"Boy, he must think we're pretty stupid to fall for that again."

Phonetic diversity and phonological uniformity in Germanic laryngeal phonology

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1. Aims:

- in binary laryngeal systems: (initial) plosives in [voice] languages (where they are voiceless unaspirated vs. prevoiced) and [sg] languages (voiceless aspirated vs. devoiced/voiceless unaspirated)

- laryngeal realism: difference does not simply lie in the phonetic manifestation of an underlying voiceless vs. voiced distinction, but is of phonological relevance as it has serious consequences for the patterning of the whole system of obstruents

- most Germanic languages are straightforward examples for [sg]

- two of the "black sheep": Swedish and Dutch

- Swedish: "voice fallacy"

- Dutch: the usual [voice] analysis is debatable

- side-effect: phonetics vs. phonology

1. Aims:

Conclusion: phonological uniformity in the Germanic family of languages is more extensive than usually assumed

2. Phonetics vs. phonology

- **phonology:**

  - **categorial**

  - **sensitive to prosodic and morphological/morpho-syntactic categories**

- **phonetics:**

  - **gradient**

  - **variable**

  - **rich in information (redundant)**
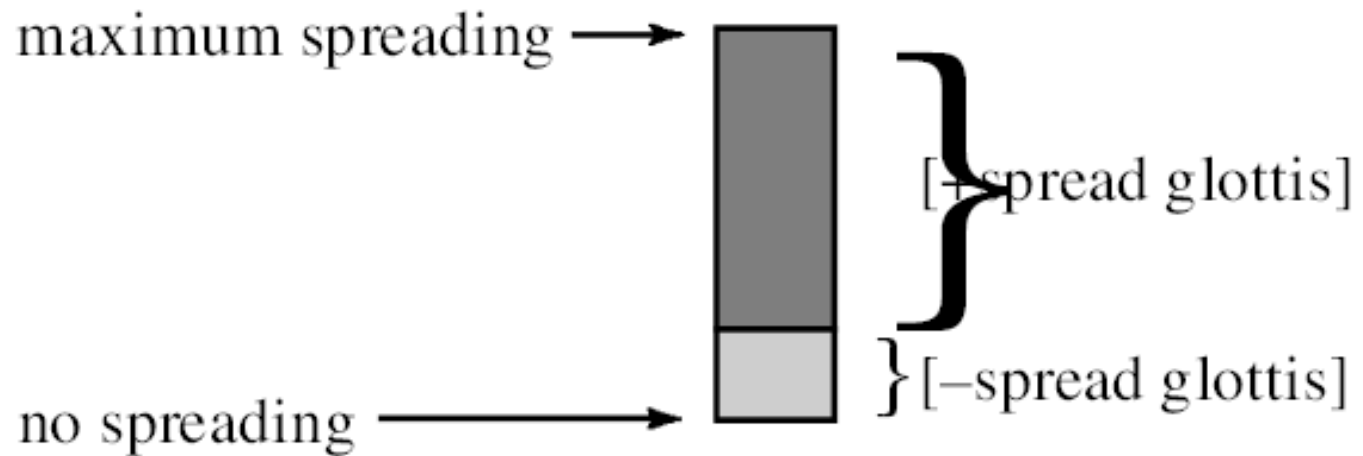
2. Phonetics vs. phonology

- **Hungarian: Jansen & Toft (2002): regressive voicing assimilation is a non-neutralising process: "physical reality"**

- **but: robust native intuition (*mész/méz ~ mésztől/mézben* 'whitewash/honey' ~ 'from whitewash=from honey/in whitewash=in honey', *zsepi* 'handkerchief, dimin.', *fokhagyma* (?) 'garlic', *hoddog* 'hotdog'): "mental reality"**
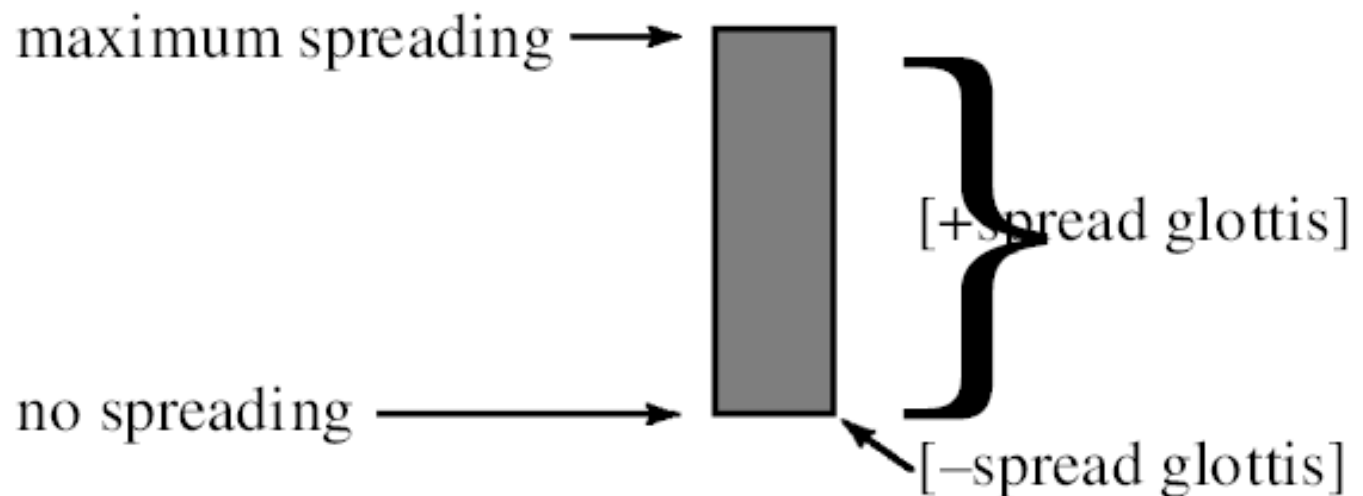
2. Phonetics vs. phonology

"phonological features bisect a continuum of phonetic activity"
(Vaux 1998: 509)

2. Phonetics vs. phonology

a. *Definition of [±spread glottis] proposed here*

maximum spreading ⟶

[+spread glottis]

[−spread glottis]

no spreading ⟶

b. *All-or-nothing definition of [±spread glottis]*

maximum spreading ⟶

[+spread glottis]

no spreading ⟶

[−spread glottis]

2. Phonetics vs. phonology

"phonological features bisect a continuum of phonetic activity" (Vaux 1998: 509)

English aspiration:

(3)   a. aspirated:

t̠én! > t̠én ≥ t̠ráin[7] > t̠èmperaméntal ≥ att̠énd/disc̠ólor ≥ lát̠èx/típt̠òe[8] > t̠omórrow > Mèdit̠erránean

        b. the twilight zone:

Améric̠an > mat̠ríc̠ulate > mát̠tress > lát̠er > lét̠ter/múppets > áft̠er > éat̠

        c. unaspirated:

plàst̠íc̠ity > st̠réss > st̠ém/disc̠úss

2. Phonetics vs. phonology

"phonological features bisect a continuum of phonetic activity" (Vaux 1998: 509)

English aspiration:

aspirated			unaspirated 1		unaspirated 2
(a)	(b)	(c)	(d)	(e)	(f)
p̱át	repéat	p̱otáto	léop̱ard	ráp̱	sp̱íll
p̱óker	suppórt	p̱olíce	clíp̱p̱er	gállop̱	wásp̱
ṯén	reṯúrn	ṯomáto	tomáṯo	cúṯ	stóp̱
ṯíger	deṯér	ṯodáy	vániṯy	suppórṯ	stándard
ḵíll	índiḵàte	ḵajóle	quáḵer	póḵe	scúll
ḵút	racḵóon	ḵollápse	póḵer	láḵk	sḵín

3. Laryngeal systems

one-way contrast

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

two-way contrast

+ three/four-way contrast...

Two-way laryngeal contrast in obstruents:

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

$$b \sim p \text{ vs. } b̥ \sim p^h \text{ (lenis} \sim \text{fortis)}$$

[p̬]=[b̥] -> "fortis" / "lenis"

* cf. Iverson & Salmons 1995 (and subsequent publications), etc.

Two-way laryngeal contrast in obstruents:

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

$$b \sim p \text{ vs. } \underset{\circ}{b} \sim p^h \text{ (lenis } \sim \text{ fortis)}$$

[p]=[b̥] -> "fortis" / "lenis"

VOT correlates of stops in Spanish vs. English (LaCharité & Paradis 2005)

Phonological value		SPANISH	ENGLISH
			Phonetic Implementation
voiced	/b, d, g/	-VOT (-40 to 0 msec)	+VOT (0 to 30 msec)
voiceless	/p, t, k/	+VOT (0 to 30 msec)	+VOT (> 50 msec)

Two-way laryngeal contrast in obstruents:

in what follows: arguments that

- voice and aspiration ([sg]) are two totally different mechanisms defining the two types of system and

- incompatible within two-way systems:

- there is no binary system in which truly voiced lenis contrasts with aspirated fortis (*b ~ p^h)

4. 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 (English, German, etc.): no assimilation!

- instead: "bidirectional devoicing":

obtain [əb̥'tʰeɪn]	*matchbox* ['mætʃb̥ɒks]
cheesecake ['tʃiːz̥kʰeɪk]	*baseball* ['b̥eɪsb̥ɔːɫ]
bigfoot ['b̥ɪgfʊt]	*cookbook* ['kʰʊkb̥ʊk]
egghead ['eɡhed̥]	*life gear* ['laɪfɡɪə(r)]
roadster ['rəʊd̥stə(r)]	*Shoot back!* ['ʃuːt 'b̥æk]

- => nothing happens! UR->SR

- "initial and final de-voicing": nothing happens!

  UR -> SR:

Utterance-initial	Utterance-final
(a)	(b)
Bravo! [ˈb̥rɑːvəʊ]	*Mad!* [ˈmæd̥]
Good! [ˈɡʊd̥]	*Go ahead!* [əˈhed̥]
Zany! [ˈz̥eɪnɪ]	*Think big!* [ˈb̥ɪɡ̊]
Damn! [ˈd̥æm]	*Bob!* [ˈb̥ɒb̥]
Very much! [ˈv̥erɪ]	*Leave!* [ˈliːv̥]

4. Two totally different mechanisms

- plus: intersonorant voicing of lenis:

rea_ding, rea_ds it, Gar_dner, ba_dly, bin_go,

bi_g name, gi_ve it, Play _Ball

- phonetics: the influence of the spontaneous phonetic voicing of the flanking sonorants, surface string-adjacency is the only requirement, applies automatically irrespective of phon/morph/synt context/structure

4. Two totally different mechanisms

The phonetics of English aspiration: is English really a clear case?

Mean VOT in msec. (average) (Lisker & Abramson 1967)

	initial, isolated	utterance-internal
/b/	-101	-61
/d/	-102	-50
/g/	-88	-73
/p/	58	34
/t/	70	45
/k/	80	53

4. Two totally different mechanisms

The phonetics of English aspiration: is English really a clear case?

- variability

- lenis: prevoicing! (cf. Hungarian)

- fortis VOT may even go below 50 msec when non-initial

- again: phonology decides

4. Two totally different mechanisms

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

As opposed to

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

  - **Apparently countered by Swedish (Ringen & Helgason 2004: "Distinctive [voice] does not imply regressive assimilation: evidence from Swedish"): see below**

- **Spanish, French, Slavic, Hungarian, etc.**

4. Two totally different mechanisms

RVA in Hungarian:

rabtól [ˈrɒptoːl]	*matchbox* [ˈmɛdʒboks]
rézkarc [ˈreːskɒrts]	*baseball* [ˈbeːzboːl]
hangfal [ˈhɒŋkfɒl]	*tökből* [ˈtøgbøːl]
éghez [ˈeːkhɛz]	*afgán* [ˈɒvgaːn]
roadshow [ˈroːtʃoː]	*kertből* [ˈkɛrdbøːl]
(glosses: 'from prisoner' 'copper etching' 'loudspeaker' 'to sky' 'ibid.')	(glosses: 'toy car' 'ibid.' 'from pumpkin' 'Afghan' 'from garden')

4. Two totally different mechanisms

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

As opposed to

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

- **true laryngeal activity!**

4. Two totally different mechanisms

Voicing assimilation triggered by sonorants

a. Sanskrit (Nespor & Vogel 1986: 118, 230)

sat – aha   *sad – aha*   'good day'

samyak uktam   *samyag uktam*   'spoken correctly'

tat namas   *tad namas*   'that homage'

b. Slovak (Blaho 2004: 46)

voja̠k [k] 'soldier Nom.Sg.'   *voja̠ka* [k] 'soldier Gen.Sg.'

voja̠k ide [g] 'the soldier goes'

le̠s [s] 'forest Nom.Sg.'   *le̠se* [s] 'forest Loc.Sg.'   *le̠s je* [z] 'the forest is'

c. Cracow Polish (Kiparsky 2003: 334)

ja[g] *nigdy* 'as never' (cf. Warsaw Polish *ja*[k] *nigdy* 'as never')

4. Two totally different mechanisms

Voicing assimilation triggered by sonorants

d. Catalan (Bermúdez-Otero 2006: 2-3)

/p/ *escu*[b] *molt* '(s)he spits a lot'

/f/ *bu*[v] *brusc* 'abrupt puff'

/f/ *bu*[v] *enorme* 'enormous puff'

/s/ *go*[z] *alat* 'winged dog' cf. *go*[s]*a* 'bitch'

/s~z/ *be*[z]-*avi* 'great-grandfather'

4. Two totally different mechanisms

Sonorant transparency: Russian *i*[s#mts]*enska* 'out of Mtsensk'

5. A detour: phonetics

- the simple phonetic realisation of a laryngeal setting may be misleading, but the *direction* of phonetic variability is dictated by deeply phonological aspects of segments

- e.g., prevoicing/VOT varies with speech tempo, but:

- as speech slows down, prevoicing increases in a true-voice language, but there is little or no effect on the VOT of the short lag stops,

- whereas in an aspirating language, when speech gets slower, VOT increases in long-lag stops, but there is little or no change in the short-lag stops

- (same for female/male difference: female ~ slow/clear)

5. A detour: phonetics

Hungarian: (Gósy & Ringen 2009:7-8)

Prevoicing in initial position

Stops	Prevoicing of lenis stops in initial position (ms)			
	females		males	
	mean	SD	mean	SD
b	-100.12	29.00	-88.28	25.70
d	-103.49	31.08	-86.19	25.96
g	-99.01	28.60	-78.44	28.35

5. A detour: phonetics

Hungarian: (Gósy & Ringen 2009:7-8)

VOT values of fortis stops in initial position (non-significant differences are marked by italics)

	VOT values of fortis stops in initial position (ms)			
Stops	females		males	
	mean	SD	mean	SD
p	8.2	4.2	11.4	6.1
t	14.7	6.4	17.4	6.9
k	*36.71*	14.5	*38.6*	12.1

6. Language typology under laryngeal realism

- Romance and Slavic languages are generally classified as [voice]

- Germanic languages belong to the [sg] type

- with a handful of notable exceptions:

- Yiddish (Iverson & Salmons 2008, etc.), upon arising from a Slavic background, took up the [voice] nature of the substrate, and as such, it exhibits plosive prevoicing and the expected pattern of voice assimilation

- Dutch (Booij 1995, Iverson & Salmons 2008, etc.), as a result of contact with Romance, also developed into a [voice] system, has voice assimilation (an untypical pattern thereof, though) and prevoicing but no aspiration (Also: Afrikaans and West Flemish.)

- Swedish (cf. Ringen & Helgason 2004, Petrova et al. 2006) has aspiration and no assimilation but considerable prevoicing in initial plosives

- certain varieties of Scots/Scottish English (Wells 1982: 412-413, Iverson & Salmons 1999: 22-23) have no aspiration but instances of regressive spread of voicing and sometimes even prevoicing

7. Two of the "black sheep": Dutch and Swedish

Swedish:

- considerable prevoicing in initial plosives (cf. Ringen & Helgason 2004, Petrova et al. 2006, Helgason & Ringen 2008): 93% of the subjects' stops had prevoicing longer than 10 ms

Swedish initial plosives
[p^h]acka 'pack'   [t^h]ak 'roof'   [k^h]ub 'cube'
[b]ad 'bath'   [d]äck 'deck'   [g]ap 'mouth'

7. Two of the "black sheep": Dutch and Swedish

Swedish:

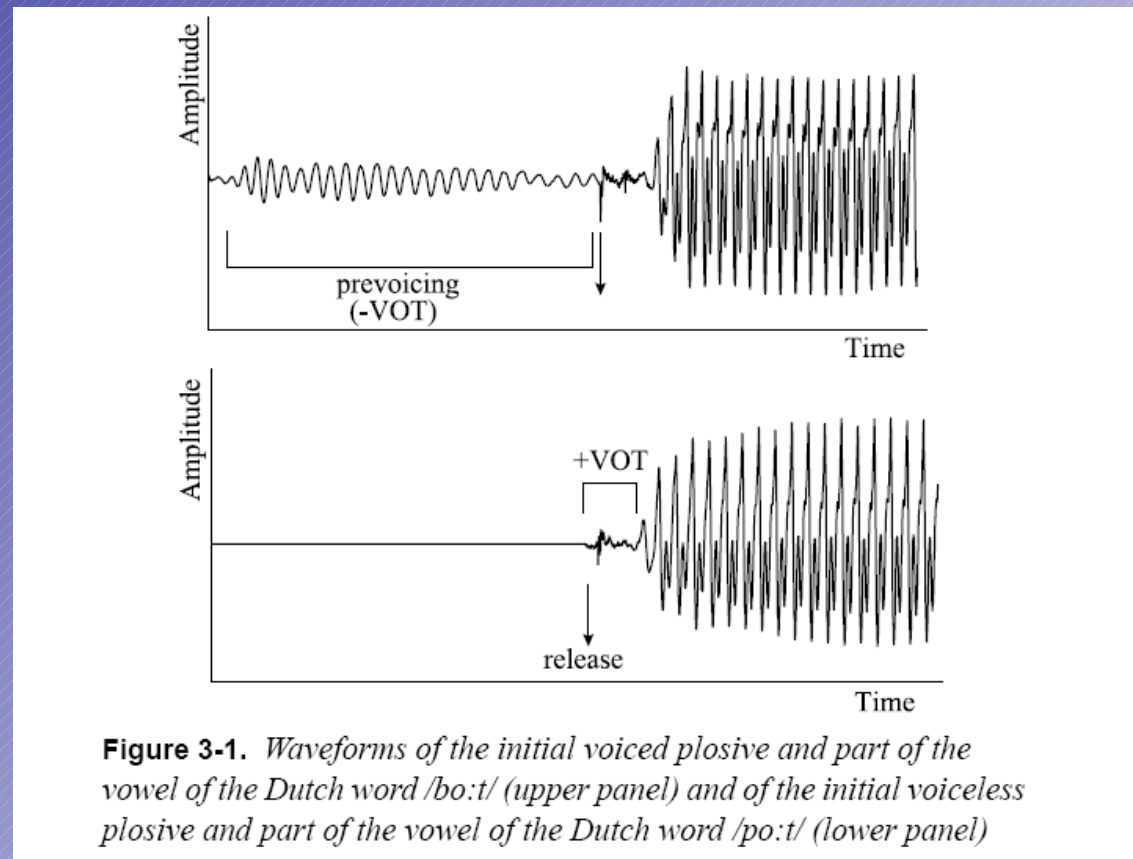- but: no (regressive) assimilation of some voicing property is attested:

- "the [voice] fallacy of [sg] languages" is but the result of phonetic interpretation; an optical illusion that is redundant and not an issue for phonology

- plus: phonetic evidence (!):

- Helgason & Ringen (2008): female subjects had significantly *shorter* prevoicing, not longer as in Hungarian, than did the male subjects (66 ms vs. 109 ms)

7. Two of the "black sheep": Dutch and Swedish

Dutch:

van Alphen (2004: 50):

Figure 3-1. *Waveforms of the initial voiced plosive and part of the vowel of the Dutch word /boːt/ (upper panel) and of the initial voiceless plosive and part of the vowel of the Dutch word /poːt/ (lower panel)*

7. Two of the "black sheep": Dutch and Swedish

Dutch:

Table 1. VOT in Dutch, German and English

	Voicing Lead	Short Lag VOT	Long Lag VOT
Dutch	-4 ms: b, d	0-25 ms: p, t	
German		16 ms: b, d	51 ms: p, t
English		32 ms: b, d	59 ms: p, t

(http://www.fikkert.com/Publications/5b.%20Voice_volume_tables.pdf)

7. Two of the "black sheep": Dutch and Swedish

Dutch:

Table 4. Laryngeal feature representation for Dutch, German and English under the Multiple Feature Hypothesis, [voice] and [spread glottis]

	Voicing Lead	Short Lag VOT	Long Lag VOT
Dutch	[voice]	[ ]	
German		[ ]	[spread glottis]
English		[ ]	[spread glottis]

(http://www.fikkert.com/Publications/5b.%20Voice_volume_tables.pdf)

7. Two of the "black sheep": Dutch and Swedish

Dutch:

- laryngeal assimilations:

  - untypical patterns:

  - all voiceless obstruents trigger the devoicing of a *following* voiced fricative

  - voiced stops /b d/ trigger *regressive* voicing assimilation of all obstruents

  - c) past tense allomorphy

  - these processes would suggest that Dutch exploits both [spread glottis], to spread rightward in a) and c), and [voice], to spread leftward in b)

7. Two of the "black sheep": Dutch and Swedish

Dutch: Obstruent assimilation patterns (Booij 1995:58-64)

Dut

(1a) *Progressive Assimilation Rule*: "a fricative is devoiced after a voiceless obstruent" (Booij 1995:58, **data** *op.cit.* 58-59, **but presentation modified**)

op**v**allend	/p#v/ > [pf]	'remarkable'
stoe**pz**out	/p#z/ > [ps]	'pavement salt'
op**g**raving	/p#ɣ/ > [px]	'excavation'
zou**tv**at	/t#v/ > [tf]	'salt tub'
zou**tz**uur	/t#z/ > [ts]	'hydrochloric acid'
straa**tg**oot	/t#ɣ/ > [tx]	'gutter'
da**kv**enster	/k#v/ > [kf]	'dormer'
?**kz** [1]		
?**k**ɣ [1]		
a**fv**al	/f#v/ > [f:]	'trash'
*a**fz**uigen*	/f#z/ > a[fs]uigen	'to extract'
a**fg**ang	/f#ɣ/ > [fx]	'failure'
*a**sv**at*	/s#v/ > a[sf]at	'ashbin'
wa**sz**ak	/s#z/ > [s:]	'laundry bag'
wa**sg**oed	/s#ɣ/ > [sx]	'laundry'
pe**chv**ogel	/x#v/ > [xf]	'unlucky person'
la**chz**ak	/x#z/ > [xs]	'laughing machine'
la**chg**as	/x#ɣ/ > [x:]	'laughing gas'

[1] *No example is given in Booij, although nothing seems to exclude these clusters*

7. Two of the "black sheep": Dutch and Swedish

Dutch: Obstruent assimilation patterns

(2a) *Regressive Assimilation Rule*: "voiceless obstruents become voiced before a following voiced stop" (Booij 1995:59)

kla**pb**and	/p#b/ > [b:]	'flat tyre'
o**pd**ruk	/p#d/ > [bd]	'imprint'
eetbaar	/t#b/ > *ee*[db]*aar*	'edible'
po**td**icht	/t#d/ > [d:]	'tight'
koekboek	/k#b/ > *koe*[gb]*oek*	'cookery book'
za**kd**oek	/k#d/ > [gd]	'handkerchief'
a**fb**ellen	/f#b/ > [vb]	'to ring off'
sto**fd**oek	/f#d/ > [vd]	'duster'
ka**sb**oek	/s#b/ > [zb]	'cashbook'
mi**sd**aad	/s#d/ > [zd]	'crime'
la**chb**ui	/x#b/ > [ɣb]	'fit of laughter'
la**chd**uif	/x#d/ > [ɣd]	'laugher'

7. Two of the "black sheep": Dutch and Swedish

Dutch: Obstruent assimilation patterns

(3a) **Past tense allomorphy: Progressive voicelessness assimilation affecting -de**

present stem	past sg. form	gloss
ze/t/	ze[t+t]e	'to put'
vi/s/	vi[s+t]e	'to fish'
re/d/	re[d+d]e	'to save'
raa/z/	raa[z+d]e	'to rage'
roe/r/	roe[r+d]e	'to stir'
zoe/n/	zoe[n+d]e	'to kiss'

7. Two of the "black sheep": Dutch and Swedish

Dutch: **Obstruent assimilation patterns**

- therefore, Dutch seems to exploit *both* [sg] and [voice] in a binary system

- This is both strange for a Germanic language and deemed impossible under laryngeal realism

7. Two of the "black sheep": Dutch and Swedish

Dutch: **Obstruent assimilation patterns**

- **therefore, Dutch seems to exploit *both* [sg] and [voice] in a binary system**

- **This is both strange for a Germanic language and deemed impossible under laryngeal realism**

Honeybone (2005:337) on research by Vaux, Tsuchida, Cohn & Kumada, Iverson & Salmons, Jansen:

"A reasonable null hypothesis remains, however, that specifications will be the same across obstruent classes within one language, unless there is evidence to the contrary."

7. Two of the "black sheep": Dutch and Swedish

Dutch: Obstruent assimilation patterns

- The origin of voicing is attributed to Romance/French influence (Iverson & Salmons 2003b, 2008, etc): (improper) language contact

- Huber & Balogné Bérces (2010):

arguments are strong in favour of either [voice] or [sg] (and they both run into representational problems under laryngeal realism, esp. in GP)

7. Two of the "black sheep": Dutch and Swedish

Dutch: Obstruent assimilation patterns

Summary of what is [voice] and what is [sg] in Dutch laryngeal phonology, compared to "purely" [voice] (e.g. Hungarian) and [sg] (English) languages, with examples

Du...

Sum...
phon... g]
(Eng...

Input	output		
	Hungarian	**Dutch**	**English**
TD ->	DD – fokban 'in degree' (= fogban 'in tooth')	DD – op**dr**uk 'imprint'	TT – matchbox
DT ->	TT – fogtól 'from tooth' (= foktól 'from degree')	TT – schan**dp**aal 'pillory'	TT – bagpipe
SZ ->	ZZ – (hypothetical) részzene 'music of part' (=rézzene 'copper music')	SS – a**sv**at 'ashbin'	SS – push them
ZS ->	SS – rézszerű 'copper-like' (≈ ésszerű 'reasonable')	SS – graa**fs**chap 'county'	SS – gravestone
TZ ->	DZ – (hyp.) fokzene 'degree music' (= (hyp.) fogzene 'tooth music')	TS – op**v**allend 'remarkable'	TS – deep valley
DS ->	TS – fogszerű 'toothlike' (= fokszerű 'degreelike')	TS – aar**ds** (< aarde) 'earthly'	TS – bigfoot
SD ->	ZD – mészben 'in whitewash' (= mézben 'in honey')	ZD – mi**sd**aad 'crime '	ST – birthday
ZT ->	ST – méztől 'from honey' (= mésztől 'from whitewash')	ST – gi**ft** (< geven) 'gift'	ST – cheesecake

T stands for voiceless stop, D for voiced stop, S for voiceless fricative, Z for voiced fricative
(where "voiced" and "voiceless" are used in the traditional, abstract phonological sense)

7. Two of the "black sheep": Dutch and Swedish

Dutch: Obstruent assimilation patterns

- It can be seen that Dutch patterns like [sg] systems, apart from RVA triggered by stops and having scope over any obstruent:

- [voice] needed for RVA

- [sg] and final devoicing can take care of the rest

7. Two of the "black sheep": Dutch and Swedish

Conclusions wrt Dutch:

- Dutch is a mixed system, but:

- only RVA makes it a [voice] system

- the fricative system is based on [sg]

- the past tense allomorphy is also based on [sg]

- therefore: [sg] may turn out to give a better fit in the overall analysis/ classification of the language

7. Two of the "black sheep": Dutch and Swedish

Conclusions wrt Dutch:

- **plus: phonetic evidence (!) (van Alphen 2004):**

- **prevoicing absent in 25% of initial voiced plosive productions (studies on other languages, e.g., Polish, did not report such a high proportion of unprevoiced tokens. Cf. Hung: 100% of the initial lenis stops had prevoicing - Gósy & Ringen 2009)**

- **male speakers: more tokens with prevoicing (86% vs 65%)**

Conclusions

- **phonetic diversity does not necessarily imply phonological differences**

- **Germanic languages are much more uniform phonologically than assumed in recent literature**

Conclusions

"Boy, he must think we're pretty stupid to fall for that again."

English as a purely [sg] language:
- **"devoiced voiced" = unaspirated:**

$$\ldots \text{s\r{g}aɪ} \ldots = \ldots \text{sk}^{=}\text{aɪ} \ldots$$

- **no voice assimilation (as in [voice] languages):** ***zg**