Stress-testing GP – the phonology of Taa

Julian Bradfield

Introduction

Despite its eclipse in recent years by OT, largely done in Jakobsonian framework, Government Phonology remains an active area. Much of the appeal of GP is its drive for simplicity and parsimony, together with the intuitively appealing idea of elements that have in themselves a concrete realization, rather than abstract features. An early aspect was the insistence on only binary branching constituents, which then developed to CV and even strict CV phonology. However, GP has been conducted almost entirely on languages that are relatively simple in terms of phonological inventory: English, Danish and Arabic are among the most complex studied. What does it look like to apply the GP philosophy to notoriously complex languages? Does it benefit our understanding of the language, or of GP?

!Xóõ/Taa

The Khoisan language known as !Xóõ or Taa is celebrated for its rich inventory of consonants, consonant clusters, and vowels. A recent analysis of the Western dialect [Nau09] proposes 87 consonants (plus 77 clusters), and 26 vowels; an earlier analysis of the Eastern dialect [Tra94] has slightly fewer consonants, but more vowels.

Phoneme inventory adapted from [Nau09]

p	t	ts		Ɵ	ǀ	ǃ	ǁ	‖	k	q		ʔ		i	e	a	o	u
b	d	dz		ᵑƟ	ᵑǀ	ᵑǃ	ᵑǁ	ᵑ‖	g	ɢ				ĩ	ẽ	ã	õ	ũ
pʰ	tʰ	tsʰ		Ɵʰ	ǀʰ	ǃʰ	ǁʰ	‖ʰ	kʰ	qʰ				i̠	e̠	a̠	o̠	u̠
bʰ	dʰ	dzʰ		ᵑƟʰ	ᵑǀʰ	ᵑǃʰ	ᵑǁʰ	ᵑ‖ʰ	gʰ	ɢʰ	qχ			i̠ː	e̠ː	a̠ː	o̠ː	u̠ː
pʼ	tʼ	tsʼ		Ɵʼ	ǀʼ	ǃʼ	ǁʼ	‖ʼ	kʼ	qʼ	ᶢqʼ				aˤ	oˤ	uˤ
	dzʼ			ᵑƟʼ	ᵑǀʼ	ᵑǃʼ	ᵑǁʼ	ᵑ‖ʼ	ᵑkʼ	ᵑqʼ	ᶢqχʼ				aˤ	oˤ	uˤ
m	n	ɲ		ᵑƟ	ᵑǀ	ᵑǃ	ᵑǁ	ᵑ‖										
ʔm	ʔn			ᵑƟ	ᵑǀ	ᵑǃ	ᵑǁ	ᵑ‖			χ		h					
f	s																	
w	l	j																
	r																	

Initial clusters are C C, and C + χ, qχ.

The rest

Two underlying tones. Quite analytic: some affixes, with no sandhi as such. **But** extensive and complex concord system, involving vowel quality, tones, and phrasal melodies.

Melody

For concreteness, start with the GP of [Har94]. This has ten melodic elements, which can combine in sets, with one member being a head (six thousand combinations should suffice …). More recent GPs omit at least **R** and **N**.

- **A**: 'mass', low back vowels, back-of-velar consonants
- **I**: 'dip', high front vowels, palatal consonants
- **U**: 'rump', high rounded vowels, labial consonants
- **@**: 'neutral', mid vowels, velar consonants
- **R**: 'coronal', coronal consonants
- **h**: 'noise', released stops, fricatives
- **ʔ**: 'stop', stops
- **N**: 'nasal', nasal consonants, nasalized vowels
- **L**: 'slack', voicing in consonants
- **H**: 'stiff', aspiration, breathiness

Clicks and their places

Is *any* click covered by those? Not really. Is there something common to clicks? Yes - articulatorily and perceptually. So:

- **K**: 'click', ingressive burst

What is {**K**}? Probably ǁ – the most distinctive, loudest, and cross-linguistically most common click. Then ǀ must be {**K**,**I**} and ǂ is obviously {**K**,**U**}, and ǃ should be {**K**,**R**}, but what about ‖?

Lateral click

The GP expression of lateral ǁ vs ǃ is said to be {ʔ,**R**} vs {**R**,ʔ}. Is it plausible that ǃ is {**R**, **K**} and ǁ is {**K**,**R**}? Possible alternative: ‖ is {**K**,**I**,**R**}, ‖ patterns with ǃ not with ǁ (see later) – awkward.

Non-clicks

The extensive non-click inventory requires some attention. The t/ts (via **h**), t/d/tʰ/dʰ (via **L** and **H**) and k/q distinctions (via **A**) are standard, and carry to clicks. More troublesome are …

Glottals

Ejectives and glottalized segments are problematic in vanilla GP. [Bel07] use **ʔ** in the setting of the Leiden model; [BH09] objects to **ʔ** and uses element geometry. If adopted, this deals with ejective clicks. Is pre-glottalization phonologically distinct? Or is ᵑʔ‖ the nasal counterpart of ǃ' ?

Vowels

Basic five-vowel system is standard. Ṽ by adding **ʔ**, V̰ with **H**, V̰ with **N**. What about V^ˤ? Pharyngeal element is **A** … . Proposal: in element geometry, give **A** a laryngeal node meaning. What about V^ˤ? [Tra94] suggested that V^ˤ is phonologically V̰^ˤ – works for GP too.

Prosody

[Har94] posits binary branching σ(O(CC),R(N(VX),C) structure. 'Strict CV' says all syllables are CV, and hacks the rest by empty positions and licensing. One surface analysis of (most) Taa lexemes is C(C)V(C)(V) – debates over size of initial cluster: is ᵑ|q' one segment per [Tra94], or ᵑ| + q' as here per [Nau09], or even g + ! + q'.

Thus per [Har94] Taa prosody looks simple. **But** there is no consistent complexity gradient in CC: either may have more elements (e.g. t + qχ' vs ᵑ‖ + q). So we need an empty nucleus between CC (properly governed by first V).

Phonological phenomena

Taa has some interesting constraints and assimilations, for example:

Counting constraints

In the Eastern language [Tra94], there are counting constraints: a lexeme may have an aspirated/breathy consonants, or a breathy vowel, but not both; similarly for ejective/glottalized segments. The first says at most one **H** per word; the second, in an element geometry approach, says at most one laryngeal **ʔ**. Awkward to express as licensing constraints.

Assimilation

/a/ raises to [ɜ] if after /ǀ‡/ or dentals, *and* before /¬(C)ǀ/. **Moreover** an intervening – even uvular – C_2 does not block it. How to express this locally? (-ology or -etics?)

Summary

The huge (apparent) inventory is not a problem, modulo issues considered already in GP; element geometry is useful. The phonological behaviour is not easy to deal with. Help from GP people welcomed!

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References

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