Metaphony, Umlaut, and !Xoon A-Raising

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Outline

- !Xoon and data summary
- Element theory
- Metaphony and ET
- Umlaut in ET
- !Xoon in ET
- A-Raising
- O-Raising and O-Unrounding

!Xoon

!Xoon, alias !Xóõ or Taa, is a Khoisan language, famous for its extensive phonological inventory.

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Affixes and function lexemes usually CV(C)(V) without clicks.

!Xoon is tonal – ignored today.

I'll use orthography rather than IPA – it's easier (for me) to read.

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!Xoon sounds

C_1	V_1	C_2	V_2

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C_1	V_1	C_2	V_2
ʘ, ǀ, ǃ, ǁ, ǂ			
gǂ &c			
ǂ’, gǂ’, ǂh, gǂh			
nǂ, nhǂ, ’nǂ			

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gǂ &c			
ǂ', gǂ', **ǂh, gǂh**			
nǂ, nhǂ, 'nǂ			
ǂq, ǂq', ǂqh [ǂq^h], **ǂqx'** [ǂ$q^{\chi'}$], **ǂx** [ǂχ], **ǂhh** [ǂh], **ǂ''** [ǂʔ] + voiced versions			

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p/b, **t/d** [t̪], **ts/dz** [t̪s̪], **k/g**, **q/gq** + **h**, **'**			
' [ʔ], **h**			
m, n, **'m, 'n**			
f, **s, x** [χ], **h**			
t, d, ts, dz + **x, qx'**			

!Xoon sounds

C_1	V_1	C_2	V_2
Θ, ǀ, !, ǁ, ǂ		**b**	
gǂ &c		[b/v],	
ǂ', gǂ', ǂh, gǂh		**w, r/l,**	
nǂ, nhǂ, 'nǂ		**y** [j],	
ǂq, ǂq', ǂqh [ǂq^h], **ǂqx'** [ǂq^x'], **ǂx** [ǂχ], **ǂhh** [ǂh], **ǂ"** [ǂʔ] + voiced versions		**ny** [ɲ]	
p/b, **t/d** [t̪], **ts/dz** [t̲s̲], **k/g**, **q/gq** + **h**, **'**			
' [ʔ], **h**			
m, n, **'m, 'n**			
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!Xoon sounds

C_1	V_1	C_2	V_2
Θ, ǀ, !, ǁ, ǂ **gǂ** &c **ǂ', gǂ', ǂh, gǂh** **nǂ, nhǂ, 'nǂ** **ǂq, ǂq', ǂqh** [ǂq^h], **ǂqx'** [ǂq^x'], **ǂx** [ǂχ], **ǂhh** [ǂh], **ǂ''** [ǂʔ] + voiced versions **p/b**, **t/d** [t̪], **ts/dz** [t̪s̪], **k/g**, **q/gq** + **h**, **'** **'** [ʔ], **h** **m, n**, **'m, 'n** **f**, **s, x** [χ], **h** **t, d, ts, dz** + **x, qx'**		**b** [b/v], **w, r/l, y** [j], **ny** [ɲ]	**a, e, i, o, u** + **n** [˜] **m** [m̩], **nn** [n̩]

!Xoon sounds

C_1	V_1	C_2	V_2
Θ, ǀ, !, ǁ, ǂ	many surface values	**b** [b/v], **w, r/l, y** [j], **ny** [ɲ]	**a, e, i, o, u**
gǂ &c	maybe **a, e, i, o, u**		+ **n** [˜]
ǂ', gǂ', ǂh, gǂh	most argue for **A, O** with underspecified values		**m** [m̩], **nn** [n̩]
nǂ, nhǂ, 'nǂ	+ **h** (breathy)		
ǂq, ǂq', ǂqh [ǂq^{h}], **ǂqx'** [ǂq$^{\chi'}$], **ǂx** [ǂχ], **ǂhh** [ǂh], **ǂ"** [ǂʔ] + voiced versions	**'** (creaky)		
	q (pharyng.)		
p/b, **t/d** [t̪], **ts/dz** [t̪s̪], **k/g**, **q/gq** + **h**, **'**	**'h**		
	qh (strident)		
' [ʔ], **h**			
m, n, 'm, 'n			
f, s, x [χ], **h**			
t, d, ts, dz + **x, qx'**			

Back Vowel Constraint

All Khoisan languages have some form of:

'Back consonants (including clicks) are not followed by (phonological) front vowels'

But in !Xoon, some clicks are less back than others, and allow phonetically front vowels ...

Or is V_1 even specified for [back] ?

‘A-raising’

Traill assumed underlying **a**, with several degrees of phonetic raising (and concomitant fronting!).

Let C^+ be **ǀ, ǂ** click (clusters) and coronal stops, C^- everything else.

Raising never applies to **aq**.

- Full: **a** → [i] / C_1^+__**i**. E.g. **ǂìi** ‘steenbook’ from **ǂAi**.
- Moderate: **a** → [ɜ] / C_1^+__{C_2**i**, **nn**} E.g. **ǂábi** [ǂɜ́bi]
- Slight: **a** → [æ] / C_1^-__**i**

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Similarly before [e]. But:

- Traill (1985) says uvular accompaniments (**ǂq** etc.) block full raising;
- Lionnet (2018) observes counter-examples in Traill 1994;
- but some of these disappear in Traill, Nakagawa (ed.), and Chebanne (ed.) 2018.
- Moderate raising after C^- in Traill’s audio data.

Situation in ǀGui (Nakagawa 2010) similar but different.

Analyses

A-raising has had varying analyses:

- Traill: *SPE* descriptive rules
- Nakagawa (2010): underspecified V_1 filled by assimilation
- Bradfield (2014): extending Traill with 'concurrent phonemes'
- Lionnet (2018): gradient subfeatural gang effects ('teamwork')

Our objective today: no gang effects, no phonological gradience, just elements behaving normally!

Element Theory

is a phonological framework developing since the 70s.

The original premise is that segments are built from phonological primes or elements, which are *privative* and have an inherent phonetic interpretation. A current 'standard' set of elements is:

- |A| lowness, backness, coronality [*sic*]
- |I| highness, frontness, palatality
- |U| roundedness, labiality
- |H| aspiration, breathiness
- |L| voicing, nasality
- |ʔ| stopness, glottality

This isn't enough, so elements are often headed |A|. People differ on whether multiple heads are allowed.

Typical element assignments: /a/ = |A|, /i/ = |I|, /e/ = |A.I|, /ɛ/ = |A.I|.

Kaye, Lowenstamm, and Vernaud (1985), Kaye, Lowenstamm, and Vernaud (1990), Harris (1994), Harris and Lindsey (1995), Backley (2011), Kaye and Pöchtrager (2013)

Elements, licensing, government

Elements are typically used in Government Phonology. In summary, there are several tiers of nodes, from prosodic structure down to elements, with associations between tiers. Licensing and government relations constrain which structures and associations are permitted (universally or in a language).

We don't consider prosody – we'll take the top tier to be an alternating sequence of C (consonant/onset) and V (vowel/nucleus) slots, associating to a bottom tier of elements.

We also adopt a version where segments have some structure: a place node (for |A I U|) and a manner node (for |H L ʔ|), each of which may have a headed element. (And actually a bit more structure. . .)

Metaphony (in ET)

Nowadays ‘metaphony’ mainly refers to vowel assimilations in Romance. Historically height assimilation to /i, u/. ET doesn't have a height element: traditional ET analyses use suppression of lowness instead, so:

(1) Subtractive analysis of Metaphony in Foggia.

'm**o**ʃːa	'm**u**ʃːu	‘soft F.SG/M.SG’
|A.U|	|U|	
'kj**e**na	'kj**i**nu	‘full F.SG/M.SG’
|A.I|	|I|	
'p**ɛ**te	'p**i**ti	‘foot SG/PL’
|A.I|	|I|	
'gr**ɔ**sːa	'gr**u**sːu	‘big F.SG/M.SG’
|A.U|	|U|	

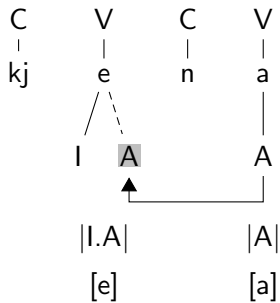
Calabrese (1985),Calabrese (1998),Pöchtrager and Kaye (2014),Valente (1975),Maiden (1991),Russo (2007),D'Alessandro and van Oostendorp (2016)

Floating elements

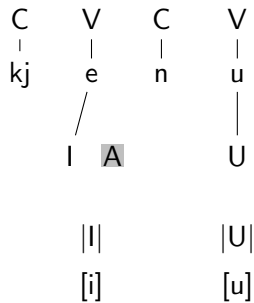
This works by saying that /e/ = |A.I|, where the floating |A| is only realized (associated) if licensed by a following explicit |A|:

(2) Foggia A-licensing.

a. /e--a/ non-metaphonic



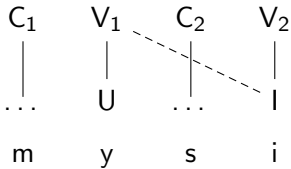
b. /e--u/ metaphonic



Umlaut

On the other hand, good old Germanic umlaut happens before /i/, and can be represented simply as spreading of |I|:

(3)



*mūsi → *mȳsi

Elements for !Xoon

We handle the large inventory and clicks by positing that clicks and cluster consonants have two place nodes, while simple pulmonics have one.

Clicks have |U| in the second node (for velar closure) and |U| plus anterior place in the first:

ʘ	ǀ	ǃ	ǂ	ǁ
|U.A;U|	|I.U;U|	|U.A;U|	|I.U;U|	|U.A;U|

(Why |A|? These are the 'back' clicks with greater tongue root retraction.)

The second node also expresses the clusters:

ǂ	ǂq	ǂʼʼ ǂhh
|I.U;U|	|I.U;U.A|	|I.U;∅|

(Other clusters differ in the manner node.)

Pulmonics

Our assignment of elements to pulmonic consonants has some (grounded) departures from standard:

p	t	ts	ɟ/ɲ	k	q	h	ʔ
|U|	|I|	|I|	|I|	|U.A|	|U.A|	|∅|	|∅|

Ask if you want me to expand on the departures!

Vowels

V_2 vowels are standard: **i, e, a, o, u** = |I, A.I, A, A.U, U|.

Vowels

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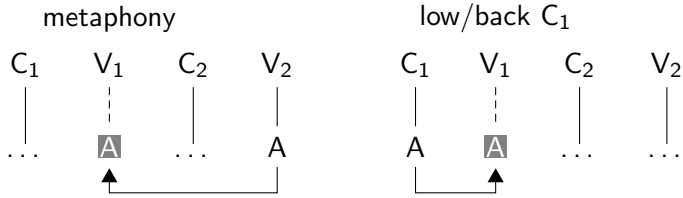
For V_1, we agree with the underspecified approach, implemented as floating elements: /A/ = |A|, /O/ = |A.U|.

We propose that half-raised [ɜ] realizes two different element structures: |∅|, and |A.I|.

!Xoon A-Raising is both metaphony and umlaut!

The |A| in /A/ is expressed when licensed by an adjacent |A|:



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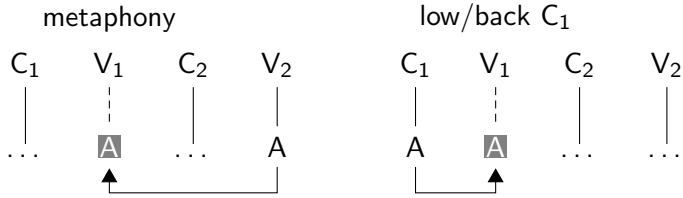
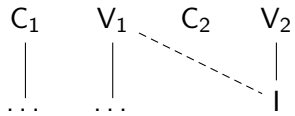


But we also have |I|-spreading, alias umlaut:



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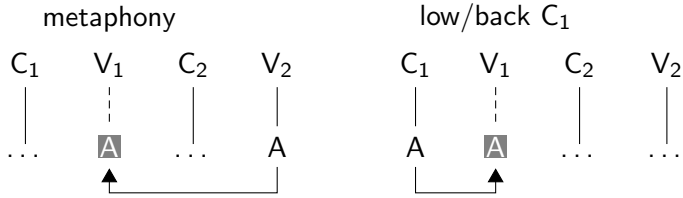

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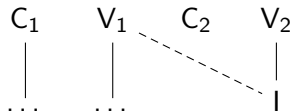


There is one more rule for palatal C_2, which I'll skip.

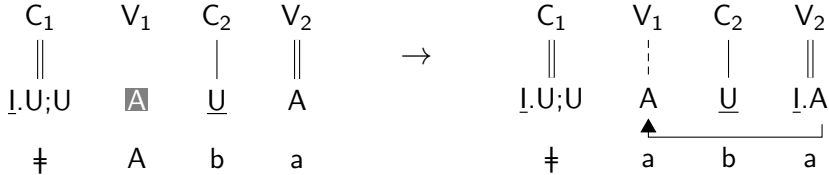
Example – ‘no raising’ (C_1 metaphony)

!álí /!Álí/ [!álí] ‘mane’.

The initial back click licenses |A|, but there is no I-spreading, so /A/ is realized as its default form [a].

Example – ‘no raising’ (V_2 metaphony)

ǂábá-tê /ǂÁbá/ [ǂábá] ‘steenboks’.



A-Licensing operates, giving |A| [a] for V_1.

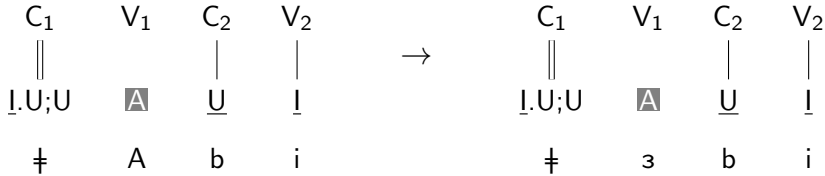
Example – ‘full raising’ (umlaut)

ɬìì /ɬÀì/ [ɬìì] ‘steenbok’.

Here, I-Spreading operates, but the A remains unlicensed, resulting in a fully raised [i].

Example – ‘partial raising’ (metophony)

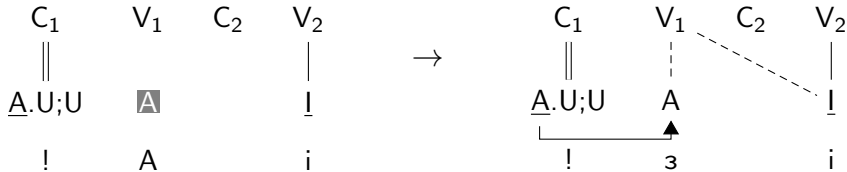
ǂábí /ǂÁbí/ [ǂʒbí] ‘young steenbok’.



No rules operate here, so V_1 surfaces with an empty place node, resulting in [ʒ].

Example – partial raising (metaphony and umlaut)

!áìǹ /!Áìn/ [!ɜìǹ] ‘stick handle’.



Similarly, but here A is licensed by the initial back click; the heading of the licensor transfers to the licensee, giving |A.I|, a more peripheral [ɜ].

Moraic **nn** fits too

!Xoon has no final consonants: **-nn** is [n̩] in V_2 position. Hence **|àńn** /|À´n̩/ [|ɜn̩] 'small'.

Here the A of the moraic nasal licenses the floating A in V_1 but also the I spreads left, so V_1 surfaces as |A.I|, with a [ɜ] realization.

O-Raising

What when V_1 is rounded? Things happen, but curiously Traill did not consider it as the same phenomenon – instead, he talked about **u**-lowering!

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There are some complexities in the data, but essentially our account handles O-Raising for free, as it should.

O-unrounding

We say that |I| spreads back from V_2 to V_1 when there's no intervening C. How does this work when $V_1 = /O/$ [u] ?

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We should get |U.I| – what's that?

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We should get |U.I| – what's that?

[ɯ], of course. Traill did not note this, and no-one else has (to our knowledge) – but it's in the present-day data!

Summary

!Xoon A-raising is complex, but it can be analysed in ET with familiar processes, metaphony and umlaut.

The analysis correctly describes the data, including aspects Traill did not unify, and moreover predicts a hitherto unnoticed but now found effect.

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