms an almost separate lexical entity in the village language (see, for example, Sorsamo 2006: 3).

The people of Babessi benefit from the fertile agricultural soil of the Ndop plain. The main crops grown are maize, beans, groundnuts and cassava. There is also plentiful production of red palm oil from oil palm trees and palm wine from raffia palm trees. Rice farming has been introduced to the Ndop plain to provide the local population with a cash crop, and there is also some coffee production.

Babessi, like much of the rest of the Northwest region, has an eight-day week. The market, which happens once a week, is both economically and socially one of the most important driving forces of village life. The rest of the week is made up of five days for working in the fields and two rest days.

Babessi is an interesting place sociolinguistically; multilingualism is part of everyday life in the village. The choice of language depends on the context. Wushi, the village language, is the language of the home: families use it in their compounds and when greeting and socialising with neighbours. Conversation in Wushi (depending on the topic) is sometimes peppered with loan words, usually from Cameroonian Pidgin or English. The market place

is dominated by Cameroonian Pidgin. Finally, there is English, which is the language of instruction in both primary and secondary schools. The typical Babessi villager thus speaks Wushi as their mother tongue, Cameroonian Pidgin as their language of wider communication (with people from neighbouring villages and for trade) and, depending on their level of education and socio-economic status, English. It is also worth noting that Babessi has a considerable number of inhabitants from other villages who have moved there, for example, because of marriage to a Babessi person. Hence other mother tongue languages are also in use in Babessi, such as Lamnso, the language of the neighbouring town of Kumbo.

1.2 Babessi: the language

The language spoken in Babessi is referred to as Wushi both by Ethnologue (Simons et al. 2018) and Glottolog (Hammarstrom et el. 2018). Wushi is referred to by Babessi speakers as [tʃɔʔ wuʃikə]. Ethnologue estimates the number of speakers of the language to be 25,000 although this data is from 2008. The three-letter ISO identifier for the language is **bse**.

Wushi's classification according to the Ethnologue (Simons et al. 2018) is as follows:

Niger-Congo → Atlantic-Congo → Volta-Congo → Benue-Congo → Bantoid → Southern → Wide Grassfields → Narrow Grassfields → Ring → South

Wushi is thus a Narrow Grassfields language. 'Ring' refers to the family of languages spoken around the Ring Road area of Northwest Cameroon. 'South' refers to the languages spoken in four villages on the southern part of this Ring Road: Bamessing, Bamunka, Babungo and Babessi (Watters 2003: 230). Hence the language of Babessi (Wushi) is most similar to the languages of the villages of Bamessing (Kenswey Nsey), Bamunka (Ngiemekohke) and Babungo (Vengo).

Wushi is placed on the EGIDS (Expanded Graded Intergenerational Disruption Scale) at **6a**, which gives the language a status of 'vigorous'. This means the language is used for face-to-face communication within all generations and the language situation is considered to be stable (Simons et al., 2018). The language has not yet reached the level of 'developing', when literature in a standardised form is used by at least some members of the community.

In fact, the only material published in Wushi that could be found was a small booklet of Wushi proverbs produced by SIL almost forty years ago (Clement 1979). No linguistics papers on the language have been published, although significant work on the phonology of

Wushi was undertaken by a SIL colleague, Cristian Balazs, a few years ago (Hamm & Balazs 2015). There is also an unfinished Wushi Orthography Guide authored by Mathaus Njeck and Robert Hedinger from about ten years ago (Njeck & Hedinger 2007).

Typologically, Wushi shares many of the features of Grassfields Bantu languages as described by Watters (2003). Noun and verb stems have a simple monosyllabic structure (Watters 2003: 234). However, whereas other Grassfields Bantu languages have both open and closed syllables, the only kind of closed syllable in Wushi is that ending with a glottal stop.

Watters argues that a seven-vowel system is most likely the proto-system for Grassfields Bantu as a whole, although vowel systems of eight to ten vowels are widely attested (Watters 2003: 234). This paper proposes a nine-vowel system for Wushi. The phenomenon of 'echo vowels' which is common in Grassfields Bantu languages (Watters 2003: 234) occurs frequently in Wushi.

The consonant inventory for Wushi in many ways follows Watters' description of consonants in Grassfields Bantu languages (Watters 2003: 234-236), with a few minor anomalies, which will be discussed later in this paper (see section 2.1). The absence of /p/ from the consonant inventory is typical of many Niger-Congo languages (Welmers 1973: 48).

The prenasalisation of plosives or fricatives in nouns is extremely common in Wushi. This is typical of Grassfields Bantu languages, where in some cases, the prenasalisation has been analysed as a syllabic nasal, and in other cases has been analysed simply as a modification of the consonant it precedes (Watters 2003: 235).

Wushi, like related languages, has an extremely complex tone system. In many ways this is the most unique and fascinating feature of the Grassfields Bantu languages. Watters (2003: 236-237) describes how historic processes such as the collapsing of disyllabic roots into monosyllabic roots, and the disappearance of some noun class affixes, have affected tone. There is evidence of both of these processes in Wushi. These historic processes account for the presence of tonal phonemena such as contour tones, 'floating' tones and tonal morphemes. Hence, the remnants of historic segmental data are often found solely in the surviving supra-segmental tonal data.

Morphologically, Wushi has seven segmental noun class affixes, plus a number of zero-morpheme (in terms of consonants/vowels) affixes. The number of noun classes is significantly reduced in comparison to Proto-Bantu systems. This collapsing of a noun class

system, by coalescences and realignments, is common in Bamileke and other Grassfields Bantu languages (Welmers 1973: 211). A distinct feature of Wushi is that noun class affixes are almost all *suffixes* rather than prefixes.

Wushi, like other Grassfields Bantu languages, has a limited range of verbal extensions (Watters 2003: 245). The tense-aspect-mood (TAM) system in these languages is complex, with some linguists choosing to describe TAM in terms of 'realis' and 'irrealis' as well as the more traditional descriptors (Watters 2003: 246). The word order in Wushi, as in related languages, is subject-verb-object (SVO).

1.3 Purpose of study and methodology

The aim of this study was to work with the language community of Babessi to develop a clearer understanding of the phonology of the Wushi language. The purpose was to facilitate wider consensus on the orthography, and so to promote language development. I spent 10 months living in the village between May 2017 and May 2018.

The data presented in this paper has come from two main sources; firstly, data transcribed when I was working with my language helper, and secondly, data collected at a Phonology Linguistics Workshop held in the village and organised by SIL. The workshop was held in July 2017 and was attended by nine members of the language community, including my language helper. It was one of several linguistics workshops organised by SIL using a participatory approach, which encourages community ownership of language development projects.

The database used for this study contains about 600 lexical items, approximately half of which were collected at the phonology workshop. I also recorded and transcribed about 200 phrases/sentences with my language helper as part of my language learning.

1.4 Acknowledgements

Many of my colleagues at SIL Cameroon have helped and supported me during this project. I particular, I would like to thank Scott Satre who read and commented on various drafts of this manuscript, and Jane Ingle who helped me with transcribing and describing tone. Stephen C. Anderson kindly agreed to check the manuscript in his role as Linguistics Consultant.

I am indebted to my language helper David Tiegho for his patience in working with someone who was learning a tonal language for the first time! I am grateful to him and his whole family for their kindness to me.

There were several people who attended linguistics workshops and have been very supportive of language development in the village. In particular, I would like to thank Melvis Tioku and the catechist of Babessi (Michael Boweh) for their collaboration and friendship.

The Interchurch Committee (ICC) of Babessi not only warmly welcomed me to the village, but showed ongoing love and support during my time there.

Finally, I want to thank my Babessi family who provided me with more than just a place to live; they gave me a home. Thank you Ma Ajara!

1.5 Notation

1.5.1 Transcriptions

The International Phonetic Alphabet was used for transcriptions. The font used in this paper is Charis SIL. Phonetic data is written in square brackets. Phonemic data is written in slash brackets.

Syllable breaks are indicated with a full stop, for example, /kuʔ.kə/ ‘cocoyam’.

1.5.2 Tone marking

Phonetic transcriptions of nouns and verbs include (surface) tone markings. Analysis of underlying tone was beyond the scope of this study, therefore phonemic data in this paper does not have tone markings. In the few examples where phonetic data without surface tone markings is used, I have made a note beside the data. Unfortunately at the time of writing this paper, I was unable to obtain any of this missing surface tone data.

For nouns, each noun was elicited in its citation form (i.e. in isolation rather than in a frame). For verbs, each verb was elicited in the frame ‘he has [verb]’. An example of this frame using the verb ‘go’ is shown below:

i	*naʔ*	*gɛ*
3S	PFV	go

‘He has gone.’

NB Further research on the verb phrase is needed to ascertain the exact grammatical function of the tense/aspect marker above which has been glossed PFV (perfective aspect).

The tone markings used for surface tone (within phonetic brackets) are shown below:

é	H	level high
ē	M	level mid
è	L	level low
ȅ	L falling	contour low falling
ē̂	HM	contour high falling (from high to mid)
ê	HL	contour high to low
ě	L rising	contour low to mid

2 The sound inventory

2.1 Consonant inventory

The table below shows the consonant phoneme inventory for Wushi:

		Labial	Alveolar	(Alveo) palatal	Velar	Labio-velar	Glottal
Plosive	vl		**t**		**k**	**kp**	**ʔ**
	vd	**b**	**d**		**g**	**gb**	
Fricative	vl	**f**	**s**				
	vd	**v**	**z**		**ɣ**		
Affricate	vl	**pf**	**ts**	**tʃ**			
	vd	**bv**	**dz**	**dʒ**			
Nasal		**m**	**n**		**ŋ**	**ŋm**	
Approximant			**l**	**j**		**w**	

Thus 26 consonant phonemes have been found in Wushi. All consonant phonemes, except for the glottal stop, can occur in the syllable onset. None of the consonants, except for the glottal stop, can occur in the syllable coda. There are probable historic reasons for this almost complete loss of consonants in the syllable coda (which will be discussed further in section 2.1.1.5).

Looking at noun and verb roots in the database, the most commonly occurring consonant by far is /ʔ/. The next most common is /k/, closely followed by /b/ and then /t/. All four of the labiovelars /kp/ /gb/ /ŋm/ and /w/ are rare but there is strong evidence that they demonstrate contrast and thus are true phonemes.

2.1.1 Plosives

There are eight plosives in Wushi; four are voiceless and four are voiced.

The voiceless plosives are:

/t/ /k/ /kp/ /ʔ/

The voiced plosives are:

/b/ /d/ /g/ /gb/

The phoneme /ʔ/ is extremely common. The phonemes /k/ /b/ and /t/ are very common. The phonemes /g/ and /d/ are fairly common. The double-articulated labiovelars /kp/ and /gb/ are rare.

The plosives are shown below, in order from most to least common. For each phoneme, two examples are given; the first is a verb and the second a noun.

/ʔ/	[sáʔ]	‘hunt’
	[mvóʔ]	‘fowl’
/k/	[ká]	‘fry’
	[kɛ́]	‘monkey’
/b/	[bé]	‘sleep’
	[bû]	‘dove’

/t/	[tjé]	‘call’
	[té]	‘palm tree’
/g/	[gɛ̀]	‘go’
	[gɨ̀]	‘voice’
/d/	[dǔ]	‘plan’
	[dɔ̀]	‘barrenness’
/kp/	[kpáʔ]	‘clap’
	[kpákə̄]	‘key’
/gb/	[gbɔ̌]	‘beat’
	NO NOUN IN DATA FOR /gb/	

2.1.1.1 Labial plosive /b/

Where there is opposition between [p] and [b] in some Grassfields Bantu languages, it is usually weak (Watters 2003: 234-235). For most of these languages, there is no phonemic contrast between these two sounds. In Wushi, only the voiced bilabial plosive /b/ exists and there is no allophonic [p]. (Historically, it is possible that the voiceless counterpart also existed.)

Even loan words in Wushi, such as ‘pear’, change the voiceless [p] to a voiced [b]:

[bia] ‘pear’ (Cameroonian English for ‘avocado’) NB Surface tone missing in data

The ‘missing’ /p/ is also a feature of the three most closely related languages: Babungo (Schaub 1985: 259), Bamunka (Sorsamo 2006: 5) and Bamessing (DeVries 2008: 7).

The labial plosive /b/ (in root-initial position) is not restricted in its environment and is found preceding vowels with varying height and frontness/backness.

2.1.1.2 Alveolar plosives /t/ and /d/

Both the voiceless and voiced alveolar plosives are found in Wushi, with their contrast in analogous environments demonstrated below:

[tɨ́ɨ́]	‘put’	(verb)
[dɨ́ə́]	‘limp’	(verb)
[n̥túúkə̄]	‘pick-axe’	(noun)
[ndúúkə́]	‘harp’	(noun)

The voiceless alveolar plosive /t/ (in root-initial position) is not restricted in its environment and is found preceding vowels with varying height and frontness/backness. The voiced alveolar plosive /d/ (in root-initial position) is found mainly before back vowels but is occasionally found preceding other vowels. In its prenasalised form, however, /d/ is unrestricted in the vowels which can follow.

2.1.1.3 Velar plosives /k/ and /g/

Both the voiceless and voiced velar plosives are found in Wushi, with the minimal pairs below demonstrating their phonemic contrast:

[kɔ́ʔ]	‘harvest’	(verb)
[gɔ́ʔ]	‘share’	(verb)
[ŋ̀kɔ̀ɔ̀kə̀]	‘marriage’	(noun)
[ŋgɔ̀ɔ̀kə̀]	‘plantain’	(noun)

The voiceless velar plosive /k/ (in root-initial position) is not restricted in its environment and is found preceding vowels with varying height and frontness/backness. The voiced velar plosive /g/ (in root-initial position) is found before high vowels and low vowels, but in the database there are not any examples of /g/ preceding mid vowels. This restriction still seems to apply if the /g/ is prenasalised.

2.1.1.4 Labiovelar plosives /kp/ and /gb/

The phonemes /kp/ and /gb/ are pronounced with double articulation. There are several examples with /kp/ in the data but only one example with /gb/. There is no minimal pair to demonstrate their phonemic contrast, but contrast in an analogous environment is shown below:

[kpɔ́ʔ]	‘rub’	(verb)
[gbɔ̌]	‘beat’	(verb)

Of the three most closely related langauges, only Bamunka has /kp/ and /gb/ in the consonant inventory (Sorsamo 2006: 5,8).

In Wushi, as in Bamunka, there is allophonic variation when the labiovelar plosive precedes a front vowel, as shown in the following rule. (The rule is shown only for the voiceless phoneme as there was not sufficient data with its voiced counterpart.)

Rule: /kp/ → [pw] / __ V [+front]
[kp] / __ elsewhere

Examples:	/kp/	Before front vowel:	[pwɛnə]	‘beans’	NB Surface tone missing in data
		Before central vowel:	[kpákə̄]	‘key’	
		Before back vowel:	[kpɔ́ʔ]	‘rub’	

It is interesting to note that in Bamunka (Sorsamo 2006: 8), the allophonic variation of /kp/ is a labialised velar plosive [kw], whereas in Wushi, the allophonic variation is a labialised bilabial plosive [pw].

An area for further research (especially with a larger corpus) is the extent to which this phoneme has purely allophonic variation. Sorsamo (2003: 8) reports that in Bamunka, ‘There is a high degree of free variation between speakers. Some speakers would always pronounce a labialised velar plosive, even when a central or back vowel follows’. It could be argued that the labiovelar plosives are undergoing a process of change in terms of their phonological status within both languages; are /kp/ and /gb/ ‘disappearing’ within the phoneme inventory?

2.1.1.5 Glottal plosive /ʔ/

The glottal plosive is the most commonly occurring consonant in noun and verb roots and also the only consonant which can occur in the syllable coda. It is widely attested that Grassfields Bantu languages have a reduced number of consonants in the syllable coda (Watters 2003: 245). Wushi is one of several languages, including Bamunka (Sorsamo 2006: 5), which are even more limited in this regard, only having one consonant, the glottal stop, which can fill the syllable-final position. Sorsamo suggests historic reasons for this; a process has happened over time where ‘the contrast between several consonants [in the syllable coda] has been neutralised’ (Sorsamo 2006: 9).

Given that the glottal plosive can only occur in the syllable coda, and not in its onset, one could argue that its occurrence is environmentally determined, and thus that it is not a true phoneme. Using this argumentation, and the fact that the syllable onset is stronger phonologically than the syllable coda, one might interpret the glottal as an allophone of one of the other voiceless plosives in the syllable onset, i.e. /t/ or /k/. However, as Schaub argues in his analysis of Babungo (Schaub 1985: 260), there are strong psycholinguistic reasons against this interpretation. A speaker of Babungo or Wushi would not perceive a syllable-final [t] or [k] as an allophone of /ʔ/. Rather, they would correct the speaker and use a syllable-final [ʔ]. The glottal plosive would only be a true allophone if mother tongue speakers could not hear the phonetic difference between [t] or [k] and [ʔ] in this environmental context.

An interesting phonetic feature of the glottal stop is the 'echo vowel' which is often heard after the glottal stop. This is illustrated in the examples below which show the phonetic realisations of phonemic data:

/mɛʔkə/	[mɛ̰ʔɛ̰kə̀]	'grasshopper'
/tʃɔʔ/	[tʃɔ́ʔɔ́]	'speak'
/ntsaʔ/	[n̩tsá̰ʔá̰]	'legal case'

The phonetic transcriptions above show the laryngealisation, or creaky voicing, of the vowels on either side of the glottal stop. The vowel which comes after the glottal stop is the echo vowel, and is not of phonemic significance.

The echo vowel in Wushi is predictable: echo vowels appear between syllable-final consonants and following consonants, both within words and between words.

2.1.2 Fricatives

There are five fricatives in Wushi; two are voiceless and three are voiced.

The voiceless fricatives are:

/f/ /s/

The voiced fricatives are:

/v/ /z/ /ɣ/

The phoneme /f/ is very common. The phonemes /s/ /v/ and /ɣ/ are fairly common, whereas /z/ is less common.

The fricatives are shown below, in order from most to least common. For each phoneme, two examples are given; the first is a verb and the second is a noun.

/f/	[fɔ̃]	‘sew’
	[fə̀]	‘chest’
/s/	[sɔ́ʔ]	‘plant’
	[sə́ʔ]	‘cap’
/v/	[véʔ]	‘listen’
	[vì]	‘woman’
/ɣ/	[ɣɔ̀]	‘finish’
	[ɣə́]	‘root’
/z/	[zéʔ]	‘eat (and be satisfied)’
	[zə̄]	‘nose’

2.1.2.1 Labial fricatives /f/ and /v/

Both the voiceless and voiced labiodental fricatives are found in Wushi, with their contrast in analogous environments shown below:

[fé]	‘sell’	(verb)
[véʔ]	‘listen’	(verb)
[fɔ́ʔkə̄]	‘leaf’	(noun)
[vɔ́ōkə̄]	‘owl’	(noun)

The voiceless labiodental fricative /f/ (in root-initial position) is not restricted in its environment and is found preceding vowels with varying height and frontness/backness. The voiced labiodental fricative /v/ (in root-initial position) is found mainly before front vowels, but it occasionally precedes a back vowel. In its prenasalised form, /v/ is only found preceding mid vowels.

2.1.2.2 Alveolar fricatives /s/ and /z/

Both the voiceless and voiced alveolar grooved fricatives are found in Wushi. Among the other three closely related languages, two have this distinction (Babungo and Bamessing) and one does not (Bamunka, which only has /s/). (Schaub 1985: 259, DeVries 2008: 7, Sorsamo 2006: 5)

The examples below demonstrate the phonemic contrast of /s/ and /z/ in analogous environments:

[sə̀ʔ]	'climb down'	(verb)
[zə̀]	'kill'	(verb)
[sə́kə̄]	'hoe'	(noun)
[zə̋]	'nose'	(noun)

The voiceless alveolar fricative /s/ has allophonic variation [ʃ] when preceding a high vowel. This is shown in the rule and examples below:

Rule: /s/ → [ʃ] / __ V [+high]
[s] / __ elsewhere

Examples:	/s/	Before high vowels:	[ʃi̋]	'grave'
			[ʃɨə̀]	'bag'
			[ʃŭʔ]	'wash'
		Before mid vowels:	[sə̀ʔ]	'climb down'
			[sŏ]	'drag'
		Before low vowels:	[sá]	'tear' (verb)
			[sɔ̀ʔ]	'kite' (bird)

2.1.2.3 Velar fricative /ɣ/

The voiced velar fricative /ɣ/ does not have a voiceless counterpart. This is also the case in Babungo, Bamessing and Bamunka (Schaub 1985: 259, DeVries 2008: 7, Sorsamo 2006: 5).

It is worth noting that in many Grassfields Bantu languges, [ɣ] is an allophone of /g/ such that /g/ becomes [ɣ] when it does not follow a nasal (Anderson, personal communication). The South Ring languages, however, attest both /ɣ/ and /g/ as consonants in the phoneme inventory.

The fricative /ɣ/ generally does not have a lot of friction. Phonetically, there is more friction when /ɣ/ is utterance-initial than when it is in other positions, such as intervocalic.

In noun and verb roots, /ɣ/ usually occurs before central vowels, but there are also occurrences of /ɣ/ preceding the back vowel /o/. Some examples are shown below:

Before central (high) vowel:	[ɣɨ́ə́]	‘work’	(verb)
Before central (mid) vowel:	[ɣə́kə̄]	‘hand’	(noun)
Before central (low) vowel:	[ɣá]	‘jeer’	(verb)
Before back (mid) vowel:	[ɣóʔkə̄]	‘bark’ (of tree)	(noun)

2.1.3 Affricates

There are six affricates in Wushi; three are voiceless and three are voiced.

The voiceless affricates are:

/pf/ /ts/ /tʃ/

The voiced affricates are:

/bv/ /dz/ /dʒ/

The phonemes /ts/ and /tʃ/ are common in noun and verb roots. The others are fairly common.

The affricates are shown below, in order from most to least common. For each phoneme, two examples are given; the first is a verb and the second is a noun.

/tʃ/	[tʃáʔ]	‘weed’	
	[tʃɨ̀]	‘mouth’	
/ts/	[tsó]	‘tether’	
	[tsə́ká]	‘tree’	
/bv/	[bvə̀ʔ]	‘bend’	
	[bvo]	‘stomach’	NB Surface tone missing in data
/dʒ/	[dʒíɛ́]	‘press down’	
	[ndʒɨ̀ə̀ʔ]	‘seed’	

/pf/	[pfə̋]	‘shut’
	[pfə̀ʔ]	‘large lizard’
/dz/	[dzə̀]	‘fast’
	[ndzé]	‘hippopotamus’

While Wushi has six affricates, Bamunka and Bamessing only have two: /tʃ/ and /dʒ/ (Sorsamo 2006: 5, DeVries 2008: 7). Babungo only has one: /dʒ/ (Schaub 1985: 259).

Given that in Wushi there is allophonic variation of /s/ preceding a high vowel, where /s/ becomes [ʃ], one might expect something similar with /ts/ and /dz/. One could argue that [tʃ] and [dʒ] are simply allophones of /ts/ and /dz/ when they are followed by a high vowel. This is common in Bamileke langages which are a neighbouring family of languages to the south (Anderson, personal communication). It is true that there is some degree of complementary distribution in the data for Wushi, where [tʃ] and [dʒ] *tend* to precede high vowels while [ts] and [dz] *tend* to precede mid and low vowels. However, there is not enough evidence for this interpretation. There are minimal (or near minimal) pairs which seem to demonstrate phonemic contrast between the alveolar affricates and their palatalised counterparts, as shown below:

/ts/ and /tʃ/	[tsə̋ʔ]	‘pound’	(verb)	
	[tʃə̋ʔ]	‘soak’	(verb)	
	[n̥tsɔ̀ɔ̀kə̀]	‘sugar cane’	(noun)	
	[n̥tʃɔ̀ɔ̀]	‘drier’ (for fish)	(noun)	
/dz/ and /dʒ/	[dzə̋]	‘sit’	(verb)	
	[ndʒo]	‘traditional dance’	(noun)	NB Surface tone missing in data

2.1.3.1 Labial affricates /pf/ and /bv/

Both the voiceless and voiced labiodental affricates are found in Wushi, with the minimal pairs below demonstrating their phonemic contrast:

[pfə̀]	‘hit’	(verb)
[bvə̀]	‘fall’	(verb)

[pfǒ]	‘shut’	(verb)
[bvǒ]	‘untie’	(verb)

It is interesting to note that neither /pf/ nor /bv/ are found in Wushi’s three most closely related languages (Bamunka, Babungo, Bamessing). They are, however, found in some other Grassfields Bantu languages, such as the Bamileke language Banjoun (Watters 2003: 235).

Both the voiceless and voiced labiodental affricates, /pf/ and /bv/, precede mid vowels. There were not any examples in the database of these affricates preceding high or low vowels.

2.1.3.2 Alveolar affricates /ts/ and /dz/

Unlike the other South Ring languages, both the voiceless and voiced alveolar affricates are found in Wushi. The minimal (or near minimal) pairs below demonstrate their phonemic contrast:

[tsǒ]	‘knit’	(verb)
[dzǒ]	‘sit’	(verb)
[n̥tsɔ̀ɔ̀kə̀]	‘sugar cane’	(noun)
[ndzɔ̀ɔ̀]	‘back’ (body part)	(noun)

2.1.3.3 Alveopalatal affricates /tʃ/ and /dʒ/

Both the voiceless and voiced post-alveolar affricates are found in Wushi, with the minimal pairs below demonstrating their phonemic contrast:

[tʃí]	‘drain’	(verb)
[dʒí]	‘urinate’	(verb)
[tʃáʔ]	‘carry’	(verb)
[dʒáʔ]	‘catch’	(verb)

2.1.4 Nasals

There are four nasals in the consonant inventory:

/m/ /n/ /ŋ/ /ŋm/

The phoneme /n/ is the most common nasal in verb and noun roots, followed by /m/ and then /ŋ/. The labiovelar /ŋm/ is very rare.

The nasals are shown below, in order from most to least common. For each phoneme, two examples are given; the first is a verb and the second a noun.

/n/	[nǒ]	‘lie (down)’	
	[nà?]	‘cow’	
/m/	[mí]	‘fling’	
	[mákə́]	‘molar’ (tooth)	
/ŋ/	[ŋɨ́]	‘jump’	
	[ŋò]	‘Babessi secret society’	
/ŋm/	*NO VERB IN DATA FOR /ŋm/*		
	[ŋma?nə]	‘book (loan word)’	NB Surface tone missing in data

2.1.4.1 Labial nasal /m/

The phoneme /m/ has bilabial articulation. It is the most common nasal found in verb and noun roots in the database. It is not restricted in its environment and is found preceding vowels with varying height and frontness/backness.

2.1.4.2 Alveolar nasal /n/

The alveolar nasal /n/ is not restricted in its environment and is found preceding vowels with varying height and frontness/backness.

For data with ambiguous segments where an alveolar nasal is followed by a palatal approximant, such as [njɛ́] ‘buffalo’, the [nj] is interpreted as a unit /nʲ/.

It is not interpreted as a sequence /nj/ because a consonant cluster does not fit the syllable patterns of Wushi (see section 3.1).

It is not interpreted as a phoneme unit /ɲ/ because this would add another (unnecessary) phoneme to the consonant inventory.

Neither is the [nj] interpreted as a sequence of a consonant followed by a vowel /ni/ because there are examples where this sequence would not fit the syllable patterns of

Wushi. This is demonstrated in the data below, where the correct interpretation is shown first, followed by interpretation of [nj] as /ni/:

[njɔ̀ɔ̀]	'animal'	/nʲɔɔ/	/CʲVV/	possible
		/niɔɔ/	/CVVV/	**not** possible

Thus, when an alveolar nasal is followed by a palatal approximant, it is interpreted as a palatalised alveolar nasal. This palatalised /n/ is not restricted in its environment and is found preceding vowels with varying height and frontness/backness.

The interpretation of [i] (phonetically similar to the approximant [j]) when it is followed by another vowel is discussed further in section 2.2.2.

The alveolar nasal /n/ is just one of a number of consonants which can be palatalised – see section 2.3.2.

2.1.4.3 Velar nasal /ŋ/

The velar nasal occurs in the database mainly before the back vowels /u/ /o/ and /ɔ/. There are also examples of /ŋ/ preceding the high central vowel /ɨ/. It was not found to precede any of the front vowels.

2.1.4.4 Labiovelar /ŋm/

The labiovelar nasal /ŋm/ is pronounced with double articulation. It is the least phonologically stable consonant phoneme in Wushi and only occurs once in the data. In closely related languages, it is found in Bamunka but not in Babungo or Bamessing. (Sorsamo 2006: 5, Schaub 1985: 259, DeVries 2008: 7)

Sorsamo (2006: 16) suggests possible allophonic variation of /ŋm/ in Bamunka, where /ŋm/ might become [ŋw] before front vowels. There is evidence of a similar phenomenon in Wushi:

/ŋm/	Before central vowel:	[ŋmaʔnə]	'book (loan word)' NB Surface tone missing in data
	Before front vowel:	[ŋwe]	'moon' NB Surface tone missing in data

More data is needed, though, to confirm this possible allophonic variation of /ŋm/. Further research with a larger corpus would also help to prove or disprove the analysis of the labiovelar nasal as a true phoneme in the language.

2.1.5 Approximants

There are three approximants in Wushi:

/l/ /j/ /w/

The phoneme /j/ is the most common approximant in verb and noun roots. The approximants /l/ and /w/ are less common.

The approximants are shown below, in order from most to least common. For each phoneme, two examples are given; the first is a verb and the second a noun.

/j/	[jɨə̀]	'sweep'	
	[jí]	'forehead'	
/l/	[lɨə̀]	'tap (palm wine)'	
	[lə̀ə̀kə̀]	'bamboo'	
/w/	[wɔ́ɔ̄]	'spear'	NB This is a noun - no verb in data
	[wokə]	'foot'	NB Surface tone missing in data

2.1.5.1 Alveolar approximant /l/

The alveolar approximant /l/ is a lateral approximant. It occurs mainly before the central vowels [ɨ] [ə] and [a] although there is one example in the data of its occurrence before the back vowel [u].

2.1.5.2 Alveopalatal approximant /j/

The alveopalatal approximant /j/ is pronounced with palatal articulation. It is not restricted in its environment and is found preceding vowels with varying height and frontness/backness.

This approximant /j/ is a semivowel and is thus arguably an ambiguous segment, open to interpretation as either a consonant or a vowel. In Wushi, though, there is clear evidence

for [j] as a consonant as it occupies the syllable onset position before a vowel in verb and noun roots (where only initial consonants are clearly attested). Furthermore, if [j] is interpreted as a vowel rather than a consonant, the phonemic data shows syllable structures which are not attested in Wushi (see section 3.1). This is illustrated in the examples below, where both possible phonemic interpretations of [j] are shown, along with their syllable patterns:

[j̃ɨə̀]	'snake'	/jɨə/	/CVV/	possible
		/iɨə/	/VVV/	**not** possible
[jú?]	'hear'	/ju?/	/CVC/	possible
		/iu?/	/VVC/	**not** possible

2.1.5.3 Labiovelar approximant /w/

The labiovelar approximant /w/ occurs in the database before non-high central and back vowels. It does not precede any front vowels.

As with the alveopalatal approximant /j/, it could be argued that /w/ is open to interpretation as either a consonant or a vowel. The reasons for its phonological status as a consonant are the same as those given in 2.1.5.2. for /j/. While it is true that the labiovelar approximant /w/ occurs infrequently in the data, it is found in a few noun roots in the syllable onset position. Besides, its interpretation as a vowel would not fit the syllable patterns of Wushi, as shown in the example below:

[wɔ́ɔ̄]	'spear'	/wɔɔ/	/CVV/	possible
		/uɔɔ/	/VVV/	**not** possible

2.2 Vowel inventory

The table below shows the nine-vowel phoneme inventory for Wushi:

	Front	Central	Back
High	**i**	**ɨ**	**u**
Mid	**e**	**ə**	**o**
Low	**ɛ**	**a**	**ɔ**

2.2.1 Vowel quality

There are nine contrastive vowels in Wushi.

Three are front vowels, which are unrounded:

/i/ /e/ /ɛ/

Three are central vowels:

/ɨ/ /ə/ /a/

Three are back vowels, which are rounded:

/u/ /o/ /ɔ

The central vowels /ɨ/ /ə/ and /a/ vary in their roundedness, but tend to be more often unrounded rather than rounded.

This is illustrated in the diagram below, which shows how the roundedness of vowels corresponds to vowel backness:

FRONT → CENTRAL → BACK
UNROUNDED → → → **ROUNDED**

As well as having the most variation in their roundedness, the central vowels also have the most variation in their place of articulation. The vowels /ɨ/ and /ə/ have the most phonetic

variation, and thus these two vowels are the most phonemically ‘similar’ on the phoneme chart.

2.2.1.1 Front vowels

Examples of the front vowels /i/ /e/ and /ɛ/ are shown below, with each column demonstrating their contrast:

/i/	[bǐ]	‘cola nut’	(noun)	[tí]	‘squeeze’	(verb)
/e/	[bé]	‘sleep’	(verb)	[té]	‘stop’	(verb)
/ɛ/	[bɛ́]	‘hate’	(verb)	[tɛ]	‘five’	(cardinal no.)
					NB Surface tone missing in data	

2.2.1.2 Central vowels

Examples of the central vowels /ɨ/ /ə/ and /a/ are shown below, with each column demonstrating their contrast:

/ɨ/	[tɨ́ɨ́]	‘put’	(verb)	[kɨ̂]	‘pot’	(noun)
/ə/	[tə́]	‘burst’	(verb)	[kə́]	‘give’	(verb)
/a/	[tǎʔ]	‘search’	(verb)	[ká]	‘fry’	(verb)

2.2.1.3 Back vowels

Examples of the back vowels /u/ /o/ and /ɔ/ are shown below, with each column demonstrating their contrast:

/u/	[tú]	‘dig’	(verb)	[bû]	‘dove’	(noun)
/o/	[tó]	‘send’	(verb)	[bǒ]	‘play’	(verb)
/ɔ/	[tɔ́ʔ]	‘stir’	(verb)	[bɔ̌]	‘cover’	(verb)

2.2.2 Interpretation of [i] and [u] in ambiguous segments

The vowels [i] and [u], which correspond to the approximants [j] and [w] respectively, are open to interpretation when they are followed by another vowel. There are three possible interpretations for each of these segments:

(1) They function as a consonant (approximant) to form a consonant cluster with the preceding consonant.
(2) They function as a vowel, or as part of a diphthong.
(3) They function as a modification of the preceding consonant.

These different interpretations are demonstrated in the examples below. The first example [tíé] shows the three possible interpretations of [i] and the second example [fùà] shows the three possible interpretations of [u]:

[tíé] 'call' Possible interpretations: /tje/ /tie/ /tʲe/

[fùà] 'king' Possible interpretations: /fwa/ /fua/ /fʷa/

Let us consider each of the three possible interpretations in turn. Interpretation (1) is not possible because interpreted data would produce syllable patterns which are not attested in Wushi. In the examples above, /tje/ or /fwa/ would create a syllable pattern /CCV/ which there are no unambiguous examples of in the data (see also section 3.1). In fact, on the whole, consonant clusters are exceedingly rare in Niger-Congo languages (Welmers 1973: 52).

Interpretation (2) does not work either. If we interpret [i] or [u] simply as a vowel, there are examples where the interpreted data will produce syllable structures which are not attested in Wushi. Look at the data below which shows interpretation (2):

[tíɔ́ɔ́.kə̄] 'calabash' /CVVV.CV/ Impossible as CVVV is **not** attested

[núáá.fə̄] 'bird' /CVVV.CV/ Impossible as CVVV is **not** attested

NB: The above examples are noun roots with an affix; the first syllable is the noun root and the second syllable is the noun class suffix.

These two examples also show why [i] or [u] followed by another vowel cannot be interpreted as a diphthong; it will not fit the syllable structure.

Thus we are left with interpretation (3), which is the only interpretation possible in Wushi. Hence when the vowels [i] or [u] are followed by another vowel, they must be interpreted as a modification (consonant offglide) of the preceding consonant, i.e. as palatalisation or labialisation. This is illustrated in the examples below, which show the correct phonemic interpretation of the phonetic data:

[i]	[víó]	‘resurrect’	/vʲo/	/CʲV/
	[bíɔ́ɔ́.kə́]	‘funnel’	/bʲɔɔ.kə/	/CʲVV.CV/
[u]	[ndùà]	‘bad luck’	/ᴺdʷa/	/ᴺCʷV/
	[núáá.fə̄]	‘bird’	/nʷaa.fə/	/CʷVV.CV/

In the above examples, interpretation of the [i] and [u] as palatalisation or labialisation of the preceding consonant produces syllable patterns which fit the syllable structure of Wushi.

A further argument for interpreting these semivowels as palatalisation or labialisation is their phonetic perception. The vowel set [i, u] is longer and carries contrastive tone whereas the approximant set [j, w] is shorter and does not carry contrastive tone. Thus the [j] in the verb [tjé] ‘call’ sounds shorter than the [i] in the verb [tí] ‘squeeze’. Though this paper only examines surface tone, there is no evidence of tone patterns on [iV] or [uV] vowel sequences changing when these semivowels are no longer there, thus, it is unlikely that these semivowels carry tone. The sets [i, u] and [j, w] are therefore arguably *not* phonetically identical. Further phonetic transcriptions in this paper where a semivowel is followed by another vowel will be transcribed [jV, wV] rather than [iV, uV].

This interpretation is discussed further in sections 2.3.2 and 2.3.3, where palatalisation and labialisation are described as contrastive modifications of root-initial consonants.

2.2.3 Diphthongs

There is only one diphthong in Wushi which is the high central vowel followed by the mid central vowel /ɨə/. All other examples of [CVV] in the data either have the same vowel with vowel lengthening, or have labialisation or palatalisation where the first vowel is interpreted as a modification of the consonant.

The diphthong /ɨə/ is very common, and occurs about 30 times in the database. Examples are shown below:

Verbs:

[fɨ́ə́ʔ] ‘build’

[ɣɨ́ə́] ‘work’

[kɨ́ə́] ‘dance’

Nouns:

[mbɨ̀ə̀] ‘shoulder’

[n̥tɨ̀ə̀ʔ] ‘quarter’ (neighbourhood)

[tʃɨ́ə́ʔkə́] ‘palm kernel’

2.2.4 Vowel sequences

The three types of vowel sequence possible in Wushi are summarised in the table below:

Type of vowel sequence	*Form of vowel sequence*	*Example*		
Long vowel	ii, ee, ɛɛ, ɨɨ, əə, aa, uu, oo, ɔɔ	[n̥tsɔ́ɔ́.fə́]	/ᴺtsɔɔ.fə/	‘star’
Palatalisation or labialisation	iV, uV	[kjóʔ]	/kʲoʔ/	‘break’
Diphthong	ɨə	[ndɨ́ə̄]	/ᴺdɨə/	‘rope’

Note that vowel length is discussed further in section 2.3.4.

2.3 Contrastive modifications of segments

2.3.1 Prenasalisation of consonants

Prenasalisation of nouns is extremely common in Wushi. There is also some prenasalisation of verbs, but this is much less common.

In many Grassfields Bantu languages, prenasalisation has been interpreted as syllabic (Watters 2003: 235). However, there is strong evidence that this interpretation is not suitable for Wushi. Rather, prenasalisation in Wushi is interpreted as a modification of the consonant. There are two arguments for this.

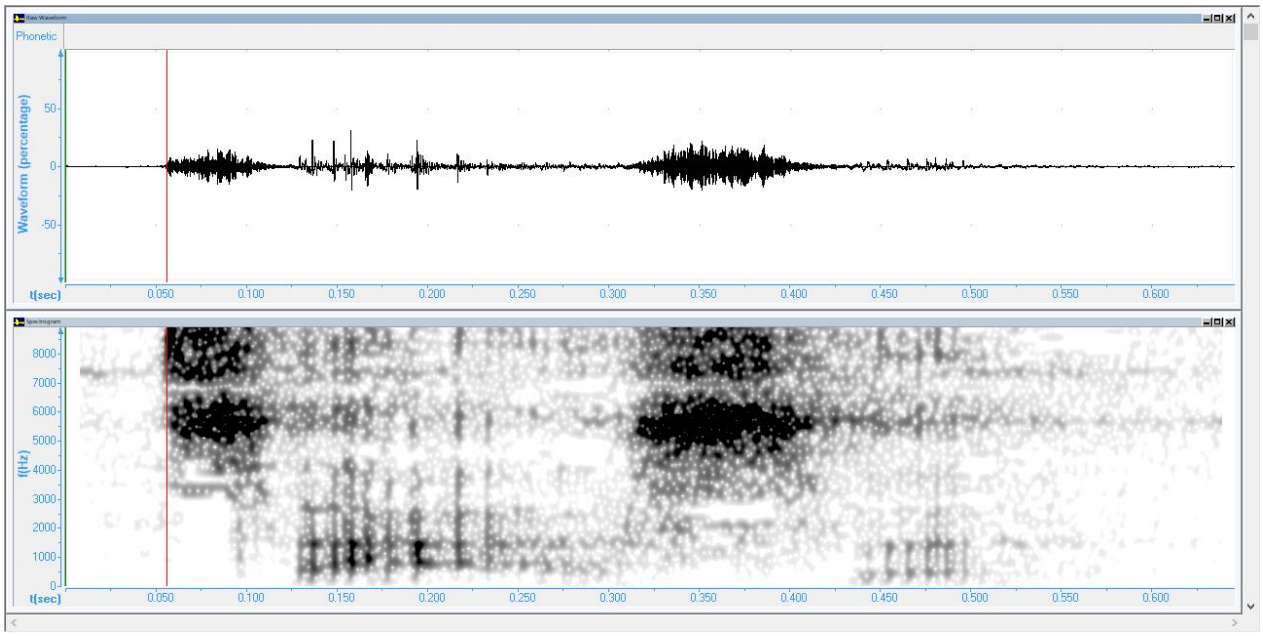
Firstly, in some Grassfields Bantu languages where prenasalisation is interpreted as syllabic, not only is there assimilation of the nasal to the place of articulation of the consonant, but there is also assimilation of the consonant to the voicing of the nasal. Thus, in these languages there is neutralisation of voiceless consonants, so that voiceless consonants become voiced when they are prenasalised (Watters 2003: 236). Besides spreading of the *voicing* from the nasal to the consonant, there can also be spreading of *occlusion*. An example of this is in Ngomba where [ɣ] becomes [g] and [l] becomes [d] following a nasal (Scott Satre, personal communication). These processes are not evident in Wushi.

In Wushi however, prenasalisation is voiceless when preceding voiceless consonants and voiced when preceding voiced consonants. This proves that it is the consonant which affects the (voicing of the) nasal, and not vice versa. This is demonstrated in the data below, where phonetic transcriptions of nouns show the distinction between voiceless and voiced prenasalisation:

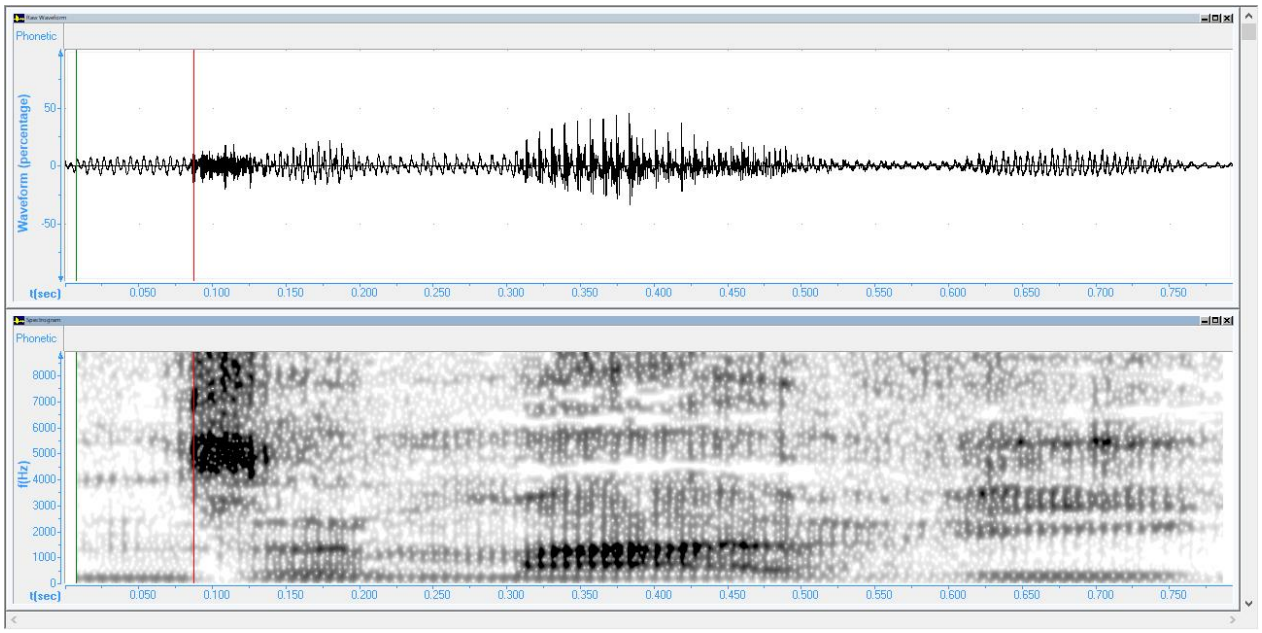
Voiceless prenasalisation:	[n̥tɔ̀ɔ̀kə̀]	‘elephant’
	[n̥tsà?]	‘palm bird’
	[ŋ̊kɛ̀?]	‘drum’
	[ɱ̊fú?]	‘bee’
Voiced prenasalisation:	[ndâ?]	‘compound’
	[ndzə̀]	‘dress’
	[ŋgáákə̄]	‘glutton’
	[ɱvó]	‘python’

NB The labiodental nasal [ɱ] above is not a distinctive segment. It is only found as prenasalisation, and since prenasalisation is always homorganic to the consonant it precedes, its place of articulation is conditioned solely by its environment.

The distinction between voiceless and voiced prenasalisation can also be demonstrated with acoustic analysis; the displays below show this contrast using Speech Analyzer. The first example shows voiceless prenasalisation with the word [n̥tsà?sə̀] ‘palm birds’ and the second shows voiced prenasalisation with the word [ndzə̀má?vì] ‘dress (for woman)’.



[n̥tsà?sə̀] ‘palm birds’ – note the voicelessness of the [n̥] between the green and red lines



[ndzə̀má?vì] ‘dress (for woman)’ - note the voicing of the [n] between the green and red lines

This assimilation of the voicing of the prenasalisation to the voicing of the root-initial consonant is also posited for Bamunka (Sorsamo 2006: 23). It could be argued that voiceless prenasalisation is very difficult to hear, and certainly the author sometimes struggled to transcribe it, but the language speaker would usually be aware of it and point out it was there. The Wushi speaker therefore seems to perceive the voiceless nasal. Further research is needed to determine what phonetic cues allow the Wushi listener to hear it.

It is important to note that the difference between voiceless and voiced prenasalisation is a phonetic difference and not phonemically contrastive; if prenasalisation is described as an archiphoneme, then voiceless prenasalisation can be considered as an allophone of voiced prenasalisation.

There is a second argument for interpreting prenasalisation as a modification of the consonant in Wushi. In other Grassfields Bantu languages where it is interpreted as syllabic, the prenasalisation usually has a grammatical function (Watters 2003: 234). If this is the case, the prenasalisation can be considered as a separate morpheme. The morpheme may be, for example, a noun class prefix or a verbal prefix such as a personal pronoun. In Wushi, however, the prenasalisation is simply a feature of the phonology and does not have any grammatical function. This may be the result of an historical process where grammatical morphemes have become lexicalised.

The consonants which can be prenasalised are shown below. Phonemically, prenasalisation is a modification of the consonant (realised as a consonant onglide). Phonetic data is used for examples, with non-prenasalised examples shown alongside, demonstrating that prenasalisation is contrastive:

/ᴺb/	[mbú?]	‘eagle’ (noun)	[bú?]	‘drum’ (verb)
/ᴺt/	[n̥tɨ́ɨ́]	‘advice’ (noun)	[tɨ́ɨ́]	‘put’ (verb)
/ᴺd/	[ndú?]	‘steal’ (verb)	[dū]	‘spoon’ (noun)
/ᴺk/	[ŋ̊ká]	‘latrine’ (noun)	[ká]	‘fry’ (verb)
/ᴺg/	[ŋgɨ̀?]	‘groundnuts’ (noun)	[gɨ̄]	‘voice’ (noun)
/ᴺf/	[m̥fíí]	‘ring’ (noun)	[fíkə́]	‘viper’ (noun)
/ᴺv/	[m̥vó]	‘python’(noun)	[vóókə̄]	‘owl’ (noun)
/ᴺts/	[n̥tsó?kə̄]	‘pestle’ (noun)	[tsó]	‘tether’ (verb)
/ᴺdz/	[ndzə̀]	‘dress’ (noun)	[dzə̄]	‘fast’ (verb)

/ᴺtʃ/	[n̥tʃɨ̀ə̀kə̀]	‘pan’ (noun)	[tʃɨ̀ə̀ʔ]	‘salt’ (noun)
/ᴺdʒ/	[ndʒɨ̀ə̀ʔ]	‘seed’ (noun)	[dʒɨ̌]	‘come’ (verb)

Most nouns in Wushi have noun class suffixes rather than prefixes, so the data with prenasalised nouns with prefixes (demonstrating the unchanged form of the prenasalisation) is limited. One example however is a noun with the plural prefix [wu-] as shown below:

[wù.n̥tsà?] /wu.ᴺtsaʔ/ ‘palm birds’

It is worth noting that the phonemes /s/ and /z/ do not appear in the list above of consonants that can be prenasalised. There seems to be neutralisation of the contrast between /s, z/ and /ts, dz/ when there is prenasalisation. Mother tongue speakers in the Phonology Linguistics Workshop perceived prenasalisation to precede /ts/ and /dz/ but not /s/ or /z/. Hence whilst alveolar fricatives and their affricated counterparts are in contrast when non-prenasalised, they seem to lose this contrast when they are prenasalised. Amongst other Grassfields Bantu languages, it is common to find that /z/ can have nasal onglides while /s/ cannot (Anderson, personal communication).

2.3.2 Palatalisation of consonants

As discussed in section 2.2.2 above, the vowel [i], which is phonetically similar to the approximant [j], is interpreted as palatalisation of the preceding consonant when it is followed by another vowel.

The consonants which can be palatalised are shown below. Phonemically, palatalisation is a modification of the consonant. Phonetic data is used for examples, with non-palatalised examples shown alongside, demonstrating that palatalisation is contrastive:

/bʲ/	[bjɔ́ɔ́ká]	‘funnel’ (noun)	[bɔ́ɔ́kā]	‘canoe’	(noun)
/tʲ/	[tjé]	‘call’ (verb)	[té]	‘stop’	(verb)
/dʲ/	[ndjó]	‘till’ (verb)	[ndó]	‘bite’	(verb)
/kʲ/	[kjé]	‘separate oil/water’ (verb)	[ké]	‘award’	(verb)
/fʲ/	[fjé]	‘mosquito’ (noun)	[fé]	‘sell’	(verb)

/vʲ/	[vjó]	‘resurrect’ (verb)	[vo]	‘ten’(cardinal no.)	Surface tone missing
/mʲ/	[mjɛ́ʔ]	‘throw’ (verb)	[mɛ̀ʔkə̀]	‘grasshopper’ (noun)	
/nʲ/	[njáʔ]	‘tiptoe’ (verb)	[ná]	‘cook’ (verb)	

It is worth noting that /gʲ/ is not included in the list above. There are not any examples of [gi] or [gj] followed by another vowel in the data. Thus, the absence of the palatalised /g/ could be due to insufficient data (especially due to the size of the corpus). Further research is needed to prove or disprove the palatalised /g/ as a contrastive modification of /g/.

Another ambiguity is the status of the palatalised /dʒ/ as a contrastive modification of /dʒ/. There is one example of a palatalised /dʒ/ in the data:

[dʒjɛ́] /dʒʲɛ/ ‘press down’ (verb)

However, the database does not have any unpalatalised examples which prove the contrast. Thus further research and additional data is needed to prove or disprove /dʒʲ/ as a contrastive modification of /dʒ/.

2.3.3 Labialisation of consonants

As discussed in section 2.2.2 above, the vowel [u], which is phonetically similar to the approximant [w], is interpreted as labialisation of the preceding consonant when it is followed by another vowel.

The consonants which can be labialised are shown below. Phonemically, labialisation is a modification of the consonant. Phonetic data is used for examples, with non-labialised examples shown alongside, demonstrating that labialisation is contrastive:

/bʷ/	[bwɔ]	‘beautiful’ (verb?) (tone missing)	[bɔ̌]	‘cover’ (verb)
/tʷ/	[twà]	‘burn’ (verb)	[tà?]	‘search’ (verb)
/dʷ/	[ndwá]	‘beg’ (verb)	[ndâʔ]	‘compound’ (noun)
/kʷ/	[kwɔ́ʔ]	‘climb’ (verb)	[kɔ́ʔ]	‘harvest’ (verb)
/gʷ/	[ŋgwɔ̀ʔ]	‘stone’ (noun)	[ŋgɔ̀ɔ̀kə̀]	‘plantain’ (noun)

/fʷ/	[fwà]	‘king’ (noun)	[fa]	‘thing’ (noun) (tone missing)
/tʃʷ/	[tʃwɔ̀]	‘appreciate’ (verb)	[tʃɔ́ʔ]	‘talk’ (verb)
/nʷ/	[nwááfə̀]	‘bird’ (noun)	[ná]	‘cook’ (verb)
/ŋʷ/	[ŋwɔ́ʔ]	‘pinch’ (verb)	[ŋɔ̀]	‘we’ (1PL inclusive pronoun)
/jʷ/	[jwí]	‘buy’ (verb)	[jí]	‘forehead’ (noun)

It is worth noting a couple of ambiguities. Firstly, /dʒʷ/ is not included in the list above, because there is insufficient data to include it. There is a labialised example in the database:

[ndʒwéʔfə́] /ᴺdʒʷeʔfə/ ‘robin’ (noun)

However, there is no unlabialised example in the data which proves the contrast. Thus further research and more data is needed to prove or disprove /dʒʷ/ as a contrastive modification of /dʒ/.

Secondly, /mʷ/ is not included in the list above, because again there is no unlabialised example which proves that labialisation is a contrastive feature. There is one labialised example in the database:

[mwɔ] /mʷɔ/ ‘one’ (cardinal no.) NB Surface tone missing in data

Again, further research and more data is needed to prove or disprove this phoneme /mʷ/ as a contrastive modification of /m/.

2.3.4 Lengthening of vowels

Vowel length is contrastive in Wushi. The data below shows length as a contrastive modification of the vowel; for each of the vowel phonemes, examples are given with first the short and then the long vowel.

/i/	[mǐ]	‘swallow’ (verb)	[mìì]	‘arrow’	(noun)
/e/	[ndzé]	‘hippopotamus’ (noun)	[dzèě]	‘up-root’	(verb)
/ɛ/	[bɛ́]	‘hate’ (verb)	[bɛ́ɛ́kə̄]	‘corn porridge’	(noun)

/ɨ/	[n̥tɨ́]	‘advise’ (verb)	[tɨ́ɨ́]	‘put’ (verb)
/ə/	[bvə̀]	‘fall’ (verb)	[bvə́ə́]	‘shiver’ (verb)
/a/	[ká]	‘fry’ (verb)	[káá]	‘tie’ (verb)
/u/	[túkə̄]	‘head’ (noun)	[n̥túúkə̄]	‘pick-axe’ (noun)
/o/	[tsò]	‘knit’ (verb)	[tsòò]	‘whisper’ (verb)
/ɔ/	[mbɔ̀]	‘stick’ (noun)	[mbɔ́ɔ̀]	‘man’ (noun)

Short vowels are much more common than long vowels; there are approximately five times as many short vowels as long vowels in the database.

Of the three most closely related languages, Babungo has contrastive vowel lengthening for eight of its nine vowels (Schaub 1985: 276), Bamunka has contrastive vowel lengthening for four of its eight vowels (Sorsamo 2006: 25), and in Bamessing (DeVries 2008: 15), vowel length was not found to be contrastive.

In Bamessing, vowel lengthening seems to be caused by changing tone patterns, where a level tone on a short vowel changes to a contour tone on a long vowel (DeVries 2008: 15). Thus tone, rather than vowel length, is considered to be the contrastive modification in Bamessing. However, in Wushi, there is evidence that vowel lengthening itself is contrastive. Take, for example, this data from the list above:

/u/	[túkə̄]	‘head’ (noun)	[n̥túúkə̄]	‘pick-axe’ (noun)

In this data, the surface tone of the first syllable in both words is level high; there is no change to a contour tone when the vowel is lengthened. This, and the number of long vowels with level tones shows that the Bamessing tone rule is not true for Wushi.

In Wushi, vowel lengthening is more common with back vowels than front or central vowels. It is also more common with low vowels than high or mid vowels. Thus, the most common lengthened vowel in Wushi is the low back vowel /ɔ/.

Vowel lengthening does not happen in closed syllables. (The diphthong, though, is allowed in closed syllables – see sections 2.2.3, 3.1 and 3.1.2 – in Wushi, the diphthong does not pattern like lengthened vowels.) If the vowel is long, the syllable is open. If the vowel is short, the syllable may be either open or closed. Some examples are shown in the data below:

	Short vowel (closed syllable)		Long vowel (open syllable)	
/i/	[kíʔ]	‘flow’ (verb)	[kìì]	‘basket’ (noun)
/ɨ/	[nɗɨʔ]	‘deny/reject’ (verb)	[n̪tɨ́ɨ́]	‘advice’ (noun)
/ə/	[bvə̀ʔ]	‘bend’ (verb)	[bvə́ə́]	‘shiver’ (verb)
/o/	[fóʔ.kə̄]	‘leaf’ (noun)	[vóó.kə̄]	‘owl’ (noun)

Vowel lengthening is a common feature of Grassfields Bantu languages. A credible explanation for vowel lengthening in these languages is historical: over time, languages have lost their root final consonant (the syllable coda) and so the syllable nucleus has lengthened (Watters 2003: 245). This would certainly corroborate the phonology of Wushi. In Wushi, the only syllables which have kept their final consonant (i.e. syllables ending with a glottal plosive) do not have lengthening of the vowel. It is thus possible that syllables in Wushi with a lengthened vowel may have had a short vowel and a coda consonant in the past. It is difficult to say with certainty what these consonants were, but looking at the coda consonants of closely related languages, it would be reasonable to postulate that nasals were present historically in Wushi's syllable coda. Both Babungo and Bamessing have retained the nasal /ŋ/ in their syllable coda (Schaub 1985: 273, DeVries 2008: 5). Interestingly, Bamunka has nasalised vowels which probably result from historical syllable-final nasal consonants (Sorsamo 2006: 27). Welmers (1973: 52) states that many Niger-Congo languages do not permit word-final consonants and in those that do, nasals seem to be the most common.

3 Syllable structure

3.1 Lexical roots

For verb and noun roots in Wushi, the canonical syllable structure is as follows:

$^{(N)}C^{(j)(w)}V(V)(C)$

$^{(N)}$	Prenasalisation
C	Consonant
$^{(j)}$	Palatalisation
$^{(w)}$	Labialisation
V	Vowel
$^{(\ )}(\ )$	Optional elements

Verb and noun root syllables in Wushi can be divided into light syllables and heavy syllables. A light syllable consists of a consonant (which may be modified both with prenasalisation and palatalisation or labialisation) and a short vowel. A heavy syllable has a heavier nucleus: either a long vowel (and no syllable coda) or a diphthong (which may or may not have a syllable coda). In Wushi, the diphthong is the only kind of /VV/ to occur in closed syllables. A syllable with a short vowel and a coda consonant will also be considered as a heavy syllable for now, although this analysis is discussed further in section 3.1.3.

All the possible syllable patterns are shown below. An example of each syllable pattern is given with both the phonetic and phonemic transcriptions. Note that since prenasalisation is always homorganic to the consonant it precedes, it can be transcribed phonemically as /ᴺ/ regardless of its phonetic place of articulation.

LIGHT	CV	[té]	/te/	‘palm tree’
	ᴺCV	[mbɔ̏]	/ᴺbo/	‘ox’
	CʲV	[kjó]	/kʲo/	‘crack’
	CʷV	[kwɔ̌]	/kʷɔ/	‘like/love’
	ᴺCʲV	[ndjó]	/ᴺdʲo/	‘till’ (prepare farmland)
	ᴺCʷV	[ŋ̍kwɔ́]	/ᴺkʷɔ/	‘leg’
HEAVY	CVV	[bàà]	/baa/	‘cup’
	ᴺCVV	[n̥tʃɔ̀ɔ̀]	/ᴺtʃɔɔ/	‘drier’ (for meat)
	CʲVV	[tjɔ́ɔ́.kə̄]	/tʲɔɔ.kə/	‘calabash’
	CʷVV	[nwáá.fə̄]	/nʷaa.fə/	‘bird’
	ᴺCʲVV	[ŋ̍kjɔ̀ɔ̀]	/ᴺkʲɔɔ/	‘gong’
	ᴺCʷVV	NO EXAMPLE IN DATA		
	CVC	[kpáʔ]	/kpaʔ/	‘think’
	ᴺCVC	[mbúʔ]	/ᴺbuʔ/	‘eagle’
	CʲVC	[tjéʔ]	/tʲeʔ/	‘push’

C^wVC	[twɔ́ʔ]	/$t^wɔ$ʔ/	‘walk’
$^NC^jVC$	[ndjɛ́ʔ]	/$^Nd^jɛ$ʔ/	‘lick’
$^NC^wVC$	[ŋgwɔ̃ʔ]	/$^Ng^wɔ$ʔ/	‘stone’
CVVC	[lɨ́ə́ʔ]	/lɨəʔ/	‘cry’ (women)
^NCVVC	[ŋ̊kɨ̀ə̀ʔ]	/^{N}kɨəʔ/	‘rooster’

It is worth noting that the following syllable pattterns are not possible: C^jVVC, C^wVVC, $^NC^jVVC$, $^NC^wVVC$. Thus a closed syllable /CVVC/, i.e. a syllable with the rhyme /ɨəʔ/, cannot have a palatalised or labialised consonant in the syllable onset. The onset consonant can however be prenasalised, as shown in the last example [ŋ̊kɨ̀ə̀ʔ] ‘rooster’ above.

3.1.1 Interpretation of long vowels as sequence

If a particular vowel, when lengthened, is functioning phonologically as a single tone-bearing unit, we would expect to find an example of that vowel in its short form with the same tone pattern. However, there is some data where this is not the case, as shown below:

[íì]	Short vowel with same tone [î] *does not exist* in data	Must be sequence /íì/
[ɔ́ɔ̀]	Short vowel with same tone [ɔ̂] *does not exist* in data	Must be sequence/ɔ́ɔ̀/

In these examples, the components of the long vowels can also occur independently of each other, i.e. there are separate examples of [í], [ì], [ɔ́] and [ɔ̀] in the data. However, there are no examples of short vowels with the same tone pattern as there is on the long vowel, i.e. [î] or [ɔ̂].

However there is other data with evidence of the same tone pattern on both long and short vowels, as shown below:

[ɔ́ɔ̄]	[wɔ́ɔ̄]	‘spear’	Short vowel with same tone: [ɔ̄]	[kɔ́] ‘bride price’
[úū]	[ndúū]	‘song’	Short vowel with same tone: [ū]	[dū́] ‘spoon’

Thus complex (contour) tones can sometimes occur on short vowels. Given though that examples such as [íì] and [ɔ́ɔ̀] are not found on short vowels, and the fact that /CVV/ is attested in the syllable structure (see section 3.1), long vowels will be analysed as a

sequence rather than as a unit. However, further research (with more data) on the relationship between vowel length and tone could help to prove or disprove this analysis.

3.1.2 Interpretation of [ɨə] as sequence

As already discussed in section 2.2.3, there is only one phonemic diphthong in Wushi: /ɨə/. All other examples of [VV] either are a lengthened vowel or have an ambiguous [i] or [u] as the first vowel which is interpreted as palatalisation or labialisation.

As the other phonetic diphthongs [iV] and [uV] have been interpreted phonemically as /^{j}V/ and /^{w}V/, it would be tempting to interpret [ɨə] in a similar way. It could be argued that /ɨ/ is similar phonologically to /i/ and /u/ as all three phonemes are high vowels. Besides, an interpretation of [ɨə] where [ɨ] is a modification of the preceding consonant would eliminate the /CVVC/ syllable which seems very heavy, for example, [lɨ́ʊ́ʔ] /lɨəʔ/ ‘cry’. Such an interpretation would postulate that palatalisation has more backness when preceding [ə], giving this rule:

Cj → Cɯ̟ / _ ə

(where ɯ̟ is the velar approximant which corresponds to the vowel ɨ)

However, there are several reasons why such an interpretation does not seem plausible:

1. If palatalisation has more backness when it precedes /ə/, and is realised as [ɯ̟ə] rather than [jə], then why does the same not happen to palatalisation when it precedes other vowels with even more backness, like [kjó] ‘crack’ or [ŋ̊kjɔ̀ɔ̀] ‘gong’?
2. The [ɨ] in [ɨə] doesn’t function like the [i] in [iV] or the [u] in [uV]. [i] and [u] are unrestricted in the vowels that can follow them, whereas [ɨ] can only be followed by one vowel [ə].
3. The approximant /ɯ̟/ corresponding to the vowel /ɨ/ is not found on the Wushi consonant chart, whereas the other high vowels /i/ and /u/ do have corresponding consonant phonemes: /j/ and /w/.

It is also interesting to note that this diphthong /ɨə/ is composed of the two vowels which are most phonemically similar on the vowel chart (see section 2.2.1).

Further research and data, as well as comparison with other Grassfields Bantu languages, would be useful to test this interpretation of /ɨə/ as a sequence. However, unless further studies produce better evidence, /ɨə/ can be considered as a diphthong where the first vowel is a true vowel rather than a modification of the preceding consonant.

3.1.3 Syllable weight

If /iə/ is indeed a sequence of two vowels – a true diphthong – then we have some rather heavy syllables in the data:

CVVC:	[gɨ́ə̀ʔ]	/gɨəʔ/	‘grind’
	[ŋ̊kɨ̀ə̀ʔ]	/ⁿkɨəʔ/	‘rooster’

In moraic theory, this CVVC pattern would usually be analysed as having three morae; the syllable nucleus with the diphthong having two morae and the coda consonant having one mora. This would constitute a superheavy syllable. (A syllable with one mora is light, with two morae is heavy and with three is superheavy.)

However, it is worth noting that the Wushi syllable coda is quite unique in that it can only be occupied by one phoneme in the consonant inventory; the glottal stop. Does this glottal stop really carry weight in the syllable? Peterson (2004: 14) states that ‘glottal approximants which result in compensatory lengthening are predicted to be moraic, while glottal stops whose deletion does not trigger compensatory lengthening are predicted to be weightless’. In Wushi, the glottal stop does not result in vowel lengthening; in fact, vowel lengthening precludes a syllable final glottal stop (see section 2.3.4). Furthermore, deletion of the glottal stop does not trigger vowel lengthening, as shown in the data below:

Presence of glottal stop:	[lɨ́ə̀ʔ]	‘cry’ (verb)
Absence of glottal stop:	[lɨ̀ə̀]	‘tap (palm wine)’ (verb)

It could thus be argued that the glottal stop in Wushi is weightless. We could then reinterpret /CVVC/ i.e. /Cɨəʔ/ as having two morae rather than three, constituting a heavy (rather than superheavy) syllable. We would also need to reinterpret /CVC/ as a light (one mora) rather than a heavy (two morae) syllable.

Again, further research is needed to confirm or disprove this hypothesis that /ʔ/ is weightless in the Wushi syllable.

3.2 Noun morphology

Noun roots in Wushi are monosyllabic. Polysyllablic nouns usually fall into one of the following categories:

(1) Noun class affix

The noun root has a noun class affix which forms a separate (grammatical) morpheme. Wushi has seven segmental noun class affixes, six of which are suffixes (-sə, -kə, -ŋgə, -fə, -mə, -nə) and one of which is a prefix (wu-). Examples are shown below:

-kə (singular) suffix:	[kû?-kà]	/ku?-kə/	'cocoyam'
-mə (plural) suffix:	[ndzə́-mā]	/ᴺdzə-mə/	'flies'
wu- (plural) prefix:	[wù-fwá]	/wu-fʷa/	'kings'

(2) Compound noun

A compound noun is made up of a noun root plus at least one other noun (or verb) root. Examples are shown below:

Noun + noun:	Compound:	/tu-ᴺdɔ?-kə/	'roof'
		head-house-NC.suffix	
	Constituents:	/tu-kə/ 'head'	/ᴺdɔ?/ 'house'
		head-NC.suffix	
Noun + verb:	Compound:	/fa-zə-kə/	'food'
		thing-eat-NC.suffix	
	Constituents:	/fa-kə/ 'thing' (noun)	/zə/ 'eat' (verb)
		thing-NC.suffix	

(3) Loan word

Loan words in Wushi are usually borrowed from English, Cameroonian Pidgin or French. Examples are shown below (syllable breaks are indicated with a full stop):

/ma.ᴺgu/	'mango'	- from English
/sɔ.ᴺde/	'Sunday'	- from English
/mo.to/	'car'	- from Cameroonian Pidgin
/ba.tɔ̃/	'baton (de manioc)'	- from French (fermented cassava)

3.3 Verb morphology

Verb roots, like noun roots, are monosyllabic. Disyllabic verbs are made up of the verb root plus a verbal extension affix, i.e. they are polymorphemic. Research on the verb phrase is needed to ascertain the extent of the forms and functions of these verbal extensions.

Disyllabic verbs may also be formed from reduplication of the verb root, as shown in the examples below:

Monosyllabic:	/be/	‘sleep’	Disyllabic:	/be.be/	‘sleep soundly’
	/tʃaʔ/	‘weed’		/tʃaʔ.tʃaʔ/	‘weed quickly’

The reduplication acts as an intensifier, enhancing and giving additional emotional context to the verb it modifies.

Grammatical particles conveying person, tense, aspect and mood are not considered as affixes but as clitics; they have the form of affixes but function as discrete words. Some examples are shown below (TAM is the grammatical marker for tense-aspect-mood):

mə *wɔʔ* *gɛ*
1S TAM go
‘I intend to go.’

a ∅ *gɛ*
2S TAM go
‘You go.’

i *nɔ* *gɛ*
3S TAM go
‘He/she is (as we speak) going.’

Watters (2003: 234) confirms this, stating that ‘typical Bantu verbal prefixes for person and tense-aspect behave more like monosyllabic verbal clitics, separate from the verbal word, than affixes’.

Note that the above glossing is tentative; further research is needed on the tense-aspect-mood system in Wushi.

3.4 Grammatical markers

The syllable structure of verb and noun roots has already been discussed (section 3.1). This section will examine the syllable structure of grammatical markers in Wushi. Some of these grammatical markers have already been described in sections 3.2 and 3.3 above.

The syllable structure of grammatical markers in Wushi is:

$$^{(N)}(C)^{(W)}V(C)$$

All possible syllable patterns are shown below, with an example for each:

V	/i/	3S (PERSON)
CV	/ti/	NEGATION
^{N}CV	/^{N}gə/	NOUN CLASS SUFFIX
C^{w}V	/ŋ^{w}e/	3PL (PERSON)
CVC	/wɔʔ/	TAM MARKER

There are no vowel-initial lexical roots in Wushi (section 3.1), but this is not the case with grammatical particles, where a vowel-only syllable is possible. This is typical of related languages: ‘Many Niger-Congo languages have no initial vowels except for a few pronoun forms and other isolated morphemes which consist of only a vowel’ (Welmers 1973: 39).

No examples were found of grammatical markers with palatalised consonants or lengthened vowels. More data is needed to confirm that these are not part of the syllable structure of grammatical particles in Wushi.

3.5 Other word classes

Nouns and verbs form the bulk of lexical items in Wushi. This study has thus concentrated on examining phonological properties within these open word classes.

There is unlikely to be any significant number of lexical items in other word classes. For example, it is widely attested that not only in related languages, but Bantu languages as a whole, there is little justification in distinguishing adjectives used as verbs from verbs used as adjectives; what appear at first sight to be adjectives usually transpire to be verbs (Welmers 1973: 250).

However, future research on the grammar of Wushi would determine the presence (or absence) of adjectives, other noun modifiers, conjunctions, relatives and adverbs in the language. The syllable structure and other phonological properties of these word classes could be researched at that stage.

4 Tone

4.1 Tone analysis in related languages

The tone systems in Grassfields Bantu languages are extremely complex. The assumption that tones can and do persist even when the segmental substance of entire syllables is lost has been foundational to nearly all tone analyses in these languages during the past forty years (Watters 2003: 237).

Analyses of Grassfields Bantu languages have shown several recurring tone phenomena: tone grounding (where a floating tone must attach to a segment), tone spreading (for example, from a noun prefix to a noun root), tone lowering (for example, when a high-tone noun prefix is lowered following a low-tone-final verb) and tone simplification (where a tone sequence is simplified) (Watters 2003: 238).

Analyses vary as to the number of level tones present in these languages. Watters (2003: 237) states that Grassfields Bantu languages will have at least four level tones: high, mid, low that is level and low that falls. This statement in itself seems problematic; how can 'low that falls' be considered a 'level' tone? There are other questions; for example, is mid actually mid, or is it a downstepped high? (Historically, Grassfields Bantu languages are assumed to have simply had two underlying level tones; high and low.) It is therefore probable that Watters is referring to surface (or phonetic) tone in his statement about levels of tone.

A coherent approach to tone analysis makes clear distinction between surface tone which is phonetic and underlying tone which is phonemic. In this preliminary study of tone in Wushi, the surface tone on nouns and verbs is examined. Any discussion on underlying tone is tentative and subject to further research. Furthermore, marking surface tone on a large number of nouns and verbs is a painstaking process, and the author apologises in advance for any inaccuracies in the phonetic transcriptions.

It is worth noting that while we might expect Wushi to have similar tone patterns to other Grassfields Bantu languages for monosyllabic nouns (noun roots without affix), the tone patterns for disyllabic nouns (noun roots with affix) may be quite different. This is because noun morphology in Wushi is unlike most Grassfields Bantu languages. These languages

have noun class prefixes which normally have a low tone (Watters 2003: 236). Wushi's noun class affixes, however, are almost all suffixes. These may have a high tone since Wushi's closely related language Bamunka also has noun class suffixes, most of which have a high tone (Sorsamo 2006: 33,38).

4.2 Surface tone on nouns

Surface tone was marked phonetically on 250 nouns; 125 nouns in their singular form and the same 125 nouns in their plural form. Each noun was elicited in its citation form (i.e. in isolation, rather than in a frame).

4.2.1 Monosyllabic noun roots without affix

4.2.1.1 Surface tone patterns

Surface tone was marked on 70 monosyllabic nouns, i.e. monosyllabic noun roots with a non-segmental noun class affix. Five distinctive tone patterns were found. These are shown below, ordered from the most common to the least common. (See section 1.5.2 for surface tone notation.)

Surface tone pattern	*Examples*	
H	[bɨ́]	'hole'
	[m̥fóó]	'tilapia' (fish)
L falling	[bɛ̀ʔ]	'boundary'
	[gɨ̀]	'voice'
L	[tìʔ]	'mamba snake'
	[fə]	'chest'
HM	[kɔ̄]	'bride price'
	[ndúū]	'song'
HL	[bû]	'dove'
	[mbɔ́ɔ̀]	'man'

The level high tone is the most common in the data. The low falling, level low and high-mid patterns are also common. The high-low pattern is rare; the two examples shown are the only examples in the data (although further research with more data may produce more examples).

An area of ambiguity is the level low (L) category. This may actually be closer to level mid (M). Unfortunately due to field work being unexpectedly cut short, rechecking of this data was not possible. Further research is therefore needed to confirm that the level low category is indeed this, and not level mid.

4.2.1.2 Evidence of phonemic contrast between surface tone patterns

The surface tone patterns described in section 4.2.1.1 above are contrasted in the examples below. The only minimal pair is for the contrast between H (level high) and L (level low). The other examples show contrast in analogous environments - further research and additional data is needed to find more minimal pairs to demonstrate convincing phonemic contrast between these other tone patterns.

Contrast between H and L falling:

H	[ndó]	‘husband’
L falling	[dô]	‘barrenness’

Contrast between H and L:

H	[n̪tsáʔ]	‘legal case’
L	[n̪tsàʔ]	‘palm bird’

Contrast between H and HM:

H	[n̪táʔ]	‘branch’
HM	[ndâʔ]	‘compound’

Contrast between H and HL:

H	[mbúʔ]	‘eagle’
HL	[bû]	‘dove’

Contrast between L falling and L:

L falling	[mbɨ̀ə̀]	‘shoulder’
L	[tʃɨ̀əʔ]	‘salt’

Contrast between L falling and HM:

L falling	[g̀ɨ]	‘voice’
HM	[ǩɨ]	‘pot’

Contrast between L falling and HL:

L falling	[ndzɔ̀ɔ̀]	‘back’
HL	[mbɔ́ɔ̀]	‘man’

Contrast between L and HM:

L	[n̩tsà?]	‘palm bird’
HM	[ndá?]	‘compound’

Contrast between L and HL:

L	[n̩tʃɔ̀ɔ̀]	‘drier’ (for fish)
HL	[mbɔ́ɔ̀]	‘man’

Contrast between HM and HL:

HM	[dű]	‘spoon’
HL	[bû]	‘dove’

4.2.2 Monosyllabic noun roots with affix

4.2.2.1 Surface tone patterns

Surface tone was marked on 180 disyllabic nouns, i.e. monosyllabic noun roots with a noun class affix (usually suffix). Seven distinctive tone patterns were found. These are shown below, ordered from the most common to the least common. Noun class affixes are glossed NC.

Surface tone pattern	*Examples*	
H-M	[n̩tə́-fə̄] intestine-NC	‘intestine’
	[ŋgáá-ŋgə̄] glutton-NC	‘gluttons’
H-H	[n̩tíə́-fə́] iron-NC	‘iron’
	[ndzə́-sə́] dress-NC	‘dresses’

L-L	[ndə̀-kə̀] refugee-NC	‘refugee’
	[wù-tìʔ] NC-mamba.snake	‘mamba snakes’
HM-M	[fɨ́ɨ̄-kə̄] luck-NC	‘luck’
	[tʃɔ̃ʔ-ŋgə̄] language-NC	‘languages’
HL-L	[n̥tʃíî-ŋgə̀] cricket-NC	‘crickets’
	[níî-kə̀] nail-NC	‘nail’
L-HM	[wù-kjɔ́ʔ] NC-small.clay.pot	‘small clay pots’
	[wù-njɛ́] NC-buffalo	‘buffalo’ (plural)
L-HL	[wù-bû] NC-dove	‘doves’

The most common surface tone pattern by far on monosyllabic noun roots with an affix (i.e. disyllabic nouns) is the H-M pattern, i.e. high on first syllable and mid on second syllable. The H-H (high on both syllables) and L-L (low on both syllables) patterns are also very common. The HM-M and HL-L patterns are fairly common. The L-HM pattern is rare. The L-HL pattern only has one example in the data and thus more data is needed to confirm this as a regular surface tone pattern.

One area for further research is the L-L (low on both syllables) pattern. In Ngiemboon and other Grassfields Bantu languages, there is a contrast between a level low and a low falling on the second syllable (Anderson, personal communication). More research on surface tone on nouns is needed to confirm whether or not this contrast is also evident in Wushi.

4.2.2.2 Evidence of phonemic contrast between surface tone patterns

The surface tone patterns described in section 4.2.2.1 above are contrasted in the examples below. (The L-HL pattern whose status is unclear is not included.) The only minimal pair is for the contrast between H-M and HL-L. The other examples show contrast in analogous

environments; more data is needed to find additional minimal pairs to confirm that all these contrasts are phonemic.

Contrast between H-M and H-H:

H-M	[sə́-kə̄] hoe-NC	‘hoe’
H-H	[tsə́-ká] tree-NC	‘tree’

Contrast between H-M and L-L:

H-M	[ndjɔ́ɔ́-ŋgə̄] bat-NC	‘bats’
L-L	[ndjɔ̀-ŋgə̀] farm-NC	‘farms’

Contrast between H-M and HM-M:

H-M	[n̩tsá?-sə̄] legal case-NC	‘legal cases’
HM-M	[sá?-sə̄] cap-NC	‘caps’

Contrast between H-M and HL-L:

H-M	[bɔ́ɔ́-kə̄] canoe-NC	‘canoe’
HL-L	[bɔ́ɔ̀-kə̀] burial.cloth-NC	‘burial cloth’

Contrast between H-M and L-HM:

No examples in the data; there is no pair of nouns with the same word structure for these tone patterns.

Contrast between H-H and L-L:

H-H	[tʃɨ́ə́?-ká] palm.kernel-NC	‘palm kernel’
L-L	[n̩tʃɨ̀ə̀-kə̀] pan-NC	‘pan’

Contrast between H-H and HM-M:

H-H	[ɣóó-ká]	‘hawk’
	hawk-NC	
HM-M	[vóō-kə̄]	‘owl’
	owl-NC	

Contrast between H-H and HL-L:

H-H	[bjɔ́ɔ́-ká]	‘funnel’
	funnel-NC	
HL-L	[bɔ́ɔ̀-kə̀]	‘burial cloth’
	burial.cloth-NC	

Contrast between H-H and L-HM:

No examples in the data; there is no pair of nouns with the same word structure for these tone patterns.

Contrast between L-L and HM-M:

L-L	[ndzɔ̀ɔ̀-sə̀]	‘backs’
	back-NC	
HM-M	[mbɔ́ɔ̄-sə̄]	‘men’
	man-NC	

Contrast between L-L and HL-L:

L-L	[dɔ̀ɔ̀-kə̀]	‘bed’
	bed-NC	
HL-L	[bɔ́ɔ̀-kə̀]	‘burial cloth’
	burial.cloth-NC	

Contrast between L-L and L-HM:

L-L	[wù-n̪tsàʔ]	‘palm birds’
	NC-palm.bird	
L-HM	[wù-ndzɛ́]	‘hippos’
	NC-hippo	

Contrast between HM-M and HL-L:

HM-M	[ɣɔ́ʔ-kə̄]	‘bark’
	bark-NC	
HL-L	[kûʔ-kə̀]	‘cocoyam’
	cocoyam-NC	

Contrast between HM-M and L-HM:

No examples in the data; there is no pair of nouns with the same word structure for these tone patterns.

Contrast between HL-L and L-HM:

No examples in the data; there is no pair of nouns with the same word structure for these tone patterns.

4.2.3 Labelling of distinctive tone patterns

The tone patterns described in sections 4.2.1 and 4.2.2 above are the distinctive tone patterns found on nouns (i.e. noun roots both without and with a noun class affix). Further research is needed though to confirm whether or not all these patterns are contrastive.

How these distinctive tone patterns are labelled is also subject to further investigation. As already discussed in section 4.2.1.1, further checking of the data is needed to confirm that the category labelled L (level low) is indeed that, and not M (level mid).

Where M is used in the data to refer to tone, it refers to surface tone. However, analysis of underlying tone may show that this is actually a downstepped high, rather than an underlying mid tone. In related languages, the mid tone is almost always the result of a downstep (Watters 2003: 237).

4.3 Surface tone on verbs

Surface tone was marked phonetically on 135 verbs (i.e. monosyllabic verb roots without any verbal extensions). The aim was to find a form of the verb which would reveal distinctive tone patterns - using a frame. The frame 'He has….' proved to be effective in finding these tone patterns – this frame is shown in the examples below, with a verb for each distinctive tone pattern:

í *ná?* *má?*
3S PFV contribute
'He has contributed.'

í *ná?* *gɛ̀*
3S PFV go
'He has gone.'

4.3.1 Surface tone patterns

Distinctive tone patterns for verbs were found to be much simpler than those for nouns; only two distinctive patterns were found. This two-way distinction for tone on verbs is found throughout Grassfields Bantu languages (Watters 2003: 236). Using the frame above (section 4.3), the surface tone on the verb was high for one group and low-rising for the other group.

Examples of these two distinctive tone patterns are shown below:

Surface tone pattern	*Examples*	
High	[bé?]	‘hide’
	[bɛ́]	‘hate’
	[bú?]	‘drum’
	[fé]	‘sell’
	[gɔ́?]	‘share’
	[ɣá]	‘jeer’
	[jé?]	‘see’
	[kí?]	‘flow’
	[kɨ́á]	‘dance’
	[tí]	‘squeeze’
Low rising	[bɔ̌]	‘play’
	[dzə̀]	‘fast’
	[fɔ̃]	‘sew’
	[gbɔ̌]	‘beat’
	[ɣɔ̀]	‘finish’
	[ʃù?]	‘wash’
	[kpà]	‘clear’
	[nə̀]	‘defecate’
	[pfə̃]	‘hit’
	[tà?]	‘search’

4.3.2 Evidence of phonemic contrast between surface tone patterns

The examples below demonstrate contrast between the two distinctive tone patterns for verbs. The first two sets of data are minimal pairs; the examples which follow show contrast in analogous environments.

High	[mí]	'fling'
Low rising	[mɨ̌]	'swallow'
High	[tsó]	'tether'
Low rising	[tsɔ̌]	'shoot'
High	[ɣɨ́ə́]	'work'
Low rising	[jɨ̀ə̀]	'sweep'
High	[ndúá]	'beg'
Low rising	[tùà]	'burn'
High	[tú]	'dig'
Low rising	[dǔ]	'plan'
High	[tʃɔ́ʔ]	'talk'
Low rising	[tʃùɔ̌]	'appreciate'

4.3.3 Labelling of distinctive tone patterns

The two distinctive surface patterns for tone on verbs have been called 'high' and 'low rising'. All verbs can be divided into these two categories. The underlying tones of the two categories are, though, a matter for further research. Their phonetic realisations depend on the grammatical context of the verb. Underlyingly, the verbs roots are likely to be all just high or low, as with other Grassfields Bantu languages.

Further research is also needed on the verb phrase, to examine verbal extensions in Wushi and investigate tone on disyllabic verbs (i.e. verbs with a monosyllabic root plus a verbal extension.)

4.4 Lexical tone and grammatical tone

Sections 4.2 and 4.3 above, examining surface tone on nouns and verbs, are describing lexical tone.

Noun phrase and verb phrase studies are needed to investigate grammatical tone in Wushi. Grammatical markers in Grassfields Bantu languages are often only marked by a floating tone (tonal morpheme), particularly verbal affixes (Watters 2003: 237).

Examining how surface tone on the noun or verb changes depending on its context within a phrase can reveal useful information about underlying tone behaviour in the language, both lexically and grammatically.

5 Conclusion

5.1 Summary of findings

Wushi has 26 consonant phonemes, of which eight are plosives, five are fricatives, six are affricates, four are nasals and three are approximants. Many of these consonants can have optional contrastive modifications in the form of prenasalisation, palatalisation or labialisation. The consonant plus contrastive modification is analysed as a complex unit rather than as a sequence of two consonants. Prenasalisation of consonants in Wushi is non-syllabic.

Wushi has nine vowel phonemes. Vowel quality can be described either in terms of vowel height (three high, three mid and three low) or vowel frontness/backness (three front, three central and three back). There is only one diphthong in Wushi, which is /ɨə/. Vowel lengthening is a contrastive modification of the vowel and is analysed as a sequence rather than as a unit.

Syllables in Wushi are mostly open. The only consonant possible in the syllable coda is the glottal plosive /ʔ/. Closed syllables ending with the glottal plosive can only have a short vowel or the diphthong. Lengthened vowels are therefore restricted to open syllables.

Surface tone on nouns was found to fall into five distinctive tone patterns for noun roots *without* an affix, and seven distinctive tone patterns for noun roots *with* an affix. Surface tone on verbs was found to fall into two distinctive tone patterns.

5.2 Contrasts with related languages

Wushi is more restricted than other Grassfields Bantu languages in its syllable coda. Related languages can often have a nasal in this position, whereas only the glottal plosive is found in the syllable coda in Wushi.

Another contrast is that Wushi has a more comprehensive set of fricatives and affricates (particularly affricates) than related languages. Wushi has six affricates whereas the most closely related languages Babungo, Bamunka and Bamessing only have either one or two. The affricates /pf/ and /bv/ which are found in Wushi are not found in any of these three languages. The phoneme /pf/ is often found in Grassfields Bantu languages, but it is uncommon that /bv/ is also phonemic (Scott Satre, personal communication).

Vowel quality in Wushi is similar to that in other Grassfields Bantu languages, as well as in the most closely related (South Ring) languages. However, vowel length was found to be contrastive for all nine of the vowel phonemes in Wushi, unlike the other South Ring languages, where vowel length is not necessarily contrastive for all vowels.

Surface tone on noun roots (without an affix) for Babessi's most closely related language, Bamunka, shows quite different distinctive patterns. The five distinctive patterns in Wushi are high, low falling, low, high-mid and high-low. The six distinctive patterns in Bamunka are high, low, high-low, low-high, high-low-high and low-high-low.

Morphologically, nouns in Wushi are quite different to those in most Grassfields Bantu languages, which have noun class prefixes. Of Wushi's seven segmental noun class affixes, six are suffixes.

5.3 Questions which remain

- *Are noun class suffixes the remnant of noun class prefixes?*
  Over time, Bantu noun class prefixes can take other forms; for example, in languages where they have become syllabic nasals (Welmers 1973: 40). Are noun class suffixes in Wushi derived from historic prefixes? In data such as [n̩tɔ̀ɔ̀-kə̀] 'elephant', where [-kə̀] is the noun class suffix, the initial nasal is clearly *not* a syllabic nasal derived from an historic noun class prefix; the noun class marker is word-final. Is it possible that the [-kə̀] was historically a word-initial [kə̀-]?
- *Why is there only one diphthong in Wushi?*
  The diphthong /iə/ seems incongruent in the data; there are no other diphthongs in Wushi. All other vowel combinations are interpreted such that the first vowel is labialisation or palatalisation of the preceding consonant. A further question concerns how the diphthong /iə/ can be followed by a glottal plosive; this is the

only type of syllable where there is a vowel sequence in a closed syllable, which leads to questions about syllable weight.
One possible explanation for the /iə/ diphthong is that the vowels /i/ and /ə/ have come together in words where previously they were connected with a consonant. An example of this is in the word [n̥tʃíə-fə] 'finger' which is also sometimes pronounced [n̥tʃíɣə-fə]. Is the [ɣ] in this word disappearing over time, so that the vowels [i] and [ə], previously in separate syllables, are now coming together? This collapsing of a two-syllable root into a one-syllable root is typical of Grassfields Bantu languages.

- *Why are some of the consonant phonemes so scarce?*
  The phonemes /kp/, /gb/ and /ŋm/ are rare. It is possible that these labiovelars are losing their phonological status as phonemes. Rather than maintaining double-articulation, they are increasingly realised as a contrastive modification (labialisation) of a more stable consonant phoneme.
- *Could [tʃ] and [dʒ] be reanalysed as contrastive modifications of /ts/ and /dz/?*
  The phones [tʃ] and [dʒ] have been analysed in this paper as phonemes: /tʃ/ and /dʒ/. However, another possible interpretation of [tʃ] and [dʒ] would describe them as palatalised contrastive modifications of /ts/ and /dz/. This would pattern with the set of consonants which are already attested as having palatalisation as a contrastive modification. Furthermore, it would eliminate two phonemes from the consonant inventory.
- *Are long vowels really a sequence, or are they a unit?*
  Vowel length in Wushi is contrastive and in this paper long vowels have been analysed as a sequence. Further investigation of the relationship between tone and vowel length however is needed to confirm this; more data with surface tone marked on both long and short vowels is needed.
- *How can surface tone on nouns and verbs be analysed in Wushi?*
  Research on the noun phrase and verb phrase in Wushi is needed to establish underlying tone patterns for nouns and verbs. Any proposals for tone orthography will be dependent on this research.

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