

# **Synchronic and diachronic aspects of [spread glottis] within GP's privative framework**

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# typology of laryngeal systems\*

the spread glottis\*\* system:  
(English/German/Mandarin Chinese/etc.)  
[sg] is distinctive for *all* obstruents

the voice system:  
(Hungarian/French/Dutch/Spanish/etc.)  
[voice] is distinctive for *all* obstruents

	/p ~ b/	/b/	/p <sup>h</sup> /	/p'/
Hawaiian	[ ]			
K'ekchi	[ ]			[cst gl]
Spanish	[ ]	[voice]		
English	[ ]		[spr gl]	

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Aims:

- a) to show that *one and only one laryngeal tier/element* is enough to account for this typology (Iverson & Salmons 1995, 2003 in particular)
- b) to show that it is the noise element {h} for spread glottis systems (and not {H} as in Harris 1994, etc), and {N} for voice systems (following Nasukawa 1997, 1998, 2005a) whose tier complement is activated (in the sense of Backley & Takahashi 1996, 1998)

\* Cf. Iverson & Salmons (1995, 2003, etc.), adopted/supported more recently by, e.g., Jessen & Ringen (2002), Backley & Nasukawa (2005), Honeybone (2005), Petrova et al. (2006); more complex systems like Thai (cf., e.g., Harris 1994:135) are beyond the scope of this poster

\*\* [spread glottis] = [spr gl] = [sg]; sometimes called **aspiration language**

\*\*\* Iverson & Salmons (1995: 383)

## data – synchronic

### English (& German, etc.):

- ☞ general devoicing of non-intersonorant lenis obstruents as in *bad* [bæd̥]; in clusters:

<i>obtain</i> [əb̥t̥eɪn]	<i>matchbox</i> [ˈmætʃbɒks]
<i>cheesecake</i> [ˈtʃiːzkeɪk]	<i>baseball</i> [ˈbeɪsbɔːl]
<i>bigfoot</i> [ˈbɪgfʊt]	<i>cookbook</i> [ˈkʊkbʊk]
<i>egghead</i> [ˈeghed]	<i>life gear</i> [ˈlaɪfgɪə(r)]
<i>roadster</i> [ˈrəʊdstə(r)]	<i>Shoot back!</i> [ˈʃuːt ˈbæk]

- ☞ aspiration: e.g., *tick* [tʰɪk];
- ☞ no aspiration in  $s+C_{[obs]}$ : *stick* [stɪk];
- ☞ sonorant devoicing in  $C_{[sg]}+C_{[son]}$  and  $s+C_{[son]}$ :  
*lay* [leɪ] versus *play* [pleɪ] and *slay* [sleɪ];
- ☞ assimilations of inflections as in *cat+s* [kʰæts],  
*back+ed* [bækt]

### Hungarian (& French, etc.):

- ☞ regressive voice assimilation:

[+v][-v] → [-v][-v]    &    [-v][+v] → [+v][+v]

<i>rabtól</i> [ˈrɒptɔːl]	<i>matchbox</i> [ˈmɛdʒbɒks]
<i>rézkarc</i> [ˈreːskɒrts]	<i>baseball</i> [ˈbeːzbɔːl]
<i>hangfal</i> [ˈhɒŋkfɒl]	<i>tökből</i> [ˈtɔgbøːl]
<i>éghez</i> [ˈeːkhez]	<i>afgán</i> [ˈɒvgaːn]
<i>roadshow</i> [ˈroːtʃoː]	<i>kertből</i> [ˈkɛrdbøːl]
(glosses: 'from prisoner'	(glosses: 'toy car'
'copper etching'	'ibid.'
'loudspeaker'	'from pumpkin'
'to sky'	'Afghan'
'ibid.')	'from garden')

- ▶ obligatory
- ▶ complete
- ▶ its result may be devoicing or voicing
- ▶ always regressive

## data – diachronic

*Grimm's Law exceptions* (Iverson & Salmons 1995:15)

### a) Unshifted: p, t, k in /s/-clusters

	IE	Gothic	gloss
	*(s)pyaw-	<i>speiwan</i>	'(to) spit'
	*(s)ter-	<i>stairno</i>	'star'
	*(s)kel-	<i>skulan</i>	'to owe'
nwIE	*peyskus	<i>fisks</i>	'fish'

This parallels contemporary Germanic varieties with no aspiration after fricatives (IE only had /s/). (see Honeybone 2005 for the relevance of historical data for laryngeal theory)

### b) Unshifted: /t/ in double-stop clusters (\*-pt- > -ft-, \*-kt- > -xt-)

	IE	Gothic	gloss
nwIE	*kap-to-	<i>hafts</i>	'captured, prisoner'
	*skap-t-	OE <i>sceaft</i>	'shaft, pole'
	*nok <sup>w</sup> t-	<i>nahts</i>	'night'

It is not a phonetically plausible history that the first C became an aspirate first: \*-pt- > ??-pht- > -ft-.

## theoretical framework – 1

*The privative Element Theoretical approach of Government Phonology*  
(GP – Kaye et al. 1985, Harris 1994, Backley & Takahashi 1998, etc.)

<i>Element</i>	<i>Common interpretation</i>	
{ <b>h</b> }	aperiodic noise	audible friction, release burst
{ <b>?</b> }	edge, drop in amplitude	occlusion in stops and laterals
{ <b>N</b> }	murmur	nasality
{ <b>H</b> }	stiff vocal cords	voiceless/aspiration, high tone
{ <b>L</b> }	slack vocal cords	active voicing, low tone
{ <b>I</b> }	dip	frontness, palatal resonance
{ <b>U</b> }	rump	rounding, labial resonance
{ <b>A</b> }	mass	non-high, pharyngeal
{ <b>R</b> }	rise, high spectral peak	coronality

following Nasukawa (1997:13, 1998, 2005a),  
we assume [voice] and nasality to be expressed by {**N**}

## theoretical framework – 2

*Developments of the idea of headedness as applied to non-melodic (= non-place-defining) elements in GP*

a) an element can be either in the head or the dependent position in an expression

**what about  $\underline{h}$ ~ $h$ ,  $\underline{?}$ ~ $?$ ,  $\underline{L}$ ~ $L$ ,  $\underline{H}$ ~ $H$ ?**

b) Scheer (1998, 2004) stipulates that only melodic elements (place-defining elements) can be heads:

**{ $h$  ? (N) L H} cannot be heads**

c) Backley and Nasukawa (2005) make the connection explicit between {H} and prosody:

**{ $h$  H ?} can be heads or non-heads**

{ $\underline{h}$ } stridency

{ $\underline{H}$ } aspiration

{ $\underline{?}$ } glottalisation (ejectives)

{ $h$ } obstruent noise, release

{H} voiceless

{?} occlusion

## theoretical framework – 3

*Activate  $\alpha$*  (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]	[ε]

## theoretical framework – 4

*Leiden paper model* (Nasukawa & Backley 2005)

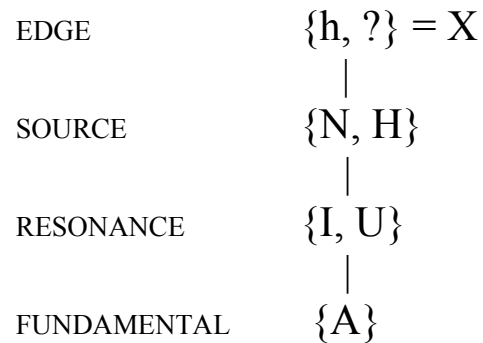
a) *all elements* are present *in all positions*

(grouped into EDGE, SOURCE, RESONANCE and FUNDAMENTAL sets)

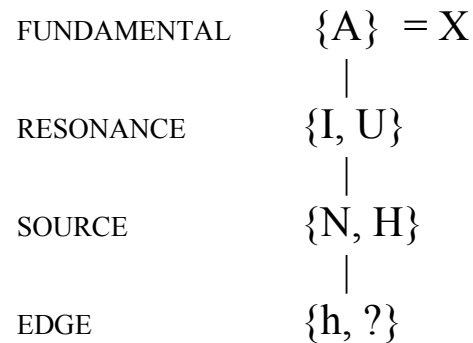
b) “vowels” and “consonants” are composed of *exactly the same elements*, but

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

### consonants



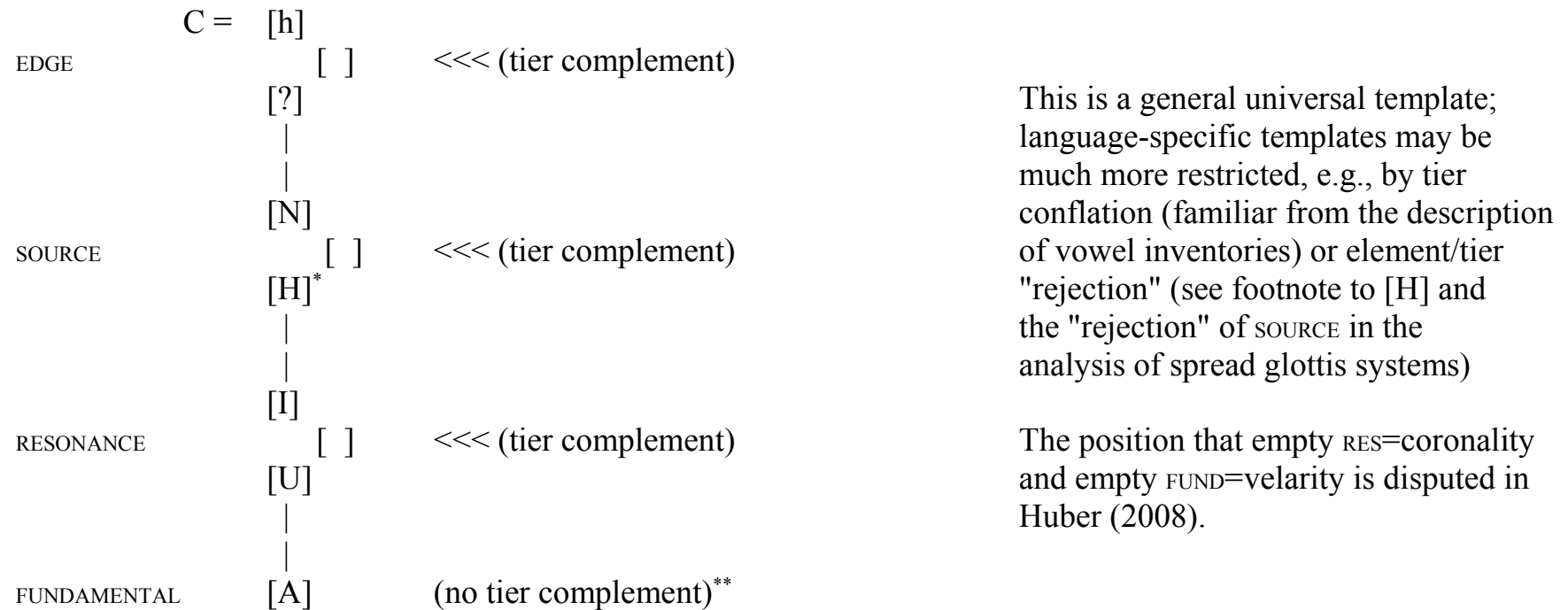
### vowels





## theoretical framework – 5

*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)



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.

\* 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 – 6

### *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

## previous accounts in GP

Harris (1994: 133-138, 194-225):

☞ "classical" **L/H** analysis of GP:

	Element	English	French
Voiced	<b>L</b>	-	[b]
Neutral	-	<i>bay</i>	[p]
Voiceless asp-ed	<b>H</b>	<i>pay</i>	-

☞ assimilation of suffixes: rightward spreading of **H**

☞ Licensing Inheritance analysis of /t/-allophones

☹ behaviour of fortis fricatives (esp. /s/) not treated

☹ sonorant devoicing not treated

Brockhaus (1999: 198): a Licensing Inheritance

(Harris 1992) account of German final devoicing:

(e.g., *blieb* [bli:p] '(I/he/she/it) stayed' versus *bliebe* [bli:bə] '(I/he/she/it) would stay')

"Final devoicing consists in the depletion of a-licensing potential, resulting in the withdrawal of an a-license from the source element **L**."

☹ fails to establish German as a spread glottis system without active [voice]

Backley & Nasukawa (2005):

☞ English as an aspiration language

☞ three-way split in English: [p<sup>h</sup>] vs [p] vs [b]

☞ {h H ?} as heads or non-heads (see above)

☺ English /p t k/ lexically contain **H**  
(= potential aspirates)

☺ the interpretation of **H** hinges on its prosodic position (= foot-initial)

☹ behaviour of fortis fricatives (esp. /s/) not subsumed under the **H**-processes (aspiration, sonorant devoicing, voiceless assimilation)

# analysis – synchronic – 1

## 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  
[ 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 {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  
[ N ]

Nasals  
[ N ]

\* 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.

# analysis – synchronic – 2

## English:

	<pick>					<back>			
	C	V	C	v		C	V	C	
h	[h]		[h]		< when [h] fails to be licenced in C <sub>2</sub> , there's no release	h	[ ]	[h]	< [h] in C <sub>1</sub> gets licenced by V (activated) so there is release of the stop, but no enhancement for aspiration
?	[?]		[?]			?	[?]	[?]	
N	[ ]		[ ]			N	[ ]	[ ]	
I/U	[U]	[I]	[ ]		< unsplit I/U tier for English	I/U	[U]	[I]	
A			[ ]		< velar (B&N 2005)	A		[A]	
	<pig>					<bin>			
	C	V	C	v		C	V	C	<pin>
									C
h	[h]		[ ]			h	[ ]	[ ]	h
?	[?]		[?]			?	[?]	[?]	?
N	[ ]		[ ]			N	[ ]	[N]	N
I/U	[U]	[I]	[ ]			I/U	[U]	[I]	I/U
A			[ ]						

# analysis – synchronic – 3

## Hungarian: voice assimilation

*vasgolyó* [ʒg] 'iron ball'

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

as opposed to:

*zsebkendő* [pk] 'handkerchief'

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

## analysis – synchronic – 4

in spread glottis systems {h} alone is active, SOURCE is "rejected". This explains:

- why there is no (true) voice assimilation
- why the distribution of aspiration and the segment /h/ coincide

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)
- in more complex laryngeal systems: e.g., voiced aspirates ({h, N}) are analyzable without having to parameterize the above statement
- in the analysis of voice assimilation, no recourse is needed to delinking or deletion of an element
- the inventory of elements utilized in spread glottis systems is reduced, which desirably constrains the generative power of the model

# analysis – diachronic – 1

## *Grimm's Law exceptions*

The old view (as summarized in Iverson and Salmons 1995:15):

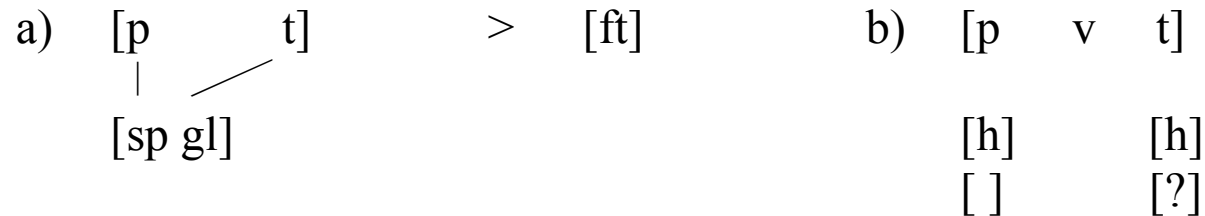
### **IE had unaspirated stops**

“Unshifted [Grimm's Law] forms...reflect phonetically unaspirated stops in the protolanguage, parallel to the lack of aspiration among stops in s-clusters in the various daughters.”

Their proposal:

### **Germanic already had [spread glottis] stops before the shift**

“[T]he shift took place whenever the old [= IE] stop was articulated with a spread glottis”.



in fact it is [?] which is no longer licenced in C<sub>1</sub> under C2C government



## analysis – diachronic – 2

In clusters like \*[pt kt] the first shifted “because it was produced with an open glottis, but the [t] did not, because it was produced with a narrow(ing) glottis” similarly to no aspiration after [s]

The emergence of aspiration in the history of Germanic (Iverson and Salmons 1995):

a) /s/ is the only IE fricative

b) IE also had voiced aspirated (murmured) plosives (with [h] specified)

> Grimm’s Law = [sp gl] becomes grammaticalized for *all obstruents* (enhancement of voiceless stops in (what came to be) Germanic)

☹ The [sp gl] specification in voiced IE stops only, however, runs into the problem that it assumes a laryngeal configuration which highly marked and unattested in the languages of today

☹ IE /s/ is specified for [h] (friction) only, and not yet for [h] (spread glottis) since it alternated with /r/ even in Germanic (rhotacism), voicing alternations are much later

Universally: [voice] precedes [spread glottis] in defining laryngeal specification in obstruents

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