Voicing on the fringe: towards an analysis of 'quirky' phonology in Ju and beyond

Lee J. Pratchett

Abstract

The binary voice contrast is a productive feature of the sound systems of Khoisan languages but is especially pervasive in Ju (Kx'a) and Taa (Tuu) in which it yields phonologically contrastive segments with phonetically complex gestures like click clusters. This paper investigates further the stability of these 'quirky' segments in the Ju language complex in light of new data from under-documented varieties spoken in Botswana that demonstrate an almost systematic devoicing of such segments, pointing to a sound change in progress in varieties that one might least expect. After outlining a multi-causal explanation of this phenomenon, the investigation shifts to a diachronic enquiry. In the spirit of Anthony Traill (2001), using the most recent knowledge on Khoisan languages, this paper seeks to unveil more on language history in the Kalahari Basin Area from these typologically and areally unique sounds.

Keywords: Khoisan, historical linguistics, phonology, Ju, typology

Introduction

A phonological voice distinction is common to more than two thirds of the world's languages: whilst largely ubiquitous in African languages, a voice contrast is almost completely absent in the languages of Australia (Maddison 2013). The particularly pervasive voice dimension in Khoisan[1] languages is especially interesting for two reasons. Firstly, the feature is productive even with articulatory complex combinations of clicks and other ejective consonants, gestures that, from a typological perspective, are incompatible with the realisation of voicing. Secondly, these phonological contrasts are robustly found in only two unrelated languages, Taa (Tuu) and Ju (Kx'a) (for a classification see Güldemann 2014). It was Anthony Traill (2001) who highlighted the numerous parallels in the phonologies of these two genealogically unrelated languages, notably in the cross-lexical frequency of these typologically and areally 'quirky' segments. Traill concluded that such similarities, although not necessarily evidence of a mutual genealogical history, are beyond the realms of chance.

This paper is structured as follows. A general phonetic-phonological overview of different click phonemes and voicing in Khoisan languages is given in Section 1 (see Güldemann & Nakagawa, this volume, for a more thorough account), followed in Section 2 by an overview of the feature in the most well-described Ju variety, Tsumkwe Jul'hoan. In Section 3, the description is extended to under-described varieties located on the language's southeastern periphery. This is significant not only because it fills a gap in the linguistic record, but the it is the only region where all three Khoisan lineages meet in the 'Central Kalahari' contact area (cf. e.g., Traill & Nakagawa 2000; Güldemann 2014: 18-9). Section 4 is concerned with how the results of the investigation in Section 3, as well as new research in the field of Khoisan linguistics, can be put to furthering an understanding of language dynamics and language history in the Kalahari Basin. To that end, two hypotheses that attempt to explain the pervasiveness of voice feature with complex segments are discussed and evaluated. This is followed by a summary of the main conclusions.

1. Some remarks on the voicing of different stops in Khoisan languages

Güldemann's (2001) phonologically-inspired framework that integrated egressive and ingressive stops into a single class of consonants was the first attempt to move beyond viewing clicks as inherently different from other consonants. A significant aspect of Güldemann's framework is the differentiation of stops based on their degree of phonetic elaboration, defined as either 'simple', 'complex', or as forming a 'cluster' (cf. Traill 1985). This is detailed in Table 1.

As with all other consonant classes, stops can be distinguished in terms of the voice dimension – voiceless ('plain') versus voiced – which is compatible with all three stop subclasses. However, voicing with complex clicks and click clusters is

1. The term 'Khoisan' is employed throughout as a convenient linguistic designation of the non-Bantu click languages of southern Africa that implies neither genealogical unity of the languages concerned nor a shared cultural identity of people who speak them.

only robustly attested in two languages, namely Ju and Taa; however it has recently been suggested that, at least historically, the feature was more widespread (see Section 4).

Subclass	Definition	Example
"simple"	plain stop, i.e. no further phonetic elaboration	/!/
"complex"	plain stop elaborated by aspiration or glottalisation	/!ʰ !'/
"cluster"	bipartite segment consisting an "onset" and an "offset"	/!χ !qχ' !h/

Table 1. Tripartite classification of stops exemplified with the plain alveolar click**/!/** (Güldemann 2001, Nakagawa 2006)

Voicing with stops involves a negative voice onset time, referred to as 'voice lead' (Traill 1985: 145). In the case of voiced simple clicks, voicing begins during the consonantal closure and continues through the release of the click (Figure 1). Occasionally, the duration of the closure is brief enough for voicing to continue uninterrupted between the release of the closure and the onset of the vowel. In this case, the stop can be described as fully voiced.

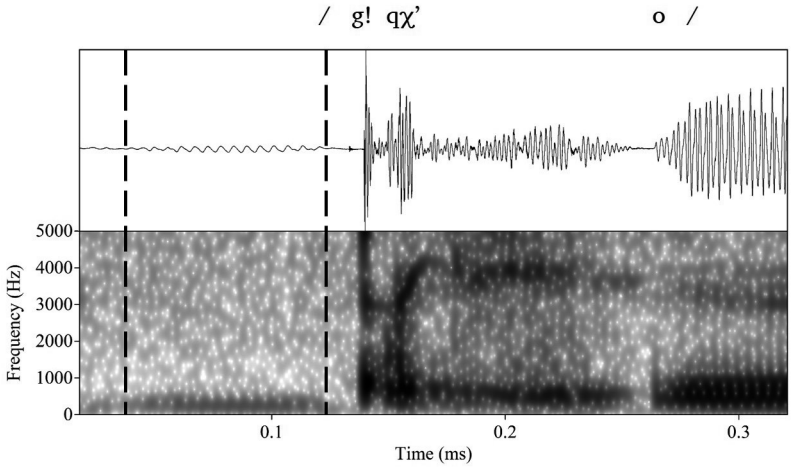


Figure 1. Waveform and spectrogram of **/g!au/** 'hand' (SE Ju) illustrating a voiced simple click. The bold dashed line indicates the beginning of voice bar ('voice lead').

In contrast to simple clicks, voiced complex clicks and click cluster segments cannot be described as 'fully voiced'. In most cases, voice lead is shorter in duration and becomes gradually weaker during the formation of the anterior closure of the click. It is not unusual for voicing to dampen out completely, resulting in a brief period of voicelessness prior to the release. Such voice discontinuity is particularly characteristic of voiced click clusters. This renders the segment into three distinct parts, namely a short period of prevoicing, a phonetically voiceless click onset, and a phonetically voiceless consonant offset (Figure 2).

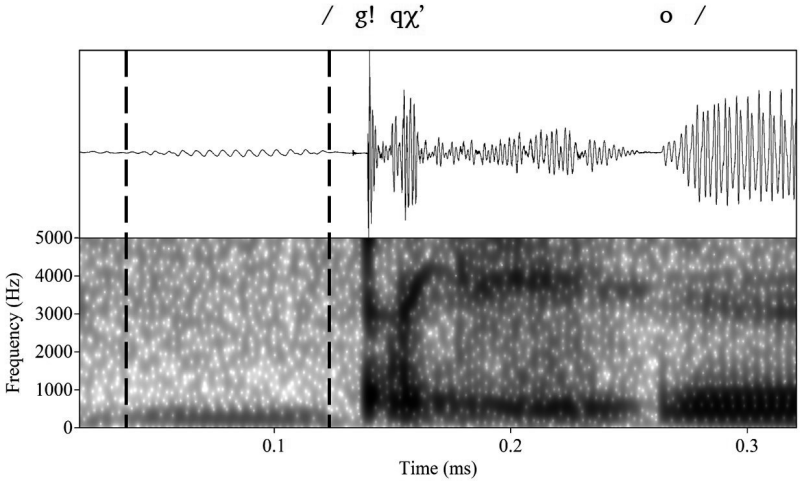


Figure 2. Waveform and spectrogram of **/g!qχ'oo/** 'be pregnant' (SE Ju) illustrating a voiced click cluster composed of a prevoiced alveolar click onset and a (voiceless) affricated uvular ejective offset. Bold dashed lines indicate the period of prevoicing.

Further to the variation described above, voicing in click clusters with a glottal stop or a glottal fricative offset – also known as 'delayed aspiration' (e.g. Ladefoged & Traill 1994) – is phonetically distinct from both of the other classes. This is because voicing is realised as nasal airflow, a phonetic detail associated with a lowered velum during the posterior closure (e.g. Traill 1985, 1991; Nakagawa 2006: 171,183). This mechanism is called 'nasal venting' which is present in both in the voiceless series and, in the languages which exhibit them, the voiced series. In the phonologically voiceless clusters, nasal venting is usually audible if the click is preceded by a vowel, as noted by Nakagawa (2006) and Gerlach (2016) for G|ui and N!aqriaxe, respectively.

In the case of voiced clusters featuring the glottal stop or glottal fricative offsets, voicing is realised distinctly as a 'nasal murmur'. Unlike other click cluster segments, voicing in clusters composed of the glottal stop or the glottal fricative continues through the posterior closure of the click and the release: in other words, voicing does not dampen out, as can be seen in Figure 3.

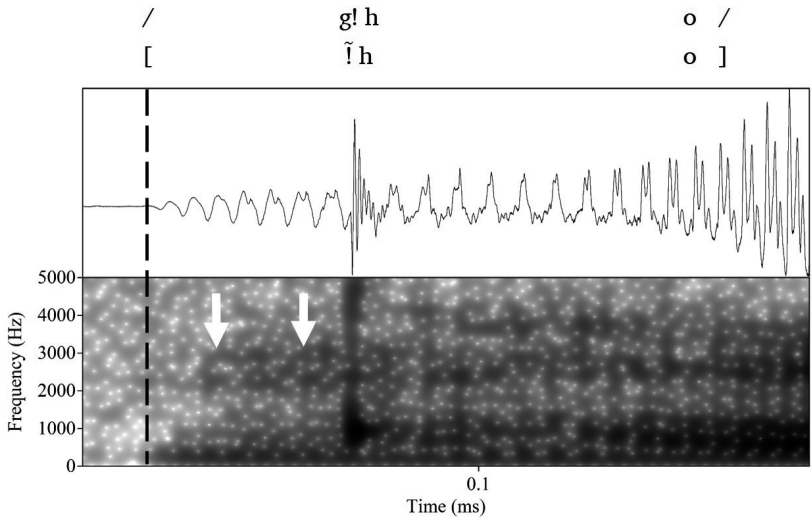


Figure 3. Waveform and spectrogram of **/n!homa/** 'tomorrow' (SE Ju) illustrating a voiced click cluster composed of a prevoiced alveolar click onset and a (voiceless) glottal affricate offset, **/g!h/** ('delayed aspiration'). The bold dashed line indicates the beginning of voice lead, which is realised as a distinctly audible 'nasal murmur'. This is indicated with white arrows.

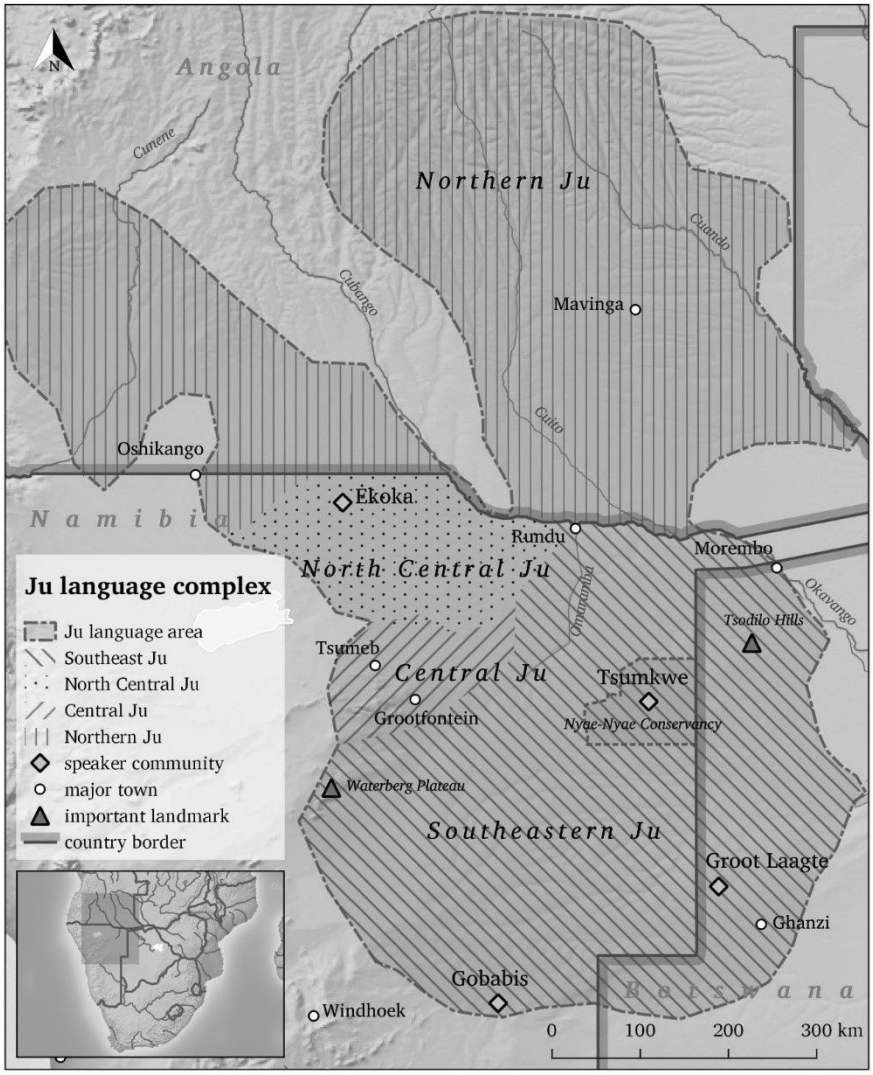
In light of the inherent articulatory variation and complexity involved in building extensive series of phonologically voiced contrasts, speaker-level variation seems almost inevitable. Thus, Sands (2010: 94f) remarks that nasalisation is a common strategy for maintaining and 'emphasising' voicing; and Miller-Ockhuizen (2003: 35f) observes that, amongst Tsumkwe Ju|'hoan speakers (SE Ju), maintaining fully voiced clicks is more predominant in male speakers than female speakers.

Having highlighted the essential phonetic and phonological details of voicing with different types of click phonemes, the next subsection provides an example of the pervasiveness of the voice contrast in Khoisan sound systems.

2. Voicing in the Ju language complex

The Ju language complex is one of two branches of the Kx'a family. Ju is spoken by communities of former hunter-gatherers in southern Angola, northern and northeastern Namibia, and northwestern Botswana (see Map 1).

The most widely adopted classification of Ju is based on Snyman's (1997) pan-Ju comparative phonological study which distinguished three main subgroups – Northern, Central, and Southeastern. The maintenance of the voice contrast with complex stops and cluster segments is one of the strongest isoglosses in Snyman's study: the further Snyman voyaged north-northwest through Namibia towards the Angolan border, the less robust the feature became (Snyman 1997: 27ff). In this paper, I follow Sands' (2010) who, using additional language data, identifies four subgroups, called Northern (N), North-Central (NC), Central (C), and Southeastern (SE) (cf. Heine & König 2015 for an alternative proposal).



Map 1. Ju language area (map credits: Simon Argus)

Ju varieties such as Tsumkwe Juǀ'hoan (SE) and Ekoka !Xun (NC) exhibit some of the largest phoneme inventories of all Khoisan languages, owed greatly to an extensive series of complex stop and stop cluster consonants with a binary voice distinction. Table 2 gives the stop consonant inventory for Tsumkwe Juǀ'hoan.

	non-clicks					clicks			
	labial	alveolar	alv. affricate	palatal	velar/uvular	dental	alveolar	palatal	lateral
simple stops									
plain	p	t	ts	tʃ	k	ǀ	ǃ	ǂ	ǁ
voiced	b	d			g	gǀ	gǃ	gǂ	gǁ
complex stops									
ejective			ts’	tʃ’		ǀ’	ǃ’	ǂ’	ǁ’
voiced ejected			dz’	dʒ’					
aspirated	pʰ	tʰ	tsʰ	tʃʰ	kʰ	ǀʰ	ǃʰ	ǂʰ	ǁʰ
voiced aspirated	bʰ	dʰ	dzʰ	dʒʰ	gʰ	gǀʰ	gǃʰ	gǂʰ	gǁʰ
stop clusters									
plain + /χ/		tχ	tsχ	tʃx		ǀχ	ǃχ	ǂχ	ǁχ
voiced + /χ/		dχ	dzχ	dʒχ		gǀχ	gǃχ	gǂχ	gǁχ
plain + /qχ’/		tqχ’			qχ’	ǀqχ’	ǃqχ’	ǂqχ’	ǁqχ’
voiced + /qχ’/						gǀqχ’	gǃqχ’	gǂqχ’	gǁqχ’
plain + /h/						ǀh	ǃh	ǂh	ǁh
voiced + /h/						gǀh	gǃh	gǂh	gǁh
simple nasal stops									
plain (voiced)	m	n			ŋ	nǀ	nǃ	nǂ	nǁ

Table 2. Stop (oral and nasal) inventory in Tsumkwe Juǀ’hoan (after Nakagawa 2006: 279 reanalysis of Güldemann 2001: 29. Cf. Dickens 1994: 9ff)[2]

The pervasiveness of the voice contrast with all three stop subclasses not only gives rise to a large number of phonemes, it accounts for there being as many click cluster segments as independent click phonemes. There are, however, some gaps in the system. For example, there is no voiced counterpart to the plain alveolar stop with a uvular ejective affricate offset, **/tqχ’/**, and the voiced ejective series is missing completely with all clicks.

Turning now to the frequency of these complex segments in the lexicon. Traill (2001) proves that clicks are the most frequent root-initial consonant in the Tsumkwe Juǀ’hoan lexicon and that the frequency of the different ‘click accompaniments’ follows a universal strength hierarchy: simple > complex > voiceless clusters > voiced clusters (cf. Güldemann & Nakagawa, this volume). Thus, a large click clusters inventory is not conducive of greater lexical frequency. This is illustrated in Table 3 using data for Tsumkwe Juǀ’hoan.

2. The plain cluster is represented orthographically as <**ǀ’h ǁ’h ǃ’h ǂ’h**> and the voiced cluster as <**nǀh nǁh nǃh nǂh**> (Dickens 2005: 13f). The click orthographic representation <**ǀh ǁh ǃh ǂh**> and <**gǀh gǁh gǃh gǂh**> is reserved for the plain and voiced aspirated click series, respectively (cf. Dickens 1991, 1994).

	click phoneme			
	ǀ	ǃ	ǂ	ǁ
cluster type				
plain + /χ/	35	50	40	40
voiced + /χ/	8	14	9	6
plain + /qχ'/	21	33	16	26
voiced + /qχ'/	5	12	17	4
plain+ /h/	19	44	35	33
voiced + /h/	12	32	20	18
total no. of lexemes involving click phoneme	365	667	399	411
of which feature the click phoneme in a cluster	100 (27.4%)	185 (27.7%)	137 (34.3%)	127 (30.9%)
of which feature the click phoneme in a voiced cluster	25 (6.8%)	59 (8.8%)	46 (11.5%)	28 (6.1%)

Table 3. Lexical frequency of plain and voiced click clusters in Tsumkwe Juǀ'hoan

The statistics in Table 3 can be summarised as follows. Click clusters account for approximately a third of all click-bearing lexical stems, and of those only a third are voiced (or approximately 8.5% of the click-bearing lexical stems).

In order to calculate the cross-lexical frequency, we can assume that the clicks occur in roughly two thirds of the entire lexicon, which means that voiced click clusters account for only 5% of all words. Thus, for the mean time at least, this paper reaffirms Traill's (2001: 45) frequency hierarchy.

3. Voicing on the fringe

Snyman's (1997) pan-Ju phonological survey shows that Ju dialects fall on a cline with respect to voicing in complex segments that corresponds with a geographic cline. Broadly speaking, the further north from the Central Kalahari the dialect is spoken, the fewer voiced contrasts we can expect to find in the dialect. The validity of that claim is put to the test in the next section, which introduces an under-documented SE Ju variety located squarely in the Central Kalahari 'core zone' and was the subject of my research since 2012.

3.1. Devoicing in the Kalahari Basin: the case of ǂKx'aoǁ'ae (SE Ju)

Over the course of my first fieldwork trips to Groot Laagte, an isolated resettlement village in the Ghanzi District, Botswana, it seemed to me that some informants did not articulate voicing in the words for which voicing is described for the closely related Tsumkwe Juǀ'hoan dialect. In order to study this further, a word list of lexemes with complex, voiced root-initial consonants and clusters was composed and elicited with two speakers aged 70+, one male and one female, and two speakers aged between 30 and 40, one male and one female.

A 70-word elicitation list was compiled using lexemes from Snyman's (1997) original study and the Ju|'hoan dictionary (Dickens 1994) which is based largely on the Tsumkwe Ju|'hoan variety. Words were elicited using English or Setswana so as to avoid the eliciting using the target language. Each word was elicited twice, and both elicitations are considered in the results. Therefore the potential size of the data set is 560 tokens.

The combined results of the experiment for all four speakers are presented graphically in Figure 4. The graph – a mosaic plot – represents the total number of tokens uttered by all speakers for each of the four different root-initial segments, the voiced complex click series and three voiced click cluster series. For the purposes of this study, and as we are concerned with behaviour of voicing with different offsets, no distinction is made according to the onset click consonant, hence the abbreviation CL for any click. In other words, the first bar represents all tokens for all speakers for the voiced aspirated click: /**g|ʰ gǃʰ g‖ʰ gǂʰ**/.

Another important detail is that the sample size for each segment varies slightly. There are several reasons for this, the first being the low cross-lexical frequency of certain segments. The second is that the elicitation success rate varied from speaker to speaker, due to speakers offering synonyms, loan words, or words being difficult to elicit. This slight variation in sample size is modelled in the design of the graph: each bar is proportional to one another and a broader bar is indicative of a larger data set. Finally, each bar is split into three colour-coded sections, representing whether a token is voiced, devoiced or 'other'. Tokens which fall under 'other' exhibited alternative variation, such as voicing is maintained but phonetic reduction results in the loss of aspiration or weakening of the cluster offset.

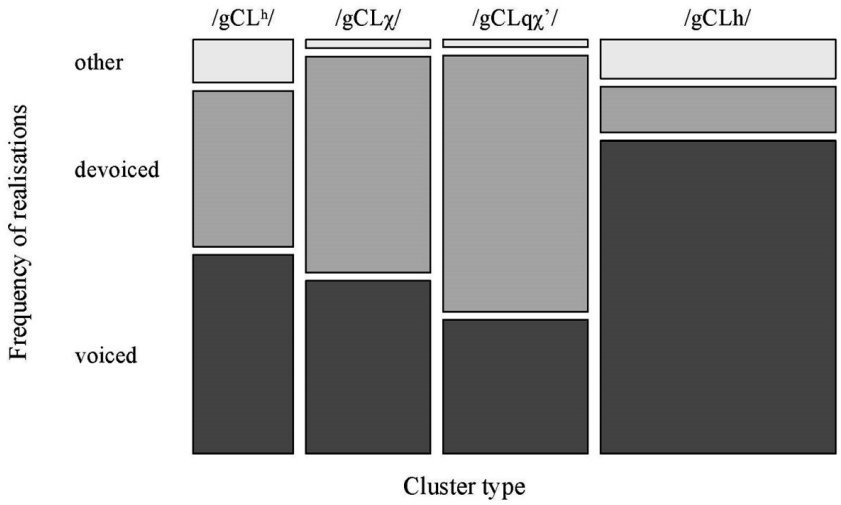


Figure 4. Frequency of voicing in phonetically complex consonants for four ǂKx'ao||'ae speakers (SE). Based on 448 tokens

A quick glance at the graph above suffices to confirm my initial suspicions of ǂKx'aoǁ'ae speech patterns and suggests a stark deviation from studies on other SE Ju varieties. Devoicing in the voiced click cluster series **/g**CL**χ/** and **/g**CL**qχ'/** occurs in more than half of the respective tokens. The voice contrast is slightly more stable for the voiced complex click, although by less than expected given the jump in phonetic complexity in clusters. However, devoicing in clusters of the type **/g**CL**h/** – 'delayed aspiration' – is considerably less extreme, an important point to which we return later in Section 3.2. Importantly, Figure 4 combines the results for all speakers. If the results for the oldest two speakers are compared with the youngest two speakers, an unmistakeable pattern emerges.

Figure 5 shows the combined results for the two elder speakers. As is clear to see, roughly three quarters of all tokens for the aspirated complex click, and the uvular fricative and ejective affricate clusters, are voiced. Interestingly, the proportion of voiced tokens for the 'delayed aspiration' cluster, is greater than the other segments – even taking into account that the sample size was also greater, as reflected by the width of the bar.

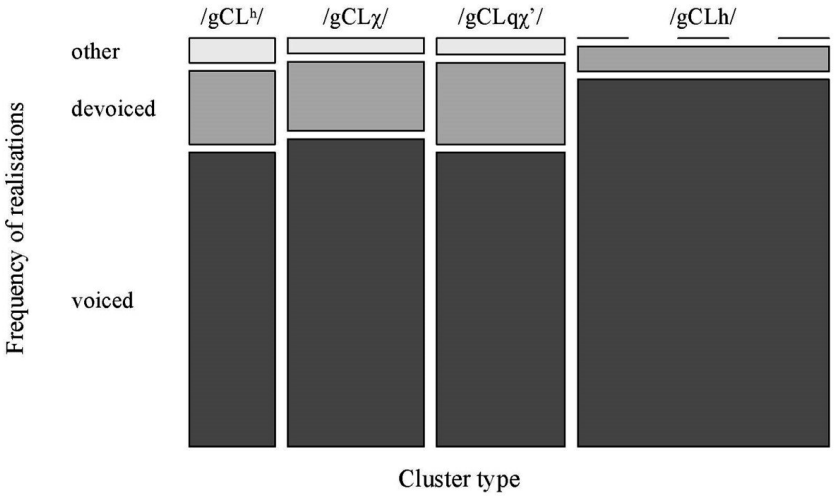


Figure 5. Cross-lexical frequency of voicing in phonetically complex consonants for two ǂKx'aoǁ'ae speakers (SE Ju) aged 70+. Based on 226 tokens

The data set for the two younger speakers is shown in Figure 6. In stark contrast to the elder speakers, all tokens of lexemes with a uvular fricative or uvular ejective affricate are devoiced. This is an extraordinary difference given that the age gap is the equivalent of only one generation. The two groups of speakers do, however, have one thing in common: like their more conservative elders, the younger speakers also show a tendency to maintain voicing when the click is followed by the glottal fricative offset, **/g**CL**h/**.

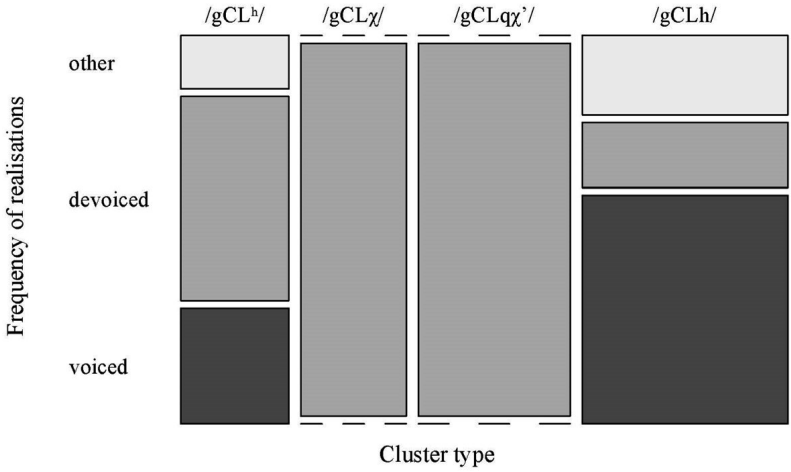


Figure 6. Cross-lexical frequency of voicing in phonetically complex consonants for two ǂKx'aoǁ'ae speakers (SE Ju) aged +/-40. Based on 222 tokens

The data asserts unequivocally that a sound change is in progress and being driven by the younger generations in the southeasternmost Ju varieties. Whilst devoicing is not surprising *per se*, it is significant that a variety in the Central Kalahari 'core zone' – where phonological complexity is greatest – is beginning to exhibit the same kind of sound change found towards the outer periphery.

A significant result that deserves further attention is the unmistakable maintenance of voicing in clusters with the 'delayed aspiration' offset. In fact, Snyman's (1997: 28f) survey points to a similar trend across the entire Ju language region. This phenomenon along with the causes of devoicing is addressed in the next section.

3.2. The causes of devoicing

Devoicing can be attributed to two factors, i.e. is multi-causal. The first is language internal. Conceivably, the cross-linguistically uncommon and phonetically complex nature of segments outlined in Section 1 provide the conditioning environment for phonetic simplification. It is also important to highlight the role of the listener in the process of sound change. In natural language, the brief period of prevoicing realised with some complex segments could be reanalysed as part of a preceding vowel. Thus, the articulatory complexity of voiced click cluster segments is responsible for synchronic variation which motivates sound change (cf. e.g. Ohala 1989; Bybee 2012).

Phonetic complexity does not only motivate devoicing; it might be key to understanding the maintenance of voicing in click clusters with a glottal fricative offset, /**g**CL**h**/. As aforementioned in Section 1, these segments are realised with phonetic nasal venting. Usually, the feature [+voice] is considered to be more 'marked' than [-voice]. However, this is arguably not the case for the cluster with

glottal fricative offset, as the feature combination [+nasal,-voice] is more complex in articulatory terms, and consequently cross-linguistically less frequent than [+nasal,+voice]. Hence, it is conceivable that the phonetic complexity of this cluster type favours voicing. This is the result of a lowered velum allowing nasal air flow through the nasal cavity and giving rise to the audibly perceivable nasalisation or 'nasal murmur' (Nakagawa 2006: 178 for G|ui; Gerlach 2016: 62f for ǂ'Amkoe). This provides a plausible explanation for the increased lexical frequency of these segments compared to other clusters as well as their relative stability, both in the present study and in Snyman's (1997) survey alike.

The implication of this, however, is that voiceless glottal affricate clusters are susceptible to reduction in phonetic complexity, i.e. become voiced. As a case in point, Figure 7 below shows the waveform and spectrogram of the word **/|o̱e!hau!hau/** 'zebra', which features two instances of the glottal affricate offset in a phonologically voiceless cluster. Each instance of **/!hau/** exhibits audible nasal venting; however, the second instance is better described as a nasal murmur and is indistinguishable from a voiced cluster.

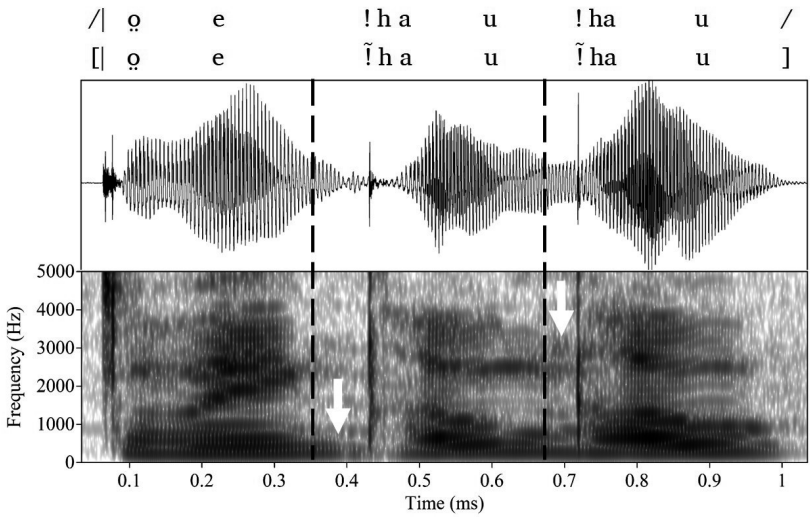


Figure 7. Waveform and spectrogram of **/|o̱e!hau!hau/** 'zebra' (SE Ju) illustrating the tendency for voiceless cluster onsets with the glottal affricate offset to become phonetically voiced when preceded by a vowel as the result of 'nasal venting'

At this juncture, an important *corrigendum* is in order. The results of Traill's (2001) study that explored the cross-lexical frequency of root-initial onsets in Ju and Taa do not match those of the present study in a very important way: instead of being the most frequently recorded voiced cluster series, as in the present study, Traill's statistics suggest that **/g**CL**h/** is cross-lexically the least frequent root-initial segment in Tsumkwe Ju|'hoan.

Fortunately, the divergence in our results can be attributed to a miscalculation caused in part by a now outdated analysis of the delayed aspiration feature, and by the design of the Ju|'hoan orthographic conventions. Designed by Dickens (1991),

the practical Ju|'hoan orthography is in many ways a good compromise between phonological transparency, efficiency and user friendliness. In the case of the voiced cluster with glottal affricate offset, pedagogy trumped phonology and is represented orthographically as <**n**CL**h**> in acknowledgement of the nasality and <**g**CL**h**> is used for the voiced aspirated click /**g**CL^{h}/. Hence, Traill's study unwittingly counts the instances of the voiced complex click and, it would seem, omits the voiced cluster with glottal affricate entirely.

If phonetic complexity was the sole cause of devoicing, one would expect the sound change to be gradual and, all else being equal, affect the language in a relatively even way. But this is far from the real situation: Snyman's (1997) pan-Ju study points to a cline of increasing sound change as distance from the Kalahari Basin core increases. To this end, the present investigation presents a notable contrast, as it attests devoicing by Ju language communities located directly in the 'core area'. More pertinently, there is strong evidence that the sound change impacts the language community in a very uneven way. Therefore, it seems reasonable that certain sociolinguistic factors are at play.

Evidence of historical contact between the ǂKx'ao‖'ae and their neighbours the Naro, a hunter-gatherer ethnic group who speak an unrelated Kalahari Khoe language (Khoe-Kwadi), can be found in oral folklore, colonial era literature (Kaufmann 1910; Bleek 1929), and, as we now know, the genetic record (cf. Section 4.1). Intermarriage and bilingualism is common. In fact, it is not unusual to encounter conversations in which both languages are used simultaneously, i.e. the ǂKx'ao‖'ae interlocutor uses his mother tongue and his Naro discourse partner responds in Naro. This happens even if Naro speakers are outnumbered, which is arguably evidence of the more prestigious status of the latter within hunter-gatherer communities in western Botswana. It is also more common for younger ǂKx'ao‖'ae speakers (under 30) to profess proficiency in Naro; in my experience, older speakers frequently deny being able to speak Naro but one should not infer from that that they do not understand it. Finally, it is important to put the question of contact in a contemporary socio-political context. Whilst historical contact between these groups is undeniable, government policy in Botswana over the last four decades has coerced the establishment of communities of linguistically heterogeneous hunter-gatherer groups (Saugestad 2001), of which Groot Laagte is one. These facts lend themselves adequately to explaining the generational variation in the present study.

The voice distinction in Naro, like all Khoe languages, is restricted to the simple subclass of stops (Vossen 1997; Nakagawa 2006). In other words, click clusters occur in a plain, voiceless series only. However, Ju and Naro share an important part of their lexicons, including many words with voiced root-initial click clusters in the former which are voiceless in the latter. Some examples are given in Table 4. Whilst contact with Naro is undoubtedly part of the cause of devoicing, the sound change is not only found in shared lexical roots. On the contrary, devoicing is systematic for some speakers. The result is a reduced sound inventory that mirrors the Naro sound system.

	Ju		Naro
	NC Ju	SE Ju	
'to germinate'	**ǃǃqχ'ùì**	**(g)ǂqχ'ùì**	**ǂqχ'ui/ ǂqχōā**
'to trip'	**g!!χàg‖àbà**	**gǂqχ'àbá**	**ǂχàbā**
'to turn inside out'	**!qχ'ùlì**	**(g)!qχ'ùrì**	**!qχ'ùrī**
'to urinate'	**ǀχam**	**(g)ǀχam**	**ǀχam**
'remove dregs/empty out'	**-**	**gǂqχ'oo-gǂqχ'oo**	**ǂqχ'oo-χo**
'aloe vera sp.'	**-**	**g‖hoq'oru**	**g‖oq'oru**
'have spots'		**(g)!χom**	**!χom**
'to snore'	**g!qχ'unu**	**g!χuni/(g)!χunu**	**!χono**

Table 4. Voiced and voiceless historically related lexemes in Ju and Naro

4. Voice(ing) of the past

Recent studies suggest that the historical areal distribution of complex voiced contrasts was once greater than today. This is investigated in the next section, which also poses the question if it is possible, plausible, and desirable to generalise the devoicing scenario described for SE Ju further through space and time.

4.1. Echoes beyond Ju?

In her recent phonetic-phonological description of N!aqriaxe – a variety of ǂ'Amkoe, the moribund sister branch of the Kx'a family – Gerlach (2016) attests an extensive and systematic inventory of voice and voiceless contrasts for one of two speakers. According to Gerlach, the voice contrast exhibited by the one speaker is a retention of a historically more complex phonology (*ibid*.: 249ff).

The complete consonant inventory is given in Table 5, with the contrasts only exhibited by one of the two speakers shaded in grey. A number of gaps in the N!aqriaxe inventory can be observed; however, the author herself points out, this could be due to a lack of data on the critically endangered language.

To account for the two different phoneme inventories, Gerlach (2016: 302f) uses the example of devoicing in ǂKx'ao‖'ae as a case in point for how the reduced system in N!aqriaxe might have come about. Gerlach suggests that devoicing "is a rather recent process that has its origin in language contact with Khoe languages" (*ibid*.) and argues that synchronic evidence of the voice contrast with click clusters in both Ju and ǂ'Amkoe makes it "feasible to assume that such voiceless/voiced contrasts were part of the proto-Kx'a phoneme inventory" (*ibid*.: 306).

	Bilabial	dental	alveolar	palatal	lateral
simple stops					
plain	**ʘ**	**ǀ**	**ǃ**	**ǂ**	**ǁ**
voiced	**gʘ**	**gǀ**	**gǃ**	**gǂ**	**gǁ**
complex stops					
ejective	**ʘʼ**	**ǀʼ**	**ǃʼ**	**ǂʼ**	**ǁʼ**
voiced ejective	**gʘʼ**	**gǀʼ**	**gǃʼ**		
aspirated		**ǀʰ**	**ǃʰ**	**ǂʰ**	**ǁʰ**
voiced aspirated	**gʘʰ**	**gǀʰ**			**gǁʰ**
stop clusters					
plain + /q/	**ʘq**	**ǀq**	**ǃq**	**ǂq**	**ǁq**
voiced + /q/	**gʘq**	**gǀq**	**gǃq**	**gǂq**	**gǁq**
plain + /qʼ/		**ǀq**	**ǃq**	**ǂq**	**ǁq**
voiced + /qʼ/		**gǀqʼ**			**gǁqʼ**
plain + /χ/	**ʘχ**	**ǀχ**	**ǃχ**	**ǂχ**	**ǁχ**
plain + /qχʼ/	**ʘqχʼ**	**ǀqχʼ**	**ǃqχʼ**	**ǂqχʼ**	**ǁqχʼ**
voiced + /qχʼ/	**gʘqχʼ**			**gǂqχʼ**	**gǁqχʼ**
plain + /ʔ/	**ʘʔ**	**ǀʔ**	**ǃʔ**	**ǂʔ**	**ǁʔ**
plain + /h/			**ǃh**	**ǂh**	**ǁh**
simple nasals					
nasal (voiced)	**nʘ**	**nǀ**	**nǃ**	**nǂ**	**nǁ**
complex nasals					
preglottalised	**ˀnʘ**	**ˀnǀ**	**ˀnǃ**	**ˀnǂ**	**ˀnǁ**

Table 5. N!aqriaxe (ǂ'Amkoe, Kx'a) click consonant inventory (after Gerlach 2016). Grey cells indicate voice contrasts only attested for one speaker.

Early attempts by Gerlach and myself to find potential cognates in both branches of Kx'a to support this hypothesis yielded only one candidate, namely 'scorpion' **/gǂχàì/** (Tsumkwe Juǀ'hoan, Ju) and **/gǂqχ'íī/** (N!aqriaxe, ǂ'Amkoe) (Gerlach 2016: 254). Since then, two interesting supplementary cases have emerged: (1a) is a promising cognate of a voiced (non-click) cluster and (1b) is an example of a voiced click cluster in N!aqriaxe with a voiceless historically related form in SE Ju.

(1)	N!aqriaxe		Southeastern Ju	
a.	**/ʤqχ'óm/**	'to hide'	**/ʤχòmá-sí/**	'hiding place'[3]
b.	**/g|qχ'áē/**	'to visit'	**/|qχ'àè/**	'to visit (from afar)'

As aforementioned, one alternative explanation for the voiced contrasts in N!aqriaxe is contact with the more phonologically complex language Taa. Another explanation is provided by Naumann (2010, 2014) who, in his analysis of Taa, proposes that a sound change observed in some varieties in which voiceless obstruents become voiced could be the result of prefix loss (i.e. *CV-OV…>CV-Ǫ̀V…>Ø-Ǫ̀V…). Consider the next pair of examples: in the Tshaasi dialect in (2), the verb **|obM** 'to know' obligatorily takes the durative prefix (or particle) **ga/ka** and has a voiceless stem-initial consonant; in the East !Xoon dialect in (3), **g|obM** is voiced and the prefix is seemingly lost.

(2) Tshaasi (Taa) (Naumann 2014: 296)

n	**ga**	**|om-a**	**laa-qae**	**'naan ya ga**
1S	DUR?	know-2ii	person-mother.S2ii	DEM.DIST:2ii

'I know that woman.'

(3) East !Xoon (Taa) (Naumann 2014: 296)

n	**g|om-a**	**taa-qae**	**ta'an ya ka**
1S	know-2ii	person-mother.S2ii	DEM.DIST:2ii

'I know that woman.'

Another context where the voiced realisation of lexical stems might be the result of prefix loss is a plural construction that Naumann (p.c.) proposes can be reconstructed as ***ka-**[stem]-(PL) to an earlier language state (cf. Gerlach 2016: 250). This would account for the voice contrast found in the singular and plural forms of certain lexemes in West Taa varieties, e.g. **/|'àn/** 'heart' (inalienable) and **/g|'ànàkê/** 'hearts' (inalienable). The fact that these noun forms are inalienable is an interesting point, as will become clear further on.

Unlike in Taa, there is no synchronic evidence for prefixes in Ju. As for ǂ'Amkoe, whilst Gerlach (2016) does not rule out such a process *per se,* it is deemed incongruous with ǂ'Amkoe as "ǂ'Amkoe generally lacks any kind of affixation" (*ibid.*: 250). Other authors, however, do describe affixation in ǂ'Amkoe (e.g. Collins 2001; Honken 2013). In Collins & Gruber (2014), **kí-** is a prefix that partakes in the marking of plurality on different nominal constituents including nouns in particular possessive constructions (4a), verbal adjectives (4b), and verbs marking a plural argument (4c) or contributing to a sense of pluractionality (4d).

(4) a. ǂHoan (ǂ'Amkoe) (Honken 2013: 255)

ǂ'àmkȍe	**kí-⊙núű̀-qà**	**'en**
person	PL-head-PL	COP

'Here are the person's heads.'

3. In SE Ju varieties, **-sí** is a nominal locative suffix.

b. ǂHoan (ǂ'Amkoe) (*ibid.*: 252)
‖Kà'a-qà **kí-kuru**
thing-PL PL-hot
'The things are hot.'

c. ǂHoan (ǂ'Amkoe) (Collins & Gruber 2014: 57)
ʘ'ú-qà **'a** **kí-kya''o** **kì** **|'óõ** **za**
duiker-PL PROG PL-go MPO tree by
'The duikers are going by the tree.'

d. ǂHoan (ǂ'Amkoe) (*ibid*.: 63)
Titi **'a** **kí-'ám**
Titi PROG PL-eat
'Titi is eating around.'

There are clear constructional and functional parallels between the ǂ'Amkoe data in (4a-d) and the aforementioned description of prefixes in Taa (cf. Güldemann 2013: 238-241 for brief note on **kâ** in the East Taa). Of particular interest is the plural construction in (4a) which is identical to the one mentioned above for Taa that has subsequently given rise to a voice distinction in singular and plural noun forms. In N!aqriaxe, some contrasts are attested by a single lexeme which happens to be a plural noun, e.g. **/g|q^{h}/** in **/g|q^{h}ãã̃/** 'women' (Gerlach 2016: 81), which is the plural form of **/ari ‖aqi/** 'woman' (Gerlach, fn.). Furthermore, in both Taa and ǂ'Amkoe, this particular plural construction seems relevant for marking an alienability distinction on nouns.

The case for reconstructing a complete inventory of voiced contrasts to proto-Kx'a is not without merit; however, the proto-language hypothesis does lose traction to the prefix-hypothesis for some important reasons. Firstly, as we have seen, affixes are attested in ǂ'Amkoe, contrary to earlier claims (Gerlach 2016: 250f). As far as the sister branch Ju is concerned, there is no synchronic evidence of prefixes, nominal or verbal; however, it would be prudent to consider a scenario whereby a now extinct Kx'a language existed somewhere between Ju and ǂ'Amkoe, both geographically and figuratively, i.e. between prevoicing and no prefixes (Ju) and scarce prevoicing and some prefixes (ǂ'Amkoe).[4] We may even be able to speculate on the function of such prefixes. Recall that both Taa and ǂ'Amkoe make use of prefixes in special plural constructions for inalienable nouns. Alienability is also encoded in both languages in their respective nominal classification systems (Kießling 2008 for Taa and Collins 2001 for ǂ'Amkoe). The Ju language, however, does not mark alienability at all, which is surprising given the extent of homogeneity in distinctly non-Khoe features, i.e. typological features which distinguish the Tuu and Kx'a families from the Khoe-Kwadi family. Alienability has not been shown to play a role in the nominal classification system in SE Ju (Pratchett 2017). Therefore, one line of future research would be to investigate a possible correlation between semantically inalienable nouns and voicing.

4. On a related note, the non-static nature of affixes is clear in some SE Ju lects where the obligatory use of **-sí** (PL) is a recent innovation and is already being reduced to **-s**.

The second argument in favour of the prefix hypothesis is typological. The reduction of grammatical prefixes to complex root-initial phonology is well documented, particularly on the African continent. For example, many of the Atlantic languages of West Africa possess noun class prefixes, the presence of which often triggers root-initial consonant mutation. If these prefixes are lost, as is the case for the North-Atlantic language Fula, consonant mutation signals the presence of prefixes in an earlier language state (Arnott 1970; Merrill 2014).[5]

Finally, in the spirit of Traill (2001), the comparative method and genealogical approach to the description of voiced complex segments and voiced click clusters in Kx'a (and Tuu) is inappropriate, if not only because the implied time depths are unworkable. By adopting a typological and areal approach (Güldemann 1998; cf. Nichols 1992), wherein complex voiced clusters are a defining feature of the Central Kalahari, the linguistic prehistory of the region is brought into focus. In doing so, and with the knowledge that these phonological contrasts are typologically exceptional in the languages of the world, we have to reckon with the need for a holistic analysis that works for both Tuu and Kx'a. Currently, only the prefix-hypothesis achieves this – and achieves it quite sophisticatedly given the similarities in the constructional and functional profile of the respective prefixes.

4.2. A non-Khoe substratum in Kalahari Khoe

There is one final loose end that is in need of attention. In Section 3.2, the impressive overlap in the lexicons of Ju and Naro was highlighted, including many words with voiced complex consonants in Ju which correspond to voiceless forms in Naro (Table 5 above). To the extent that one can be sure that voiced complex onsets are more representative of an earlier language state, it is reasonable to conclude that the voiceless forms in Naro are of Ju (or Kx'a) stock – especially as some voiced forms have a greater distribution across Ju lects.

As discussed in Section 3.2, SE Ju language communities and their Naro neighbours have been in contact since long before written records began. Nevertheless, I believe that shift-induced substrate interference provides a more elegant account for the voiceless forms in Naro than a prolonged contact scenario. Thus, following the hypothesis first laid out by Güldemann (2008), I presume that the Naro underwent complete language shift at some unidentifiable time in history from a Ju-like language towards the Khoe language of incoming pastoralists. In more recent years, this idea has been backed unequivocally by research advances made in anthropology (Barnard 2014 for a study on kinship and name-giving rules in Ju and Naro) and population genetics (e.g. Pickrell *et al*. 2012, Packendorf 2014). It is also worth mentioning that in Section 4.1. I suggest that a now extinct Ju (or Kx'a) language with prefixes might have once been located between ǂ'Amkoe and Ju, an area that is predominantly inhabited by Naro communities.

In light of the above scenario, one might ask: does this mean that a 'devoicing event' took place in Naro? Consider the following: in a few generations, due to an increasingly large Naro language community in Groot Laagte, the ǂKx'aoǁ'ae population – far removed from other SE Ju varieties in the north, and cut off from

5. My thanks to Viktoria Apel for pointing this out to me.

communities in Namibia – shift to some hybrid version of Naro. When that time comes, it will be the voiceless complex clicks and click clusters from which we learn of this shift. Given the rate of sound change highlighted by this study, the respective voice contrast will have long been lost.

Conclusions

The binary voice contrast contributes to the phonetic complexity of some Khoisan languages and the unparalleled size of consonant inventories. There is, however, more to this feature than the sum of these facts.

Anthony Traill considered the intriguing parallels in the Ju and Taa phonologies, the inventory of phonetically complex segments, and their identical cross-lexical frequency "a localised affinity which has persisted diachronically" (Traill 2001: 448-9). Yet, as shown in Section 3, the linguistic ecology in some communities is such that, in the passing of a single generation, these very features are lost and with them an important key to unlocking language dynamics and language prehistory in the Kalahari Basin. For this reason, my foremost concern in this paper has been to underline the value of such iconic features.

To that end, in Section 4.1, I highlighted the methodological imperfections of applying the comparative method to explain the kind of linguistic diversity considered in this paper. The underlying issue with reconstructing such a typologically impressive feature to any one family, with the knowledge we have today, is that the linguist is forced to accept one of two inevitable implications: either feature diffusion between Tuu and Kx'a is due to contact or the feature is mutually inherited. There are, in my view, no grounds for considering independent innovation scenarios, and both of the other implications are unfounded at this time. Further research is needed and, to that end, an investigation that marries the curious lack of alienability marking on nouns in Ju with voicing is both typologically relevant and promises to be insightful irrespective of the outcome. A study of verbs with durative aspect and voicing would also be worthwhile, given the data in Taa and ǂ'Amkoe.

In conclusion, the study of 'quirky phonology' is an exciting window into language prehistory and may still prove to be the remnants of yesteryear's morphology rather than the echo of an old and extraordinary phonology. Situating the analysis in a typological-sound framework also has the added benefit of dispelling the quirkiness of the click languages and approaching "the uniqueness of Khoisan languages […] as a variation on a universal theme" (Traill 1985: 166).

Abbreviations

In the Taa examples, Roman numerals indicate tone class and Arabic numerals indicate noun agreement class.

C	consonant
CL	any click consonant
DEM	demonstrative

DIST	distal
DUR	durative
MPO	multi-purpose oblique marker
NC	North-central Ju
O	(cluster) onset
PL	plural
PROG	progressive
S	singular
SE	Southeastern Ju
V	Vowel

Acknowledgements

I wish to thank my ǂKx'ao‖'ae informants, in particular Baq'u, Nǂhai-G‖ao, Nǂaisa, ǀKaece and ǀKaece N!a'an. I am also grateful to Alena Witzlack-Makarevich for assistance producing the graphs; to Tom Güldemann, Hirosi Nakagawa, and Viktoria Apel for comments and suggestions on previous version of this paper; and to Linda Gerlach for sharing data in the early stages of this research. This research was made possible thanks to a language documentation grant from the Endangered Languages Documentation Programme (grant MDP0241) and support from the "Japan Society for the Promotion of Science (JSPS)" KAKENHI (grant numbers 16H01925, 25300029).

References

Arnott, D.W. 1970. *The Nominal and Verbal Systems of Fula*. London: Oxford University Press.

Barnard, A. 2014. 'The Juǀ'hoan-Naro contact area'. In A. Barnard & G. Boden (eds), *Southern African Khoisan Kinship Systems*. Köln: Rüdiger Köppe, pp. 209-222.

Bleek, D.F. 1928. *The Naron: a Bushman Tribe of the Central Kalahari*. Cambridge: Cambridge University Press.

Bybee, J. 2012. 'Patterns of lexical diffusion and articulatory motivation for sound change'. In M.-J. Solé & D. Recasens (eds), *The Initiation of Sound Change: Perception, Production, and Social Factors*. Amsterdam: John Benjamins, pp. 211-234.

Collins, C. 2001. 'Aspects of plurality in ǂHoan'. *Language* 77, 3: 456-476.

Collins, C. & Gruber, J. 2014. *A Grammar of ǂHòã with Vocabulary, Recorded Utterances and Oral Texts*. Köln: Rüdiger Köppe.

Dickens, P. 1991. 'Juǀ'hoan orthography in practice'. *South African Journal of African Languages* 11: 99-104.

Dickens, P. 1994. *English – Ju/'hoan / Ju/'hoan - English Dictionary*. Köln: Rüdiger Köppe.

Gerlach, L. 2016. *N!aqriaxe: the Phonology of an Endangered Language of Botswana*. Wiesbaden: Harrassowitz.

Güldemann, T. 2001. 'Phonological Regularities of Consonant Systems Across Khoisan Lineages'. *University of Leipzig Papers on Africa, Languages and Literatures* 16. Leipzig: Institut für Afrikanistik, Universität Leipzig.

Güldemann, T. 2013. 'Morphology: Taa (East !Xoon dialect)'. In R. Vossen (ed.), *The Khoesan Languages*. London: Routledge, pp. 234-241.

Güldemann, T. 2014. '"Khoisan' linguistic classification today.' In T. Güldemann & A.-M. Fehn (eds), *Beyond 'Khoisan': Historical Relations in the Kalahari Basin*. Amsterdam: John Benjamins, pp. 1-41.

Heine, B. & König, C. 2008. *A Concise Dictionary of Northwestern !Xun*. Köln: Rüdiger Köppe.

Heine, B. & König, C. 2015. *The !Xun Language: a Dialect Grammar of Northern Khoisan*. Köln: Rüdiger Köppe.

Honken, H. 2013. 'Morphology: Eastern ǂ'Hoan'. In R. Vossen (ed.), *The Khoesan Languages.* London: Routledge, pp. 249-261.

Ladefoged, P. & Traill, A. 1994. 'Clicks and their accompaniments'. *Journal of Phonetics* 22: 33-64.

Ladefoged, P. & Maddieson, I. 1996. 'Clicks'. In P. Ladefoged & I. Maddieson (eds), *The Sounds of the World's Languages*. Oxford: Blackwell Publishers, pp. 246-280.

Maddieson, I. 2013. 'Voicing in plosives and fricatives'. In M.S. Dryer & M. Haspelmath (eds), *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology.

Merrill, J. 2014. *A historical account of the Fula and Sereer consonant mutation and noun class systems*. http://linguistics.berkeley.edu/~merrill/files/Merrill_Fula_Sereer_Mutation.pdf (accessed on: 5 January, 2017).

Miller-Ockhuizen, A.L. 2003. *The Phonetics and Phonology of Gutturals: a Case Study from Ju|'hoansi.* New York: Routledge.

Miller-Ockhuizen, A.L. & Sands, B. 1999. '!Kung as a linguistic construct'. *Language and Communication* 19, 4: 401-413.

Nakagawa, H. 2006. 'Aspects of the Phonetic and Phonological Structure of the G|ui Language'. PhD thesis, University of the Witwatersrand, Johannesburg.

Naumann, C. 2010. 'The consonantal system of West !Xoon (Tuu/Southern Khoisan, Namibia)'. Presentation at the University of Potsdam.

Naumann, C. 2014. 'A preliminary classification of Taa dialects'. In T. Güldemann & A.-M. Fehn (eds), *Beyond 'Khoisan': Historical Relations in the Kalahari Basin*. Amsterdam: John Benjamins, pp. 281-300.

Ohala, J.J. 1989. 'Sound change is drawn from a pool of synchronic variation'. In L.E. Breivik & E.H. Jahr (eds), *Language Change: Contributions to the Study of its Causes*. Berlin: Mouton de Gruyter, pp. 173-198.

Packendorf, B. 2014. 'Molecular anthropological perspectives on the Kalahari Basin area'. In T. Güldemann & A.-M. Fehn (eds), *Beyond 'Khoisan': Historical Relations in the Kalahari Basin*. Amsterdam: John Benjamins, pp. 45-68.

Pickrell, J.K., Patterson, N., Barbieri, Ch., Berthold, F., Gerlach, L., Güldemann, T. & Kure, B. *et al.* 2012. 'The genetic prehistory of southern Africa'. *Nature Communications* 3: 1143.

Pratchett, L.J. 2017. 'Dialectal Diversity in Southeastern Ju (Kx'a) and a Documentation of Groot Laagte ǂKx'aoǁ'ae'. PhD thesis, Humboldt-Universität zu Berlin, Berlin.

Sands, B. 2010. 'Juu subgroups based on phonological patterns'. In M. Brenzinger & C. König (eds), *Khoisan Languages and Linguistics: Proceedings of the 1st International Symposium, January 4-8, 2003, Riezlern/Kleinwalsertal*. Köln: Rüdiger Köppe, pp. 85-114.

Saugestad, S. 2001. *The Inconvenient Indigenous: Remote Area Development in Botswana, Donor Assistance and the First People of the Kalahari*. Uppsala: Nordic Africa Institute.

Snyman, J.W. 1975. *Žuǀ'hõasi fonologie en woordeboek* (Communications of the School of African Studies 37) Cape Town & Rotterdam: A.A. Balkema.

Snyman, J.W. 1997. 'A preliminary classification of the !Xũũ and Žuǀ'hõasi dialects'. In W.H.G. Haacke & E.D. Elderkin (eds), *Namibian Languages: Reports and Papers*. Köln: Rüdiger Köppe, pp. 21-106.

Traill, A. 1985. *Phonetic and Phonological Studies of !Xóõ Bushman*. Hamburg: Helmut Buske.

Traill, A. 1994. *A !Xóõ Dictionary* (Quellen zur Khoisan-Forschung 9). Köln: Rüdiger Köppe.

Traill, A. 2001. 'Structural typology and remote relationships between Zhu and !Xóõ'. In D. Nurse (ed.), *Historical Language Contact in Africa*. Köln: Rüdiger Köppe, pp. 437-454.

Visser, H. 2001. *Naro Dictionary: Naro - English, English - Naro*. Gantsi: SIL International.

Voßen, R. 1997. *Die Khoe-Sprachen: Ein Beitrag zur Erforschung der Sprachgeschichte Afrikas*. Köln: Rüdiger Köppe.

Author's address

Lee J. Pratchett
Humboldt-Universität zu Berlin
Institut für Asien- und Afrikawissenschaften
Seminar für Afrikawissenschaften
Unter den Linden 6
10099 Berlin
Germany
lee.pratchett@hu-berlin.de

Résumé

Le contraste de voix binaire est un élément productif des systèmes phonétiques des langues khoisan, mais il est particulièrement envahissant dans le ju (kx'a) et le taa (tuu) où il produit des segments phonologiquement contrastés comportant des réalisations phonétiquement complexes tels que des groupes de clics. Cet article examine en profondeur la stabilité de ces segments « extravagants » du complexe linguistique ju à la lumière de nouvelles données provenant de variantes

sous-documentées parlées au Botswana, qui montrent un dévoisement quasi systématique de ce genre de segments, et signalent qu'un changement phonétique est en cours dans des variantes où on l'aurait moins attendu. Après avoir ébauché une explication multicausale de ce phénomène, notre investigation se tourne vers une recherche diachronique. Dans l'esprit d'Anthony Traill (2001), et utilisant les connaissances les plus récentes sur les langues khoisan, cet article cherche, à partir de ces sons typologiquement et géographiquement uniques, à lever le voile sur l'histoire linguistique de la zone du bassin du Kalahari.