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Diachronic phonological typology: a plea for detail

Patrick Honeybone
University of Edinburgh
patrick.honeybone@ed.ac.uk

The structure of the talk:

1. Phonological (in)stability and diachronic phonological typology
2. A crude intuitive approach and crude quantitative approach (bad ideas?)
3. What really matters: what is the *Relevant Entity for Phonological Stability or Instability*?
4. A plea for detail: contrasts, systems and *full analysis*

1. Phonological (in)stability and diachronic phonological typology

The call for this session says:

- "The aim of this workshop is to explore the stability and instability of sound patterns, understood here as the set of phonetic and phonological properties of languages."
  - what a fantastic thing to do!

For me, the questions being considered are a central aspect of Historical Phonology

- they involve fundamental issues of diachronic phonological typology
  - if it is true that certain phonological structures/entities/units undergo change a lot, and others undergo change a little, Historical Phonology needs to know/explain this
- [there are also potential applications: if it can be shown beyond doubt that certain structures/entities/units are very stable, it could be reasonable to rely on those when working out contentious linguistic classification and reconstruction]
  - [this is the point of Greenhill, Wu, Hua, Dunn, Levinson & Gray (2017)]

So, stability is indeed worth thinking about; although, it rarely *is* thought about:

- Ségéral & Scheer (2008, 140): "Phonologists, however, tend to accept only observable modifications as a phonologically relevant event – even if, as Lass (1973) points out, stability, rather than change, is surprising in diachronic evolution."
- but, however, although: stability and the causes of stability are quite different things…

2. A crude intuitive approach and crude quantitative approach

So: *are* certain phonological entities/structures/units more stable than others?

We would probably all agree, on an 'intuitive' basis that:

- h is *more likely* to be lost
- m is *less likely* to be lost

And I'd stick my neck out and say:

- c is *more likely* to change into something else
- p is *less likely* to change into something else

There is also a fair amount of relevant discussion in the literature, such as:

- Blevins (2004, 6) discussing "one particularly common sound change, that of s > h"
- Michaud, Jacques & Rankin (2012, 2) say that: "A widely attested diachronic change is the creation of nasal vowels from nasal codas, the latter disappearing in the process."

But: it's surely not ok to rely on 'intuitions' about this.

So: how can we establish if some phonological structures are stable and some unstable?

- or: if some phonological structures are more stable than others?

Wichmann & Holman (2009) offer stability metrics (based on WALS) for some things:

• voicing in plosives and fricatives	22.0	very unstable
• lateral consonants	31.3	unstable
• vowel nasalization	57.0	very stable

So do Greenhill, Wu, Hua, Dunn, Levinson & Gray (2017) (from 81 Austronesian languages)

• is there phonemic vowel length?	fast changing
• is there a phonemic distinction between l/r?	medium
• are there fricative phonemes?	slow changing

But what if we want to know whether things like *these* are true?

- h is *more likely* to be lost
- m is *less likely* to be lost
- c is *more likely* to change into something else
- p is *less likely* to change into something else

How could we find out if those things are true? A crude quantitative approach.

Here's one possible (quantitative, diachronic) approach:

- take a language family that we know a good amount about
  - one that goes back several thousand years
  - which has a good number of diverse well-described descendent languages
  - for which we can reconstruct the proto-language with some confidence
- take a number of words which are likely to be retained in languages
  - = take them from a Swadesh list
- compare the words, as reconstructed in the proto-language, with a number of diverse descendent languages (from a number of diverse descendent language families)
  - determine whether the phonological units of the proto-language have been stable or not in the histories of the descendent languages
  - compare the phonological units involved in terms of their relative stability

[This is a 'vertical'/diachronic approach, unlike Wichmann & Holman (2009) and Greenhill, Wu, Hua, Dunn, Levinson & Gray (2017) who have a 'horizontal'/synchronic approach.]

So… I had a go…

- I only know anything in detail about Indo-European, so I used Indo-European
- as descendent languages, I used:
  - English
  - Welsh
  - Serbo-Croat (Central South Slavic, Bosnian/Croatian/Montenegrin/Serbian)
  - French
  - Armenian
- this gives a time depth of 5000-6000 years

- I considered consonants and the first 28 (more or less) nouns on the final Swadesh list
- I used Pokorny's (1959) *Indogermanisches etymologisches Wörterbuch* (Köbler's online version) and, among others, Brill's searchable IE etymological dictionaries:
  - *Etymological Dictionary of Proto-Germanic*
  - *Etymological Dictionary of Proto-Celtic*
  - *Etymological Dictionary of the Slavic Inherited Lexicon*
  - *Etymological Dictionary of Latin*
  - *Etymological Dictionary of the Armenian Inherited Lexicon*
- I considered all the consonants in the morphological stems (≅) to see if they have survived unchanged (though transmission) in the 5 descendent languages

What were the consonants of PIE?

Ringe (2011) gives this inventory:

Phoneme inventory of Proto-Indo-European (39 phonemes)

p	t	ḱ	k	k^w	y	
b	d	ǵ	g	g^w	w	
b^h	d^h	$ǵ^h$	g^h	g^{wh}	m	m̥
	s	h_1	h_2	h_3	n	n̥
					l	l̥
					r	r̥

I treat syllabic and nonsyllabic sonorants as the same phonological entity, I use IPA-like symbols, and I ignore laryngeals (as does Pokorny) – this gives:

p	t	c	k	k^w	j
b	d	ɟ	g	g^w	w
b^h	d^h	$ɟ^h$	g^h	g^{wh}	m
	s				n
					l
					r

Is it *absurd* to think that much could survive that long?

- no: some segments do indeed seem to have survived unchanged (= have been stable) for as long as we can know = c. 5000-6000 years

PIE	Gmc = Eng	Celtic = W	Slavic = SC	Italic = Fr	Armenian	stability
*gᵘ̯ĕn- *gʷenh₂- *gʷ–V–n-	*queen*	*benyw*	*žena*	—	*kin*	gʷ = 0/4 = 0 n = 4/4 = 1
	gʷ = 0 n = 1	gʷ = 0 n = 1	gʷ = 0 n = 1	—	gʷ = 0 n = 1	
*ment- *mn-to- *m–V–nt-	*mouth*	*mant*	—	*menton*	—	m = 3/3 = 1 n = 1/3 = 0.333 t = 2/3 = 0.666
	m = 1 n = 0 t = 0	m = 1 n = 1 t = 1	—	m = 1 n = 0 t = 1	—	

If we do this, we end up with something that looks like it means something…

stability		stable/possible	number of words
0	c	0/10	2
0	ɟʰ	0/8	2
0	kʷ	0/5	1
0	gʷ	0/4	1
0	bʰ	0/4	1
0	dʰ	0/3	1
0	gʰ	0/5	1
0.214	t	3/14	4
0.25	g	1/4	1
0.272	w	3/11	4
0.291	d	7/24	6
0.3	p	3/10	3
0.333	k	2/6	2
0.48	s	12/25	9
0.619	m	13/21	7
0.638	n	23/36	9
0.714	l	5/7	2
0.947	r	18/19	7

Do these numbers mean anything?

Have I discovered the relative (in)stability of these segment types?

- I am cautious

What's wrong with this approach…?

- it's just Indo-European!
  - and I might have got it wrong! I know little about Armenian, for example…
- it depends on analysis: the figures depend on final rhotics being present in English
  - if they are not, r goes down from 0.947 (18/19) to 0.736 (14/19)
- it's all focused on 'contextless' segments
- if s and n are so stable, how can it also be true tht:
  - "one particularly common sound change … [is] … s > h"
  - "a widely attested diachronic change is the creation of nasal vowels from nasal codas, the latter disappearing in the process"
  - s and n are stable in onsets, not codas? we need to consider phonological environments

And, more fundamentally: this last point focuses on changes, not structures

- what *should* we be focusing on when we consider phonological (in)stability?

3. What is the *Relevant Entity for Phonological Stability or Instability*?

Should we consider individual segments when we evaluate phonological stability?

- or should we focus on features? or contrasts? series of segments? subsystems like tone? or on a whole segmental/phonological system?
  - what is the *Relevant Entity for Phonological Stability or Instability* (REfPhSoI)?

A productive approach might be to direct our attention *not* at the stability of structures but at the likelihood of changes

- if we do this, we need to work on the typology of changes
  - which changes are common? which are rare? which changes are possible?
- are there impossible changes? for example: θ > f, but f ⊁ θ

I think it is sensible to assume that a key REfPhSoI is: 'the change'

- if this is right, there are further complications – at the least, changes could involve:
  - the innovation of a phonological process
  - the reanalysis of underlying structures

If this is right, my crude PIE investigation is aimed the wrong way

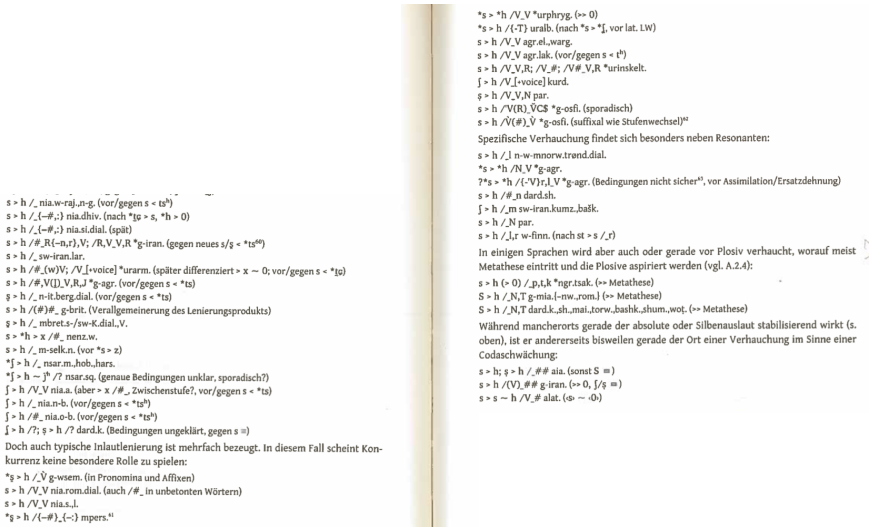
- it may be that n is not inherently stable, but it may be stable because there are few changes which remove initial-n (and, also, initial-n is common in languages)

Can we work out the typology of phonological changes?

To do so involves an immense amount of work

- one starting point is: Kümmel (2007) *Konsonantenwandel: Bausteine zu einer Typologie des Lautwandels und ihre Konsequenzen*
  - this heroic work groups cases of 'types of change' which can be compared in terms of how common they are in the history of over 200 languages:

s > h



*s > *h /V_V *urphryg. (=> 0)
*s > h /{-T} uralb. (nach *s > *ʃ, vor lat. LW)
s > h /V_V agr.el.,warg.
s > h /V_V agr.lak. (vor/gegen s < tʰ)
s > h /V_V,R; /V_#; /V#_V,R *urinskelt.
ʃ > h /V_[+voice] kurd.
ʂ > h /V_V,N par.
s > h /V(R)_V̆C$ *g-osfi. (sporadisch)
s > h /V̆(#)_V̆ *g-osfi. (suffixal wie Stufenwechsel)[42]

Spezifische Verhauchung findet sich besonders neben Resonanten:

s > h /_l n-w-mnorw.trønd.dial.
*s > *h /N_V *g-agr.
?*s > *h /(-'V)r,l_V *g-agr. (Bedingungen nicht sicher[43], vor Assimilation/Ersatzdehnung)
s > h /#_n dard.sh.
ʃ > h /_m sw-iran.kumz.,bašk.
s > h /_N par.
s > h /_l,r w-finn. (nach st > s /_r)

In einigen Sprachen wird aber auch oder gerade vor Plosiv verhaucht, worauf meist Metathese eintritt und die Plosive aspiriert werden (vgl. A.2.4):

s > h (> 0) /_p,t,k *ngr.tsak. (=> Metathese)
S > h /_N,T g-mia.(-nw.,rom.) (=> Metathese)
S > h /_N,T dard.k.,sh.,mai.,torw.,bashk.,shum.,wot. (=> Metathese)

Während mancherorts gerade der absolute oder Silbenauslaut stabilisierend wirkt (s. oben), ist er andererseits bisweilen gerade der Ort einer Verhauchung im Sinne einer Codaschwächung:

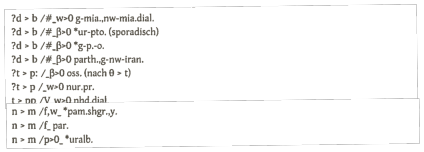
s > h; ʂ > h /_## aia. (sonst S =)
s > h /(V)_## g-iran. (=> 0, ʃ/ʂ =)
s > s ~ h /V_# alat. (‹s› ~ ‹0›)

s > h /_ nia.w-raj.,n-g. (vor/gegen s < tsʰ)
s > h /_{–#,:} nia.dhiv. (nach *tɷ > s, *h > 0)
s > h /_{–#,:} nia.si.dial. (spät)
s > h /#_R{–n,r},V; /R,V_V,R *g-iran. (gegen neues s/ʂ < *ts[44])
s > h /_ sw-iran.lar.
s > h /#_{w}V; /V_[+voice] *urarm. (später differenziert > x ~ 0; vor/gegen s < *tɷ)
s > h /#,V{},V,R,J *g-agr. (vor/gegen s < *ts)
ʂ > h /_ n-it.berg.dial. (vor/gegen s < *ts)
s > h /(#)#_ g-brit. (Verallgemeinerung des Lenierungsprodukts)
ʂ > h /_ mbret.s-/sw-K.dial.,V.
s > *h > x /#_ nenz.w.
s > h /_ m-selk.n. (vor *s > z)
*ʃ > h /_ nsar.m.,hob.,hars.
*ʃ > h ~ ʃʰ /? nsar.sq. (genaue Bedingungen unklar, sporadisch?)
ʃ > h /V_V nia.a. (aber > x /#_; Zwischenstufe?, vor/gegen s < *ts)
ʃ > h /_ nia.n-b. (vor/gegen s < *tsʰ)
ʃ > h /#_ nia.o-b. (vor/gegen s < *tsʰ)
ʃ > h /?; ʂ > h /? dard.k. (Bedingungen ungeklärt, gegen s =)

Doch auch typische Inlautlenierung ist mehrfach bezeugt. In diesem Fall scheint Konkurrenz keine besondere Rolle zu spielen:

*ʂ > h /_V̆ g-wsem. (in Pronomina und Affixen)
s > h /V_V nia.rom.dial. (auch /#_ in unbetonten Wörtern)
s > h /V_V nia.s.,l.
*ʂ > h /(–#)_{–:} mpers.[45]

dental/alveolar > labial



?d > b /#_w>0 g-mia.,nw-mia.dial.
?d > b /#_β>0 *ur-pto. (sporadisch)
?d > b /#_β>0 *g-p.-o.
?d > b /#_β>0 parth.,g-nw-iran.
?t > p: /_β>0 oss. (nach θ > t)
?t > p /_w>0 nur.pr.
t > nn /V_w>0 nhd.,dial.
n > m /f,w.,*pam.shgr.,y.
n > m /f_ par.
n > m /p>0_ *uralb.

- however…
  - we would ideally investigate each change in detail to be sure that all are comparable
  - are all changes listed endogenous and monoquantal and rule-additions? or are they exogenous? or telescoped? or reanalyses?

4. A plea for detail: contrasts, systems and *full analysis*

If it is right that we should be focusing on the probability of languages innovating a particular type of change, we need to consider the detail of each case

- there may be reasons (unrelated to the change itself) why the innovation of a change might be inhibited in particular phonological systems
- a change may be likely in and of itself, but some aspect of a phonological system may be able to inhibit it
  - if that kind of system is common (e.g., in a language family or in a linguistic area), the change may (falsely) be seen as unlikely (or even impossible)

Gurevich (2004) makes a claim along these lines – Round (2019) summarises it thus:

- "Gurevich's (2004) survey of 153 languages world-wide … showed that when a sound's phonemic category is changed by diachronic lenition, the result in over 90% of cases is a phonemic category which is novel"
  - Gurevich's argument is that such changes are far more likely if they are non-neutralising

One way of interpreting this is to assume that:

- b, d, g > β, ð, ɣ is a common change (there are many cases in Gurevich 2004)
  - but it can be inhibited by the existence of a contrast /b, d, g : β, ð, ɣ/

Specific properties of phonological systems may inhibit otherwise likely changes

- this could undermine/affect our understanding of the likelihood of changes
  - unless we investigate the systems involved in detail

Is this a widespread issue?

- it could be…
  - other potential cases are not difficult to think of – for example:
- spontaneous u-fronting is common: u > y
  - e.g., in Modern English, Basque, Ancient Greek...
  - but is it possible in all kinds of phonological systems?
  - could it happen in a language which has the vowel system /i, a, u/?
  - that would leave /i, y, a/ – is that a possible vowel system?

So, it may be that:

- u > y is a possible change, but:
  - u > y {¬/i, a, u/}
  - u ⊁ y {/i, a, u/}
- and maybe we should thus assume: b, d, g ⊁ β, ð, ɣ {/β, ð, ɣ/}

In order to know such things, we need a full analysis of the phonological systems involved.

Another example?

Hyman (1975, 17-18) writes that:

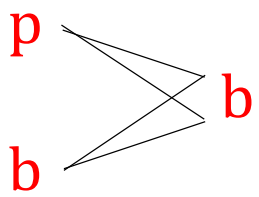
- "... a sound change turning all instances of [p, t, k] into [b, d, g] has never been reported. If such a sound change were to take place, the resulting system would include a series of voiced stops but no series of voiceless stops. In other words, the Jakobsonian implicational universal whereby /b, d, g/ implies /p, t, k/ would be violated. As pointed out by Greenberg, any sound change which produces an impossible sound system (such as the one which would result from a change voicing all voiceless stops) is an impossible change."
  - Hyman is claiming that: p, t, k ⊁ b, d, g {context-free}

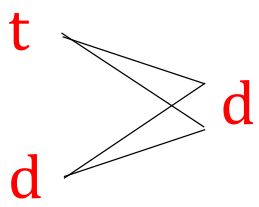
It seems, however, that the binnenhochdeutsche Konsonantenschwächung (Lessiak 1933 = 'Inner-High-German Consonant Weakening' = IGCW) disproves this claim:

p,b	Standard German	*pakeːt*	'package'	Standard German	*blɛç*	'metal'	
	Barchfeld German	*bagɛd*		Waldau German	*blax*		b
t,d	Standard German	*tiːf*	'deep'	Standard German	*drai*	'three'	
	Waldau German	*dīf*		Stadtsteinach German	*drai*		d
k,g	Standard German	*kartn*	'cards'	Standard German	*gartn*	'garden'	
	Leipzig German	*gardn*		south Osterländisch	*gardn*		g

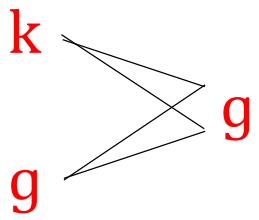
It seems clear from this data that the IGCW involved a set of segmental mergers among the series of stops

- the change formulated here are based on the correspondences given in Albrecht (1881) and Bergmann (1991) for the city of Leipzig specifically, (the same correspondences are described more generally by Schmidt & Vennemann (1985) for the 'Upper Saxon' variety, and Bergmann (1991) pinpoints the core area as the South Osterländisch variety of Upper Saxon





It seems that p, t, k > b, d, g, after all



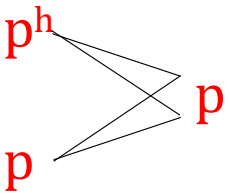
However, there is evidence that the input to the ICGW change was not /p, t, k : b, d, g/

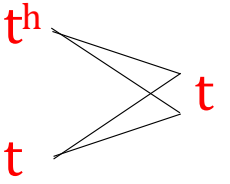
- this is the contention of the phonological position known as 'Laryngeal Realism'
- LR in a nutshell:

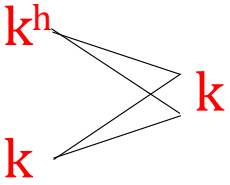
○ 'typical' Romance and Slavic languages have:
– full voicing in lenes
– laryngeal assimilation to lenes
– no aspiration in fortes

○ 'typical' Germanic and Celtic languages have:
– only passive voicing in lenes
– laryngeal assimilation to fortes
– aspiration in fortes

The input to the ICGW was 'typical Germanic' /p^h, t^h, k^h : p, t, k/, so the change was, in fact:







- why? LR assumes that this is because the two types of languages in fact have different contrasts/features

○ Romance and Slavic languages typically have:
– 'laryngeally unspecified' segments : voiced segments
– /p, t, k : b, d, g/ = Ø : [voice]

○ Germanic and Celtic languages typically have:
– aspirated segments : 'laryngeally unspecified' segments
– /p^h, t^h, k^h : p, t, k/ = [spread] : Ø

If we analyse the change in detail, there is no evidence to doubt that: p, t, k ≯ b, d, g

To conclude…

The study of phonological stability and instability is important and intricate

- we need to consider what is the *Relevant Entity for Phonology Stability or Instability*
- understanding cases of phonological (in)stability requires us (at least in part) to examine whether specific changes are likely or unlikely or impossible
  - this requires us to consider in detail what each change involves
  - … and whether unrelated factors might inhibit specific changes
  - … and the full analysis of the phonological system involved in the innovation of the change (or not)