On [voice] and/versus [spread glottis] in Element Theory

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back to good old Element Theory :-)

observations and outlines of work in progress
(question marks...)

laryngeal systems

	/p ~ b̥/	/b/	/pʰ/	/p'/
Hawaiian	[ ]			
K'ekchi	[ ]			[cst gl]
Spanish	[ ]	[voice]		
English	[ ]		[spr gl]	

Two-way laryngeal contrast in obstruents:

[voice] vs. [spread glottis] languages ("laryngeal realism" – Honeybone 2005):

b ~ p vs. b̥ ~ pʰ (lenis ~ fortis)

[spread glottis]: henceforth [sg]

Two totally different mechanisms

"The only source of phonological knowledge is phonological behaviour."
(Phonological epistemological principle, Jonathan Kaye, *p. c.*)

- voice totally inactive in [sg] languages: no assimilation!

- instead: "bidirectional devoicing"

obtain [əb̥ˈtʰeɪn]	*matchbox* [ˈmætʃb̥ɒks]
cheesecake [ˈtʃiːzk̥ʰeɪk]	*baseball* [ˈb̥eɪsb̥ɔːɫ]
bigfoot [ˈb̥ɪgfʊt]	*cookbook* [ˈkʰʊkb̥ʊk]
egghead [ˈeɡhed̥]	*life gear* [ˈlaɪfɡɪə(r)]
roadster [ˈrəʊd̥stə(r)]	*Shoot back!* [ˈʃuːt ˈb̥æk]

- => nothing happens! UR->SR

Two totally different mechanisms

- plus: intersonorant voicing of lenis:

- phonetics, surface string-adjacency only, irresp. of phon/morph/synt context/structure

Two totally different mechanisms

"The only source of phonological knowledge is phonological behaviour."
(Phonological epistemological principle, Jonathan Kaye, *p. c.*)

- [voice] languages: "Distinctive [voice] implies regressive voicing assimilation" (van Rooy & Wissing 2001)

Two totally different mechanisms

"The only source of phonological knowledge is phonological behaviour."
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ra<u>b</u>tól ['rɒptoːl]
ré<u>z</u>karc ['reːskɒrts]
han<u>gf</u>al ['hɒŋkfɒl]
é<u>gh</u>ez ['eːkhɛz]
roa<u>d</u>show ['roːtʃoː]
(glosses: 'from prisoner'
'copper etching'
'loudspeaker'
'to sky'
'ibid.')

ma<u>tch</u>box ['mɛdʒboks]
bas<u>e</u>ball ['beːzboːl]
tö<u>k</u>ből ['tøgbøːl]
a<u>f</u>gán ['ɒvgaːn]
ker<u>t</u>ből ['kɛrdbøːl]
(glosses: 'toy car'
'ibid.'
'from pumpkin'
'Afghan'
'from garden')

Two totally different mechanisms

"The only source of phonological knowledge is phonological behaviour."
(Phonological epistemological principle, Jonathan Kaye, *p. c.*)

- [voice] languages: "Distinctive [voice] implies regressive voicing assimilation" (van Rooy & Wissing 2001)

- true laryngeal activity!

Two totally different mechanisms

"The only source of phonological knowledge is phonological behaviour."
(Phonological epistemological principle, Jonathan Kaye, *p. c.*)

- plus: "spontaneous" voicing of sonorants (either of (certain) C's or also of V's): active, opaque/transparent in [voice] languages (only?)

- assimilation: Slovak/Catalan: across word boundaries only, in reaction to final devoicing (to compensate for loss of laryngeal feature?)

- => phonology!

Two totally different mechanisms

"The only source of phonological knowledge is phonological behaviour."
(Phonological epistemological principle, Jonathan Kaye, *p. c.*)

- transparency: Russian: word-initial sonorant consonants followed by an obstruent permit assimilation through them if preceded by a preposition ending in an obstruent, as in world-famous *i*[s#mts]*enska* 'out of Mtsensk'

- => phonology!

Two totally different mechanisms

- "final devoicing":
- lenition in [voice] languages: $b \rightarrow p$ (e.g., Slavic)
- fortition in [sg] languages: $\underset{\circ}{b} \rightarrow p^h$ (e.g., German)

Markedness

- (one-way laryngeal contrast: voiceless unaspirated <- unmarked)
- in [voice] languages [+voice] is marked
- in [sg] languages [+sg] is marked
- => in a privative framework, [voice] and [sg]
- but: they never (?) combine in a lang. with a two-way contrast: *b ~ p^h

Markedness

- "the [voice] fallacy of [sg] languages", e.g., Swedish (cf. Ringen & Helgason 2004, Petrova et al. 2006)

[pʰ]acka 'pack' [b]ad 'bath'
[tʰ]ak 'roof' [d]äck 'deck'
[kʰ]ub 'cube' [g]ap 'mouth'

- but: result of phonetic interpretation, [voice] phonologically inactive (no assimilation)

- recall: *"The only source of phonological knowledge is phonological behaviour."*
  (Phonological epistemological principle, Jonathan Kaye, *p. c.*)

Classical GP's Element Theory

- L, H

- doesn't capture the fact that there are two different mechanisms! (see above), e.g., H never spreads R-to-L (no regressive aspiration assimilation)

Classical GP's Element Theory

- L, H

- two different mechanisms!

- L: the AUTONOMOUS INTERPRETATION HYPOTHESIS: primes of phonological representations should all enjoy 'stand-alone phonetic interpretability' (Harris & Lindsey 1995:34) (noted in Szigetvári (1996), de Carvalho (2002), Sóskuthy 2008)

Classical GP's Element Theory

- L, H

- two different mechanisms!

- L: the AUTONOMOUS INTERPRETATION HYPOTHESIS

- /h/ -- the interpretation of [H] or [h]? -- redundancy

Classical GP's Element Theory

- L, H

- two different mechanisms!

- L: the AUTONOMOUS INTERPRETATION HYPOTHESIS

- /h/ -- the interpretation of [H] or [h]? -- redundancy

- let's throw away both! :-)

[voice]

- Nasukawa (1997:13, 1998, 2005a): [voice] and nasality to be expressed by [N]:

- head in (truly) voiced obstruents, non-head in nasals

Aspiration

- = fortisness: English: all (?) fortis obstruents:

pit	*prim*	*spit*	*spray*
sit	*slit*		
ship	*shrink*		

(*fling*? *throb*? -- no data; prediction: devoiced sonorant)

(NOT phonetic: *I slip* vs. *ice lip*)

Aspiration

- plus: lenis obstruents take on passive voicing between sonorants: lenis ~ sonorant

- => fortis is more obstruent than lenis

- ==> aspiration is dominant obstruency ([h])

Theoretical framework

Activate α (Backley & Takahashi 1996, 1998)

a) worked out for vocalic representation only (harmony processes specifically)

b) it assumes *all melodic elements* (**I, U, A**) to be present *in all positions*

c) it respects the strict Structure Preservation Principle

d) it introduces ACTIVATION (and tier complement): it is a lexical instruction to activate an element lying dormant on its tier (or on the tier complement)

```
tier complement  >     [comp]          [ ]
                         /               /
melodic tier     >     [I]             [I]
                        |               |
aperture tier    >     [A]             [A]

                       [e]             [ɛ]
```

Theoretical framework

Leiden paper model (Nasukawa & Backley 2005)

a) *all elements* are present *in all positions*
(grouped into EDGE, SOURCE, RESONANCE and FUNDAMENTAL sets)

b) "vowels" and "consonants" are composed of *exactly the same elements*, but

c) in the reverse order of dominance (structure may be lost)

consonants			vowels		
EDGE	{h, ?} = X		FUNDAMENTAL	{A} = X	
SOURCE	{N, H}		RESONANCE	{I, U}	
RESONANCE	{I, U}		SOURCE	{N, H}	
FUNDAMENTAL	{A}		EDGE	{h, ?}	
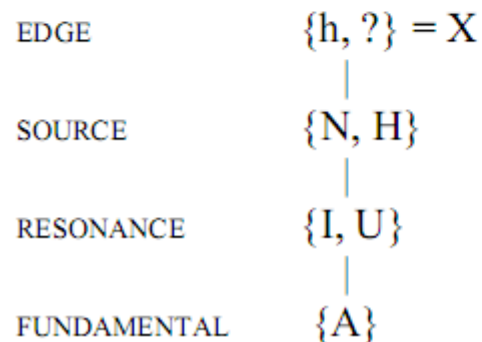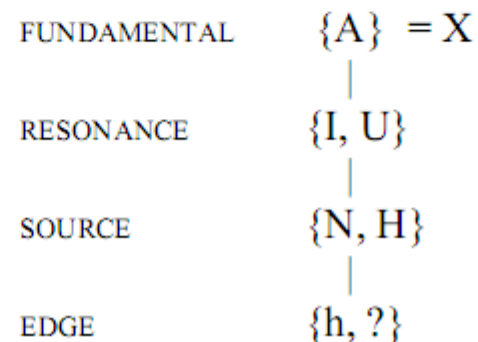
Theoretical framework

The elements and the structure we assume consonants to have maximally
(combining the idea that {N} = [voice], the notion of tier complement & activation, and the Leiden model)

C = [h]

EDGE   [ ]   <<< (tier complement)

[?]
|
|
[N]

SOURCE   [ ]   <<< (tier complement)
[H]*
|
|
[I]

RESONANCE   [ ]   <<< (tier complement)
[U]
|
|
FUNDAMENTAL   [A]   (no tier complement)**

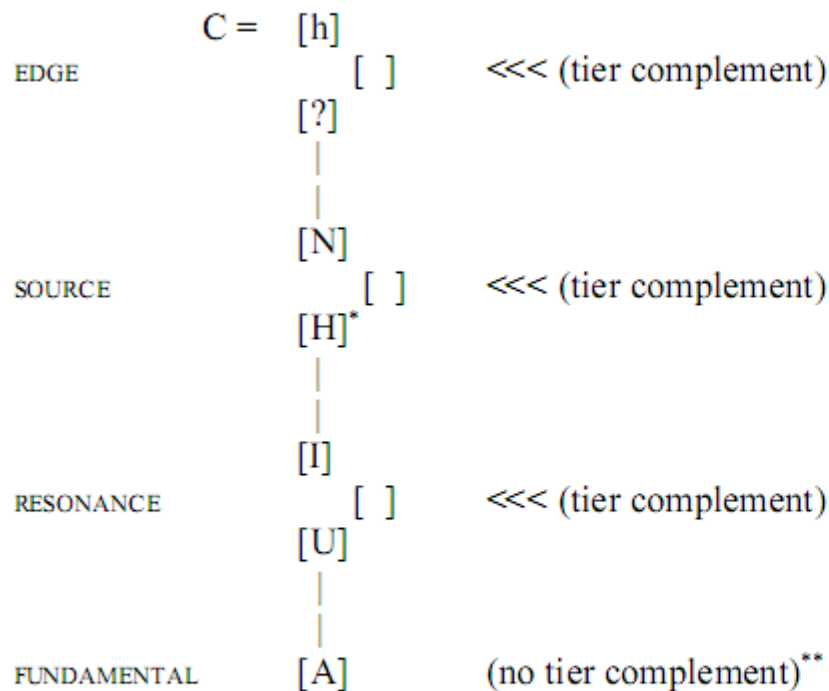This is a general universal template; language-specific templates may be much more restricted, e.g., by tier conflation (familiar from the description of vowel inventories) or element/tier "rejection" (see footnote to [H] and the "rejection" of SOURCE in the analysis of spread glottis systems)

The position that empty RES=coronality and empty FUND=velarity is disputed in Huber (2008).

Tier complements always only enhance *one* of the elements in the group.

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* The present analysis will not need recourse to the element [H] at all; whether this universally applies to phonological systems is a question we leave open. Nevertheless, we suspect that [H] is universally absent – which would make SOURCE a natural parallel to FUNDAMENTAL.
** The issue of whether FUNDAMENTAL has a tier complement is beyond the scope of, and irrelevant to, the present discussion.

Theoretical framework

The forces defining the asymmetric relations between positions

licensing means stability/fortition
lack of licensing means (one type of) lenition
((government means (another type of) lenition))
(Ségéral & Scheer 1999, Szigetvári 1999, etc., esp. Balogné 2008, Huber 2008):

"Proper Government inhibits segmental expression of its target."
"Licensing comforts segmental expression of its target."
(Ségéral and Scheer 1999: 20)

Suprasegmental structure: Strict CV phonology

the skeleton is composed of strictly alternating C and V positions
surface consonant clusters are CvC sequences, where "v" stands for an empty V
empty v's do not normally license the preceding C
surface word-final consonants are followed by empty v
this final empty v is parametrically set to be un/able to license

(Tentative) analysis

English:
underlying representations: no {H/L/N} in SOURCE
fortis C's have {h} in EDGE [comp]
                    (underlying aspirates[*])
lenis C's do not have {h}

aspirated[**]	unaspirated
[$\underline{h}$]	[ ]

☞ no voice assimilation: nothing to assimilate
☞ intersonorant voicing of lenis C: effect of
(otherwise inactive) sonorant SOURCE
☞ aspiration: *Activate* **h** in licenced position, {h} in
sonorants (incl. vowels) interpreted as devoicing[***]
☞ same devoicing by voiceless fricatives
☞ /s/+/p, t, k/: two adjacent segments with {$\underline{h}$}:
element sharing (OCP ☺ effect)[****]

Hungarian:
underlying representations:
voiced C's have {N} in SOURCE
voiceless C's do not have {N}

voice assimilation = *Activate* **N** in licenced
position (= by the following nonempty V)

Vless	Voiced	Nasals
[_]	[$\underline{N}$]	[N]

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[*] Cf. Iverson & Salmons (1995), Vaux (2002), Backley & Nasukawa (2005), etc.
[**] Henceforth, in the representations underlining means "with a tier complement"
[***] Nasukawa (2005b) also proposes that vowel devoicing in Tokyo Japanese is caused by the interpretation of {h}
[****] Kim (1970), Iverson & Salmons (1995), etc.

(Tentative) analysis

English:

<pick>

	C	V	C	v
h	[h]		[h]	
?	[?]		[?]	
N	[ ]		[ ]	
I/U	[U]	[I]	[ ]	
A			[ ]	

< when [h] fails to be licenced in C_2, there's no release

< unsplit I/U tier for English
< velar (B&N 2005)

<back>

	C	V	C
h	[ ]		[h]
?	[?]		[?]
N	[ ]		[ ]
I/U	[U]	[I]	
A		[A]	[ ]

< [h] in C_1 gets licenced by V (activated) so there is release of the stop, but no enhancement for aspiration

<pig>

	C	V	C	v
h	[h]		[ ]	
?	[?]		[?]	
N	[ ]		[ ]	
I/U	[U]	[I]	[ ]	
A			[ ]	

<bin>

	C	V	C
h	[ ]		[ ]
?	[?]		[?]
N	[ ]		[N]
I/U	[U]	[I]	

<pin>

	C	V	C
h	[h]		[ ]
?	[?]		[?]
N	[ ]		[N]
I/U	[U]	[I]	

(Tentative) analysis

Hungarian: voice assimilation

vasgolyó [ʒg] 'iron ball'

	C	v	C	
	C	v	C	
h	[h]		[h]	< release/friction
?			[?]	
N	[ ]		[N]	[N] is licenced by the followig nucleus, so
I/U	[I]		[ ]	[g] activates [ ] in /ʃ/
A			[ ]	

as opposed to:

zsebkendő [pk] 'handkerchief'

	C	v	C	
	C	v	C	
h	[h]		[h]	
?	[?]		[?]	
N	[N]		[ ]	[N] fails to be interpreted in /b/ because
I/U	[U]			following v cannot licence it
A			[ ]	

(Tentative) analysis

- in [sg] systems: {h} alone is active, SOURCE is "rejected/suppressed". This explains:

- why there is no (true) laryngeal activity, no (true) voice assimilation

- why the distribution of aspiration and the segment /h/ coincide (at least in English)

(Tentative) analysis

- even in [voice] systems, {H} and {L} are not active in laryngeal specifications – they are vocalic elements for high and low tone, respectively. This explains:

- why {H} and {L} can be combined in vocalic segments to produce contour tones, but in classical Element Theory, where they stood for [voiceless] and [voiced], resp. in consonants, a separate statement was needed to the effect that they are mutually exclusive within a segment (criticized in, e.g., Szigetvári 1998)

(Tentative) analysis

- in more complex laryngeal systems: e.g., voiced aspirates ({h, N}) are analyzable without having to parameterize the above statement

- plus: we can <u>only</u> have voiced aspirates if there are <u>both</u> voiced and aspirated obstruents, too

- in the analysis of voice assimilation, no recourse is needed to delinking or deletion of an element

- in [voice] languages, SOURCE is present, even in sonorant C's and V's (recall Slovak etc.)

(Tentative) analysis

- two totally different mechanisms!! which cannot combine in lang. with a two-way contrast:

- if SOURCE present with its [N] → active → [voice] lang.

- if Activate [h] present → [sg] lang.

- if neither → one-way contrast: voiceless unasp.

- and: the inventory of elements utilized is reduced, which desirably constrains the generative power of the model

Questions remaining, e.g.:

- final devoicing (English vs. German; lack thereof in Hungarian/(present-day) French etc.)

- how to model no aspiration in sC (= "sharing" of dominant [h])? (~ how to model cons. clusters?)

- nasalized vowels

- languages with 3/4-way laryngeal contrast, [constr gl] systems...