
Sound change, phonological theory, and *inference*

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Come to beautiful Tromsø!



The travelling phonology conference ‘Fonologi i Norden’ will be held in Tromsø early next year. You don’t have to be from Scandinavia or work on a Scandinavian language to participate! Separately, there is a *PhD position* at UiT, *deadline of 15 September*. Catch me this week if you’d like to talk about either of these things (or other opportunities to visit).

§ 1

Preliminaries

What is(n't) a sound change? What is(n't) phonological change?

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- We certainly do want to distinguish between “change” in the strict sense = *innovation*, and “change” in the lamentably loose sense (‘stuff that happens over time in language’). At the same time, *diffusion* or *propagation* (through the population? through space?) is inextricable from all the real-world data that we have to deal with; virtually every ‘change’ of which we are *aware* has come to our notice because it has ‘made it’.

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- We certainly do want to distinguish between "change" in the strict sense = *innovation*, and "change" in the lamentably loose sense ("stuff that happens over time in language"). At the same time, *diffusion* or *propagation* (through the population? through space?) is inextricable from all the real-world data that we have to deal with; virtually every 'change' of which we are *aware* has come to our notice because it has 'made it'. I think this means that as theoretical phonologists, we need a characterisation of both mechanisms; if nothing else, because we want to understand what has driven the synchronic typologies that we see, as most phonologists do. (I'll try to cash this cheque tomorrow.)

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 - Swedish /i/ \neq anyone else's /i/, etc. Maybe even textbook surface variation in French: r > ʀ, ʁ, ʁ̥, or R.

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A few Scandinavian verbs.

Central Swedish

Scanian Swedish

/hø:ra/ [2'hœ:ra]

'to hear'

/çø:ra/ [2'çœ:ra]

'to drive'

/fø:ra/ [2'fœ:ra]

'to bring, to take'

/lɛ:ra/ [2'læ:ra]

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- **So one thing we want to know is whether or not change in the *realisation* of x has led to change in the *system* in which it participates.** Note the implied order of events: change on the surface, then change underneath. We'll return to this point; will all 'surface change' inevitably give rise to phonological change *given sufficient time*?

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Did Icelandic medial fortis stops undergo *sound change*? (Steblin-Kamenskij, 1974)

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Representational change without phonetic change? S-K argues that there was no phonetic 'weakening' here.

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Early WG **habuc* 'hawk' > **hæbuc* ('Anglo-Frisian Brightening') > *hafuc* ('a-restoration') > **hæfuc* ('Second fronting') > *hæɤfuc* > *<heafuc>* in the Mercian *Vespasian Psalter*.

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a-restoration was a **rule**, not a **>**, which was then lost. **Change in the grammar.**

$\underset{[+\text{stressed}]}{\text{æ}} \longrightarrow [+back] / \text{_____} \text{C} \text{V} \underset{[+\text{back}]}{\text{}}$

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<i>uninflected form</i>	<i>absolutive sg.</i>	
<i>gixon</i>	<i>gixona</i>	'man'
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 - In particular, how we (synchronic phonologists? diachronic phonologists?) reason from 1. global typology, 2. 'local' typology, 'dialect data', and the 'relatedness' of varieties; what we can really infer about *change sensu stricto* & its *propagation*; and how right we are to do it.

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If we restrict ourselves in this way, what classes of change do we *not* consider? (c.f. what Patrick has already said.)

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If we restrict ourselves in this way, what classes of change do we *not* consider? (c.f. what Patrick has already said.)

Looking only at changes that are regular in this way, as the Neogrammarians would have, we then have *unconditioned* and *conditioned* changes.

What's where when why?

In that case, what kinds of changes are we 'supposed' to be most interested in? And what are we 'supposed' to be saying about them?

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Looking only at changes that are regular in this way, as the Neogrammarians would have, we then have *unconditioned* and *conditioned* changes. Individual conditioned changes can often look suspiciously like something else we are interested in, which is to say, synchronic phonological alternations, modulo worries about reanalysis and rule inversion; but it is somewhere to start!

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In talking about these two varieties of Swedish, I've been assuming a few things: this is that we know what the *ancestral state* is, and that we know that these two varieties share a common origin. Easily done here, or is it? **What about when we don't know that for sure?**

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But for most practical purposes, a theory of *possible / probable* changes constrains what we ought to be reconstructing. What constrains it in turn? **What assumptions have I made in saying these sentences?**

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 - And see e.g. Kümmel (2012), who points out (Blust, 1974, 2006) that Kelabit (Northern Borneo) has voiced aspirates without voiceless ones. i.e. enhance our hypothesis-formation via better *global typological attestation*.

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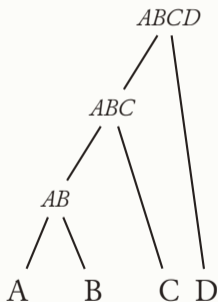
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Let's say that we've resolved all of this, and we've decided that varieties A, B, C, and D are all related through sound comparative reasoning, and decided on a possible family tree:

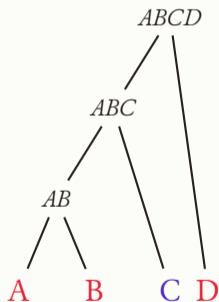
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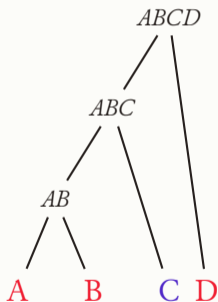
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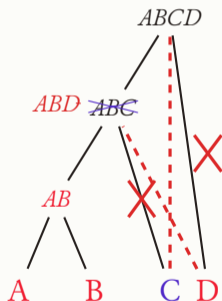
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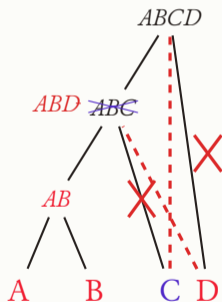
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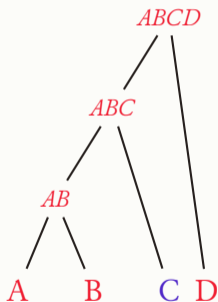
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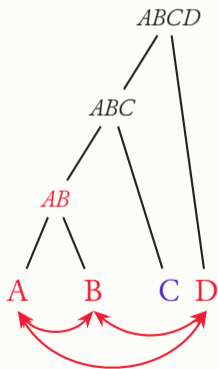
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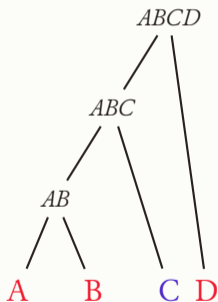
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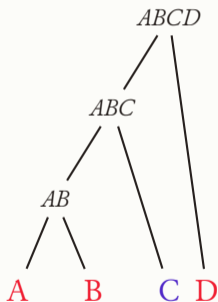
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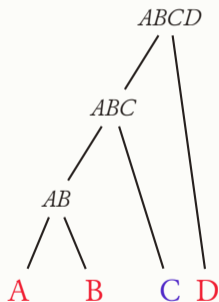
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Disambiguating between these options is, I'd argue, a job for a good theory of what phonological change can do.

§2

Where does phonological change begin?

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'drive'±P.PTCP	çø:ra	çø:ɹ̥	çø:ka çø:kt
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'drive'±P.PTCP	çø:ra	çø:ɹ	çø:ɸa	çø:ɸt	çø:ra	çø:rt
'bring, take'±P.PTCP	fø:ra	fø:ɹ	fø:ɸa	fø:ɸt	fø:ra	fø:rt
'learn'±P.PTCP	lɛ:ra	lɛ:ɹ	lɛ:ɸa	lɛ:ɸt	lɛ:ra	lɛ:rt

What's where when why?

Let's take a look at that Scandinavian retroflexion again.

Swedish retroflexion.

	<i>Central Swedish</i>		<i>Scanian Swedish</i>		<i>Helsinki Swedish</i>	
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'drive'±P.PTCP	çø:ra	çø:ɹ	çø:ɸa	çø:ɸt	çø:ra	çø:rt
'bring, take'±P.PTCP	fø:ra	fø:ɹ	fø:ɸa	fø:ɸt	fø:ra	fø:rt
'learn'±P.PTCP	lɛ:ra	lɛ:ɹ	lɛ:ɸa	lɛ:ɸt	lɛ:ra	lɛ:rt

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'learn'±P.PTCP	lɛ:ra	lɛ:ɹ	lɛ:ɸa	lɛ:ɸt	lɛ:ra	lɛ:rt

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'drive'±P.PTCP	çø:ra	çø:ɹ	çø:ɸa	çø:ɸt	çø:ra	çø:rt
'bring, take'±P.PTCP	fø:ra	fø:ɹ	fø:ɸa	fø:ɸt	fø:ra	fø:rt
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'drive' ±P.PTCP	çø:ra	çø:ɹ	çø:ɸa	çø:ɸt	çø:ra	çø:rt
'bring, take' ±P.PTCP	fø:ra	fø:ɹ	fø:ɸa	fø:ɸt	fø:ra	fø:rt
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- Is there a pattern which is logically possible but not attested? **Is that gap systematic?**

What's where when why?

Norwegian retroflexion (Stausland Johnsen, 2012).

	<i>Standard E. Norwegian</i>	<i>(Stavanger)</i>	<i>Frogner, Arendal & Tvedestrand</i>
'hear'±PRET	hø:r	hø:ɹ	
'big'±NEUTER	stu:r	stu:ɹ	
'father'±POSS	fa:r	fa:ɹ	

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	<i>Standard E. Norwegian</i>		<i>(Stavanger)</i>	<i>Frogner, Arendal & Tvedestrand</i>
'hear'±PRET	hø:r	hø:ɹ̥ə	hø:ɕ	hø:ɕt
'big'±NEUTER	stu:r	stu:ɹ̥	stu:ɕ	stu:ɕt
'father'±POSS	fa:r	fa:ɹ̥	fa:ɕ	fa:ɕs

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'big'±NEUTER	stu:r	stu:ɹ̥	stu:ɾ	stu:ɾt	stu:ɾ
'father'±POSS	fa:r	fa:ɹ̥	fa:ɾ	fa:ɾs	fa:ɾ

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'big'±NEUTER	stu:r	stu:ɹ	stu:ɕ	stu:ɕt	stu:ɕ	stu:ɹ
'father'±POSS	fa:r	fa:ɹ	fa:ɕ	fa:ɕs	fa:ɕ	fa:ɹ

What's where when why?

Normal · · · · · (S. 1, 11.1, 2012)

trand

'h
'b
'fa



(B) Uvular *r*



(c) Retroflexion

Bye (2011)
figs. 6b. and 8c.

What's where when why?

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'big'±NEUTER	stu:r	stu:ɹ	stu:ɣ	stu:ɣt	stu:ɣ	stu:ɹ
'father'±POSS	fa:r	fa:ɣ	fa:ɣ	fa:ɣs	fa:ɣ	fa:ɣ

Six varieties, three patterns. What possible explanations can we come up with?

- *Should* we expect retroflexion with one of these 'r's and not the other?

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'big'±NEUTER	stu:r	stu:ɹ	stu:ɕ	stu:ɕt	stu:ɕ	stu:ɹ
'father'±POSS	fa:r	fa:ɹ	fa:ɕ	fa:ɕs	fa:ɕ	fa:ɹ

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$$\begin{array}{c} \left[\begin{array}{l} -\text{syll} \\ +\text{son} \\ -\text{nas} \\ -\text{ant} \end{array} \right] \\ /r/ \end{array} + \begin{array}{c} \left[\begin{array}{l} -\text{syll} \\ +\text{ant} \\ +\text{cor} \end{array} \right] \\ /t/ \end{array} \longrightarrow 0 + [-\text{ant}]$$
$$\longrightarrow 0 + [t]$$

What's where when why?

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'big'±NEUTER	stu:r	stu:ɹ̥	stu:ɕ	stu:ɕt	stu:ɕ	stu:ɹ̥
'father'±POSS	fa:r	fa:ɹ̥	fa:ɕ	fa:ɕs	fa:ɕ	fa:ɹ̥

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$$\begin{array}{c} \left[\begin{array}{l} +\text{son} \\ -\text{nas} \\ +\text{back} \\ -\text{high} \end{array} \right] \\ /ɕ/ \end{array} + \begin{array}{c} \left[\begin{array}{l} -\text{syll} \\ +\text{ant} \\ +\text{cor} \end{array} \right] \\ /t/ \end{array} \longrightarrow 0 + [-\text{ant}]$$
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- **Yes** if /ɹ/ ≠ /ɐ/ and we think /ɹ/ is something like [-anterior].

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'hear'±PRET	hø:r	hø:ɹə	hø:ɐ	hø:ɐt	hø:ɐ	hø:ɹə
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'father'±POSS	fa:r	fa:ɻ	fa:ɐ	fa:ɐs	fa:ɐ	fa:ɻ

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A little more data? (Norwegian from Stausland Johnsen 2012, Swedish made up).

	<i>Central Swedish</i>		<i>Standard E. Norwegian</i>	
'yellow-NEUT'	/gʏ:l-t/	[gʏ:lt]	/gʏ:ɹ-t/	[gʏ:ɹ]
'steal (IMP) your'	/hʏɛ:l#din/	[hʏɛ:ldin]	/stæ:ɹ#din/	[stæ:din]
'stiff/sore as'	/ste:l#sɔm/	[ste:lsɔm]	/stø:ɹ#sɔm/	[stø:sɔm]
'big as'	/stʏ:r#sɔm/	[stʏ:sɔm]	/stʏ:ɹ#sɔm/	[stʏ:sɔm]

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'father'±POSS	fa:r	fa:ɹ̥	fa:ɐ	fa:ɐs	fa:ɐ	fa:ɹ̥

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- **Or not?** Why retroflex at all?

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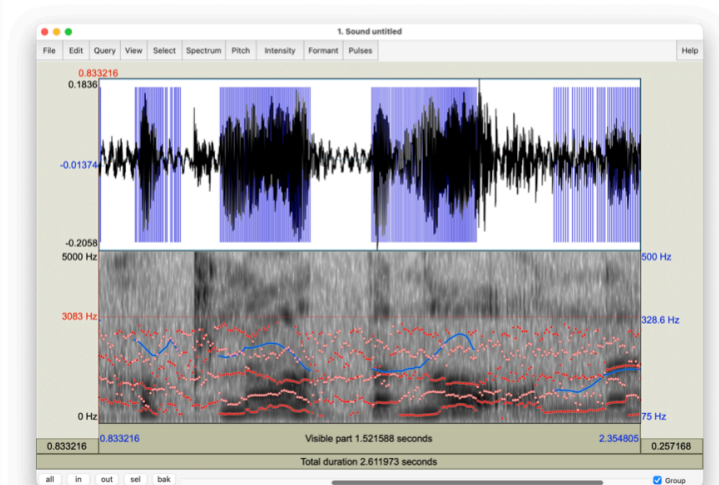
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- **What about phonetics?**

The phoneticians' revenge

Sorry, but we have to talk about the wet, messy stuff for a moment.

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All phonetics, always has been?

'For well over a century, research in historical phonology has been informed by the observation that, in numerous instances of sound change, the innovative grammar replicates a previously unintended phonetic effect.' (Bermúdez-Otero and Hogg, 2003, 4)

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 - *Top-down*. Change is driven by *structural* factors; often properties of inventories, like *symmetry* and *economy*, and their trade-offs against *contrast* (look at e.g. Martinet 1955).

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“[D]iachrony proposes, synchrony disposes” (Hyman, 2008, 129)

One way to try to adjudicate between them: phonological change is usually *initiated* by phonetic factors, but systemic considerations restrict the set of possible outcomes?

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- That's nice, but what are we supposed to do with it?
- Possible pathways of change essentially *must* (sometimes) be restricted by things other than the grammar; if so, then a source of much contention within the literature has been whether the restrictions that acoustics, perception, physiology etc. impose by their nature must *also* be encoded into the grammar (redundantly!).

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The phoneticians' revenge

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Phonetics > phonology

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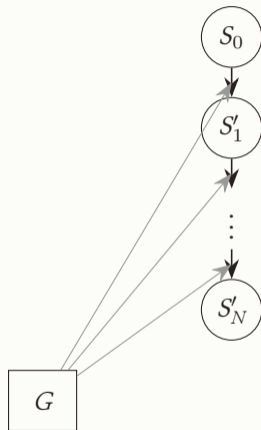
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S_0

G

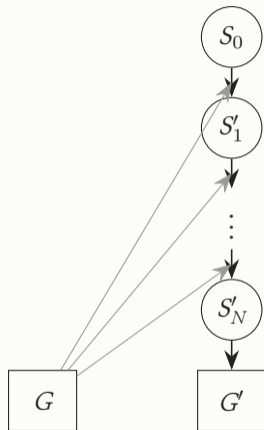
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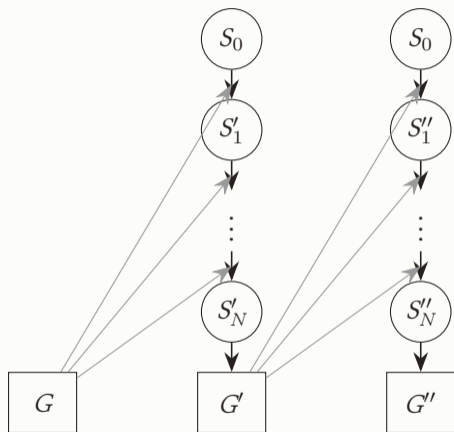
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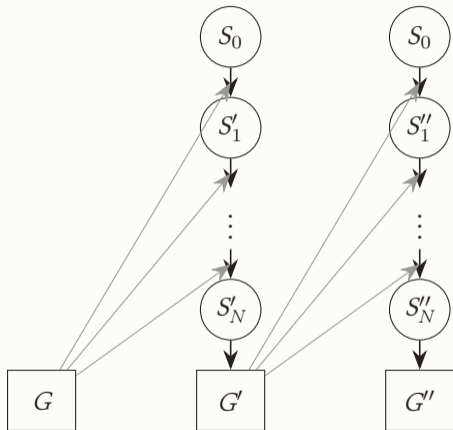
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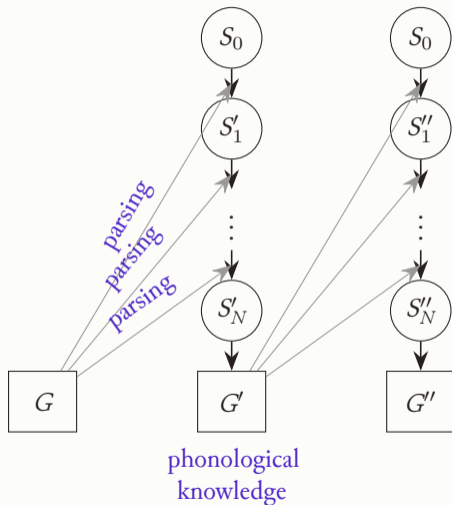
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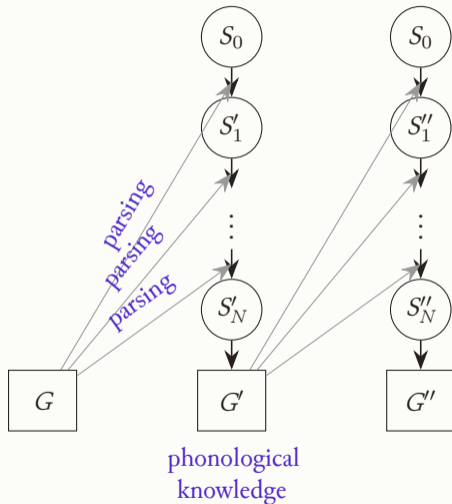
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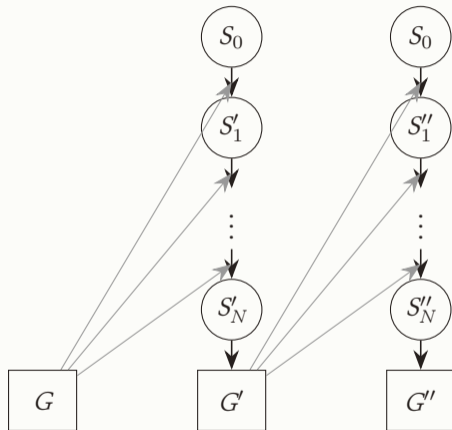
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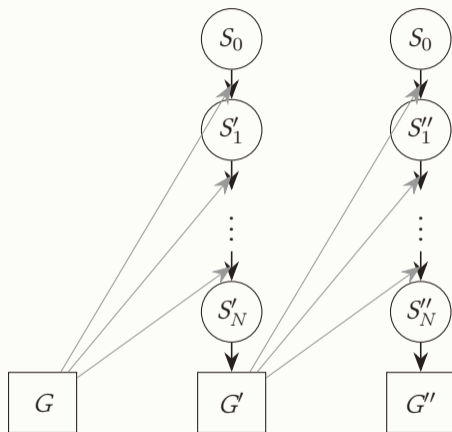
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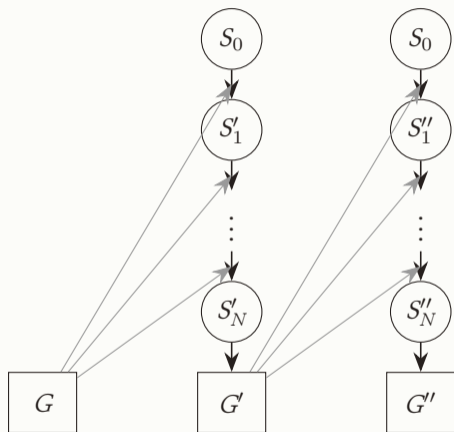
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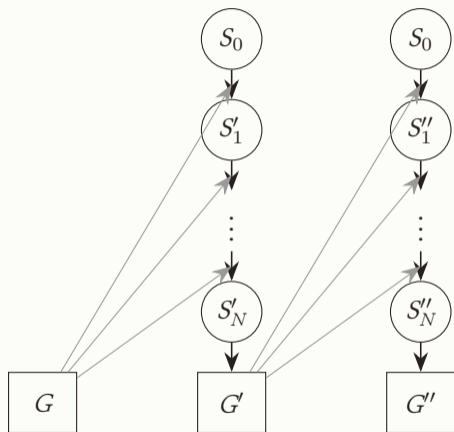
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 - If retroflexion enters the phonology of a variety via perceptual errors driven by low F3, *then we should predict that it does not 'phonologise' readily in varieties with κ .*



Phonologisation and sequels

So the idea so far is that we have to pay some attention to phonetics, because phonetics can introduce perturbations in the *input* to a new acquirer, which *with some probability* lead to failures in parsing, reparses, and downstream reanalysis.

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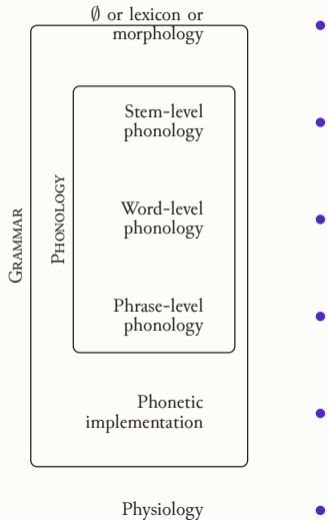
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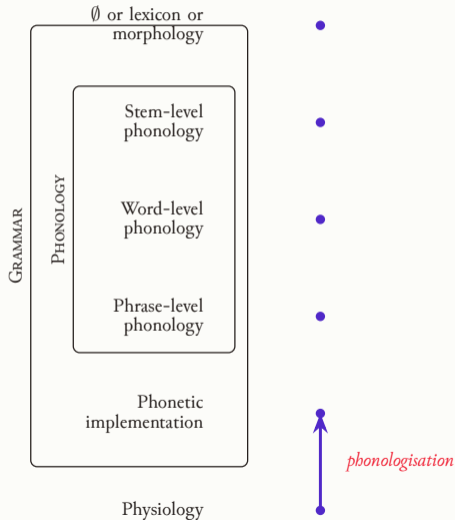
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 - *Stratification*. It's possible for the phonological domains corresponding to the various morphosyntactic constituents to be subject to different phonological generalisations (e.g. 'stem-level phonology' \neq 'word-level phonology' \neq 'phrase-level phonology'). (Jakobson 1931, 165; Kiparsky 1982).

The life cycle of phonological processes



A phonetic effect originates outside the grammar and is successively reanalysed into higher modules.

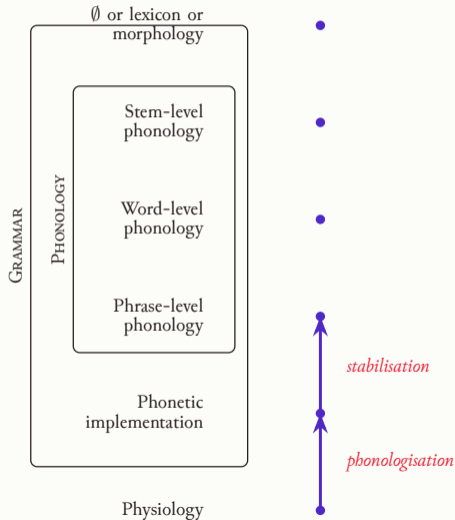
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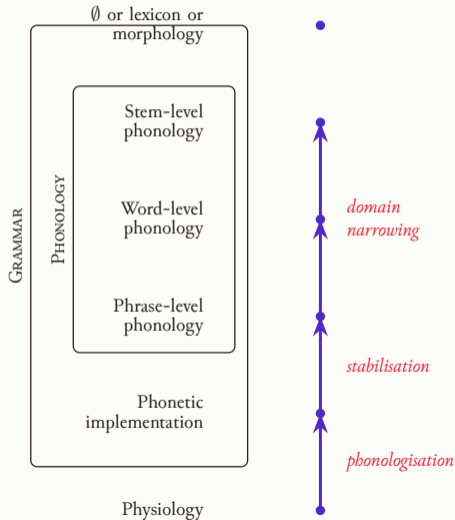
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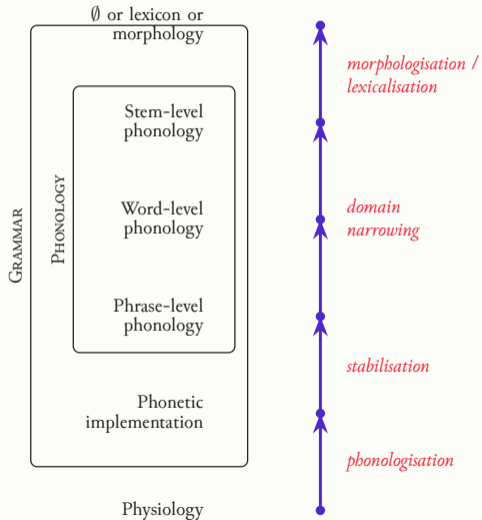
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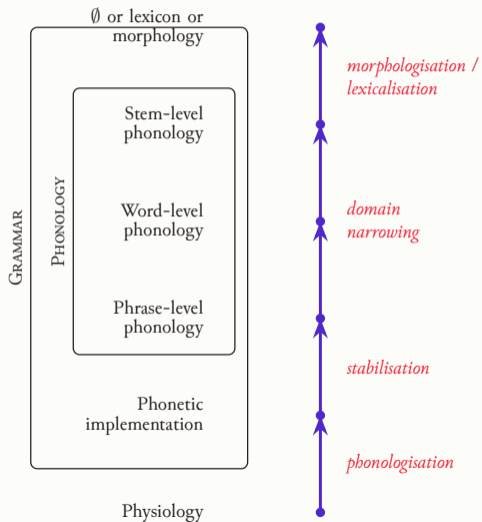
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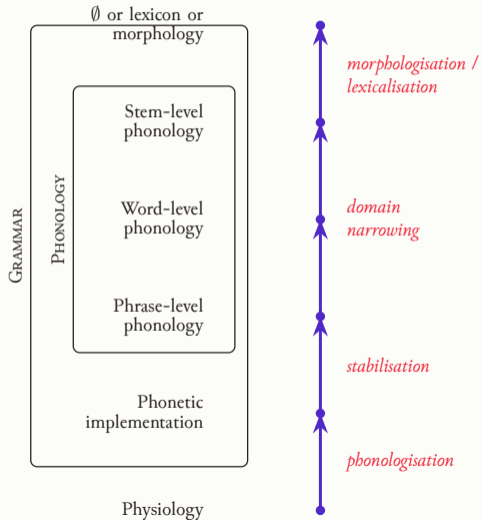


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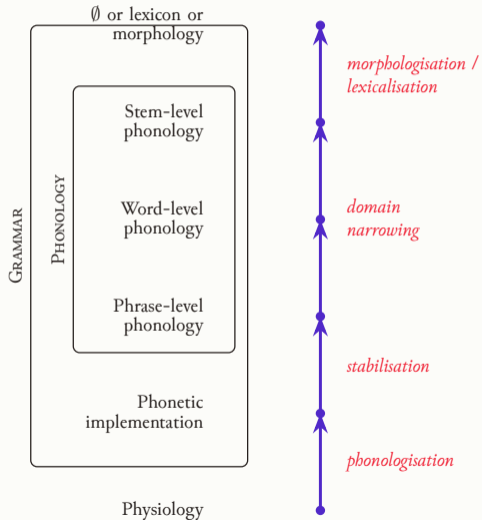
If we believe Bermúdez-Otero (2015) (etc.) then this is **overwhelmingly unidirectional**, with at most isolated retrograde steps.

The life cycle of phonological processes



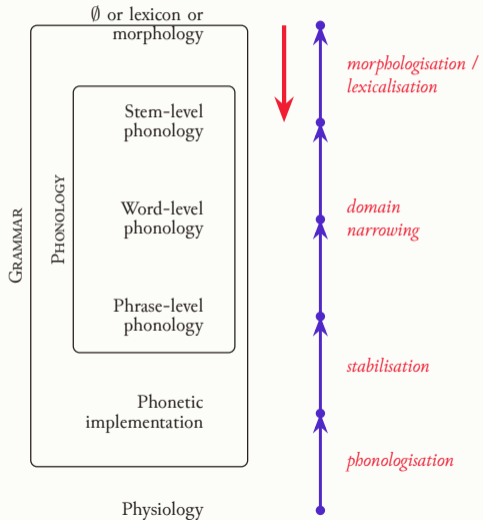
Why should change propagate upward through the grammar?

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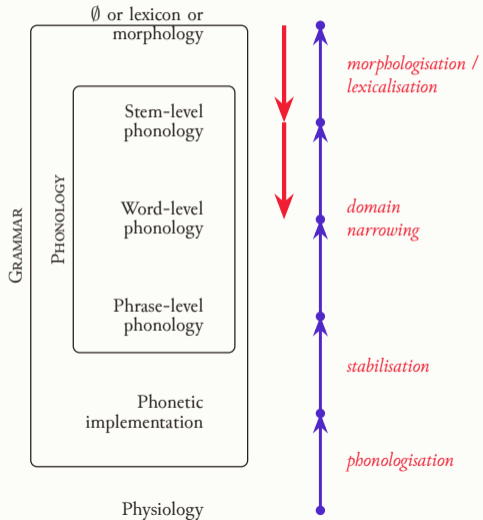
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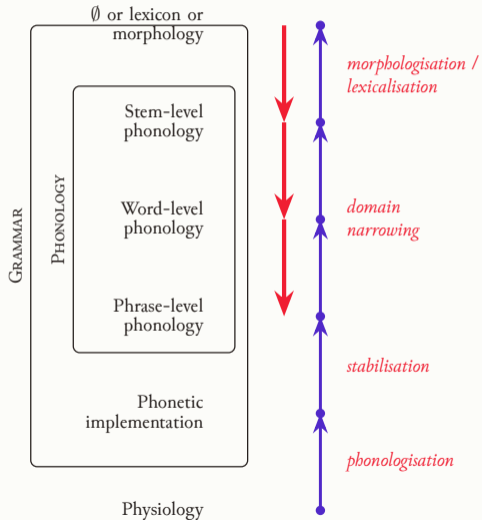
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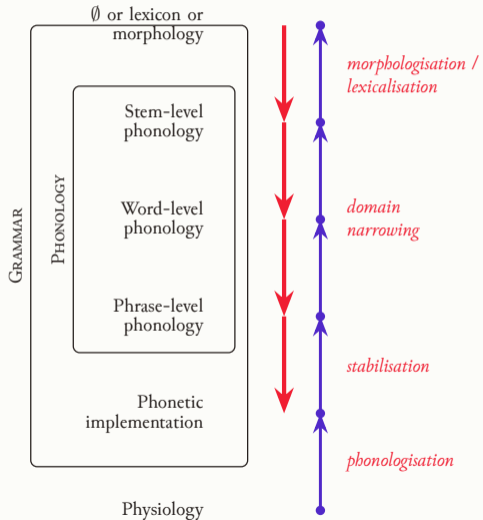
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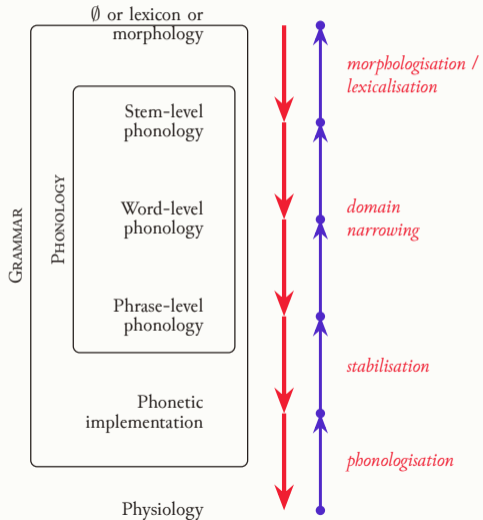
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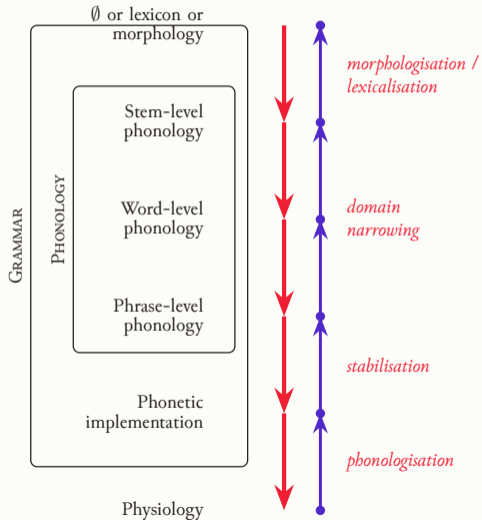
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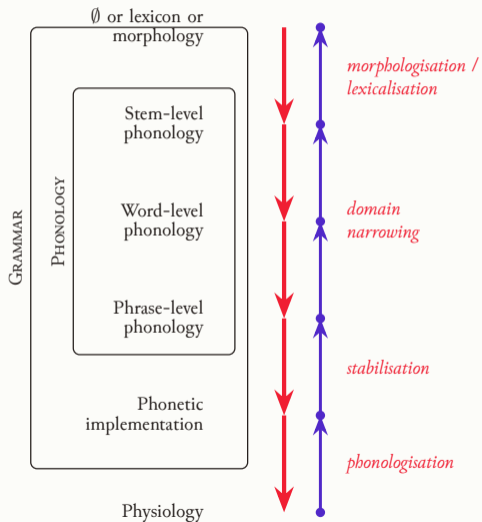
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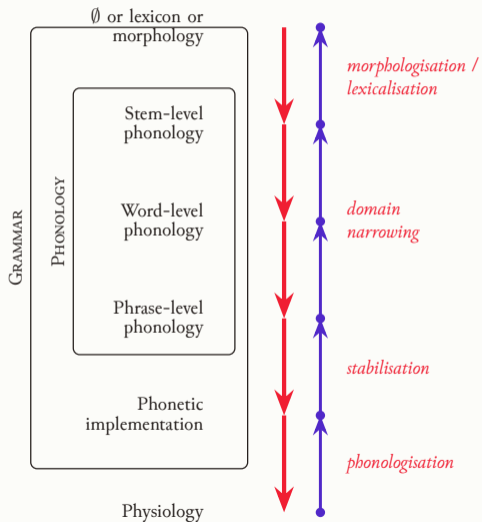
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- In **production**, information flows downward: morphology \rightarrow phonology (SL \rightarrow WL \rightarrow PL) \rightarrow phonetics.
- But in **learning** there is no access to other speakers' Gs, so all we can do is **infer** them from the acoustic signal.
- Hence *input restructuring*. A property derived within module X is over-represented in the output of X, and a learner assumes that it was present in the input to X instead – which is the output of X-1.

The life cycle of phonological processes

How is this supposed to work?

The life cycle of phonological processes

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Domain narrowing in postnasal /g/-deletion

Stage	Level reached	<i>elongate</i>	<i>prolong-er</i>	<i>prolong it</i>	<i>prolong</i>
0	—	ŋg	ŋg	ŋg	ŋg

- What there must have been in EModE is some kind of *phonetic* effect on the durations of post-nasal pre-pausal stops.

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- James Elphinston, *Principles of the English Language* (1765): /g/ is pronounced after /ŋ/ “to articulate either a vowel or a liquid; which it does not only if the vowel or liquid follow in the same word, but even, upon solemn occasions, if either feebly commence the word following in immediate connexion and dependance” (Blevins and Garrett 2009 excerpt this and give a more detailed exegesis).

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- Presumably, in Elphinston's “un-solemn” speech, word-final /g/ is deleted after /ŋ/ even if there's something ‘resyllabifiable’ coming up.

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3	stem level	ŋg	ŋ	ŋ	ŋ

- This is certainly my idiolect.

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Frogner Norwegian (Stausland Johnsen, 2012, 516).

“Retroflexion is a very old process in E. Norwegian, dating back as far as the 14th century (Seip 1955: 177, 289). The Frogner dialect in Oslo is an E. Norwegian dialect [...] Uvular /ɣ/, on the other hand, cannot be very old in the Frogner dialect [...] dating back no further than the middle of the 18th century (Nielsen 1950). Retroflexion must therefore have existed in Oslo long before /r/ was replaced by a uvular /ɣ/ in the Frogner dialect. So when /ɣ/ was introduced into the dialect, the retroflexion process already existed [...]”

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“Retroflexion is a very old process in E. Norwegian, dating back as far as the 14th century (Seip 1955: 177, 289). The Frogner dialect in Oslo is an E. Norwegian dialect [...] Uvular /ɣ/, on the other hand, cannot be very old in the Frogner dialect [...] dating back no further than the middle of the 18th century (Nielsen 1950). Retroflexion must therefore have existed in Oslo long before /r/ was replaced by a uvular /ɣ/ in the Frogner dialect. So when /ɣ/ was introduced into the dialect, the retroflexion process already existed [...]”

- If we accept this chronology, then we don't need /ɣ/ to *condition* development in Frogner; we just need it to do what we want representationally.

Retroflexion, yet again

- So going backwards, we've raised two quarrels with Frogner, Arendal & Tvedestrand Norwegian retroflexion.
 - Formally, /ɻ/ may lack the *features* that condition synchronic alternation.
 - Phonetically, /ɻ/ may lack the *surface properties* that condition diachronic development.
- **Are these serious problems?** We need a little more ammunition to answer this.
- Arendal and Tvedestrand, unfortunately, are the exact inverse of Frogner; in these varieties, we are fairly sure that the retroflexion rule arrives substantially *after* /ɻ/, and so we can't appeal to the idea that retroflexion is phonetically straightforward to innovate.

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- *So how does that work?* **Stay tuned!**

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