Emergent Features

The Evenki Challenge

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Emergent Features

Mielke (2008)

- Rejection of the idea that distinctive features have a phonetic function (that features are articulatorily descriptive).
- Only remaining: the classificatory or phonological function: features (feature combinations) capture phonologically active classes of segments.
- The reason that many of these classes are natural or almost so is essentially diachronic (link to Blevins's 2004 theory of Evolutionary Phonology). All synchronic patterns have a diachronic motivation but synchronically they all are equally arbitrary.

Emergent Features

Why not innate?

- Mielke lists a number of reasons why features should not be innate:
- Existence of sign languages
- The unattested vs impossible conundrum
- No proper large-scale survey to test validity
- ... and no null hypothesis: Features are innate or ...?
- Categorical perception part of mammalian perception in general
- Features only recapitulate independently observable facts

How do features come into being?

Mielke (2008)

- Traditional assumption: Processes and phonological patterns are determined by features. Instead, it's the other way round: The phonological patterns determine the features.
- Processes start their lives as phonetically natural tendencies. Speakers may decide to exaggerate them and extend them to other, similar segments — a feature is born that demarcates this class of segments.
- Often this extension is complete (natural class), but it may also be partial or be extended in unexpected directions (problematic for standard feature theory).
- The vagaries of diachrony can create patterns with holes; subsequent change may even create 'crazy' classes. (More on this later.)

Emergent features and phonetics

Mielke (2008)

- The genesis of features is phonetic: They are posited when a phonetic change is detected, which then phonologises. Afterwards, there is no connection to phonetics.
- Mielke appeals directly to other functional and "emergentist" approaches, such as Exemplar Theory, Bybeean network models, Dispersion Theory.
- Link to phonetics remains unclear though. If features are not the interface, what is? (Mielke: perhaps exemplars.)
- Also unclear: Why should phonologisation make a gradient process categorical if the feature is only an index?
- How do we know what a process is, without a link to phonetics?
- Also gone: contrastive function. If only phonology matters, not all sounds may be contrastively specified.

Emergent features

Mielke's survey

- Empirical basis: Survey of 6000+ phonologically active classes in 600+ languages and language varieties.
- At least a quarter of phonologically active classes can't be readily captured by a (phonetically grounded) feature or feature combination.
- Many cases: hole in pattern or minor twist.
- Currie Hall (2010) looks at 4 cases discussed by Mielke — finds alternative analyses (or problems with data).
- But also existence of 'crazy' classes — Evenki a prime example.

Evenki nasal assimilation

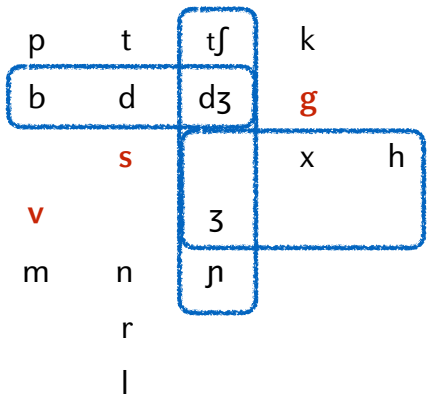
A 'crazy' class

- In Evenki (Tungusic), *v, s, g* assimilate in manner to a preceding nasal across a suffix boundary: /v, s, g/ → [m, n, ŋ] / [+nas] # _
- Examples (Konstantinova 1964, Nedjalkov 1994, Boldyrev 2007):

acc.def.	bira-va	'river'	laaŋ-ma	'trap'
	ile-ve	'human'	ŋinakin-ma	'dog'
refl.poss.	ǰu-vi	'(his) house'	oron-mi	'(her) reindeer'
2pl.poss.	ǰu-sun	'your house'	oron-nun	'your reindeer'
elative	ure-git	'hill'	kurim-ŋit	'wedding'
	golo-git	'log'	sun-ŋit	'coat'

Evenki consonants

Mielke (2008), after Nedjalkov (1996)



But …

A third function of features

- Counterclaim: Evenki is analysable with 'traditional' features.
- Corollary: recognising the third function of features, not discussed by Mielke: the contrastive function.
- Here: assuming a strong version: contrast determines feature specifications.
- Lack of contrast: lack of specification → phonetic variation
- Additional assumption: privative features, adding an extra layer of non-specification.
- (Ideas followed here e.g. in Clements 1987, Morén 2003, Dresher 2009, Iosad 2012)

And …

a second take-home message

- Another problem: Looking at a process in isolation. This may miss generalisations.
- Instead: How does the process interact with the overall system?
- Here (looking ahead): general constraint against nasal+continuant clusters, motivating the process.
  - Consequence: *g* is (underlyingly) a continuant.
  - Follow-up question: How are other continuants affected?

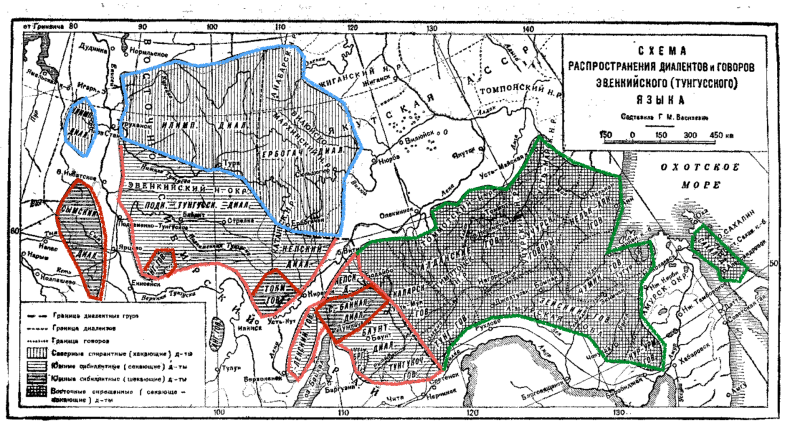
Evenki

What are we talking about, anyway?

- formerly known as Tungus, largest of the Tungusic languages
- but endangered: ~15,000 speakers (10,000 in China, 5,000 in Russia), numbers falling: many ethnic Evenki abandon the language.
- Chinese Evenki is terra incognita; focus on Russian Evenki (as Mielke)
- Spoken in communities scattered across a large part of Siberia.
- Consequently, considerable dialectal variation; 3 major dialect groups (North, South, East).
  - Literary Evenki based on Southern subdialects
- Where relevant, we'll also discuss dialect data: the process plays out differently in different dialects

Evenki dialects

(Vasilevich 1948)



Northern Southern (hissing & hushing) Eastern

Sources

Works consulted

- Mielke relies on Nedjalkov's (1996) grammar, but only a short chapter on phonology, not well organised, inconsistent transcriptions
- Other sources consulted: Al'kor (1930), Gorcevskij (1939), Cincius (1949), Konstantinova (1964), Bojcova (1966), Boldyrev (2007), Andreeva (2008)
- Descriptions of dialects: Vasilevič (1948), Romanova & Myreeva (1964), Andreeva (1988), Bulatova (1999), Myreeva (2006)
- Website evengus.ru — practical info, lessons, but also audio recordings of one native speaker, with Russian translations / glosses

Analysis

Roadmap

- Repair the consonant chart
- Look at cluster phonotactics for clues
- Look at other phonotactic restrictions and processes
- Get a first idea of what *v, s, g* are phonologically
- Establish what *v, s, g* are phonetically
- Bring everything together
- Develop a brief analysis

Evenki consonants

repaired (Gorcevskij 1939, Konstantinova 1964, Andreeva 2008, *inter alia*)

p	t	tʃ	k	
b	d	dʒ	g	
	s		~~x~~	h
β–v		~~ɣ~~	ɣ	
m	n	ɲ	ŋ	
	r			
w	l	j		

Evenki consonants

Alternative proposal

p	t	č	k	
b	d	ǰ		
m	n	ɲ	ŋ	
w	s	j	ɣ	h
	r			
	l			

Cluster phonotactics

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Introduction

- Evenki syllable structure: C V (C)
- Only heterosyllabic CC clusters
- What are attested clusters? Sheds light on phonotactic constraints that may also explain the nasalisation process.
- Bojcova (1966) provides a survey.
- But to be taken with a pinch of salt: some methodological issues
  - Takes Evenki dictionary and small corpus of written Evenki.
    Problem: written Evenki corpus adds heteromorphemic clusters in inflected forms that are otherwise unattested, but isn't comprehensive/systematic.
- Marked red: attested clusters, pink: marginal/dubious clusters.

Cluster phonotactics

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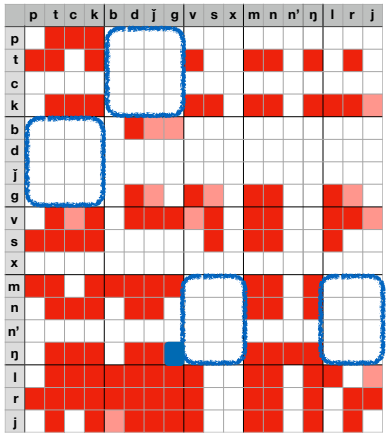
Major patterns

voicing agreement

no nasal + continuant

but [ŋ+g] allowed



Cluster phonotactics

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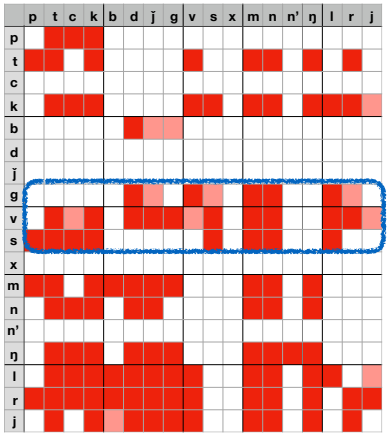
How about *v, s, g*?

v, s, g don't pattern alike



Cluster phonotactics

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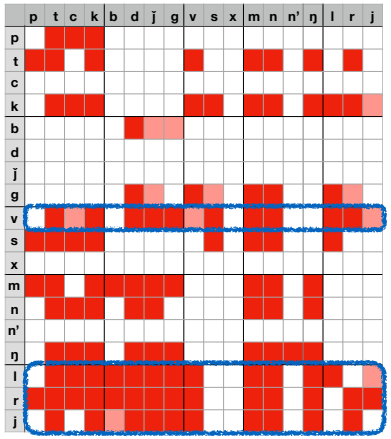
How about *v*?

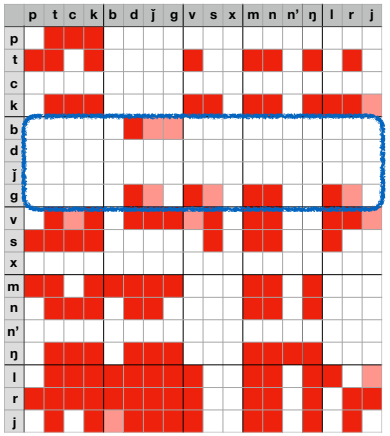
v patterns with sonorants



Cluster phonotactics

How about *g*?

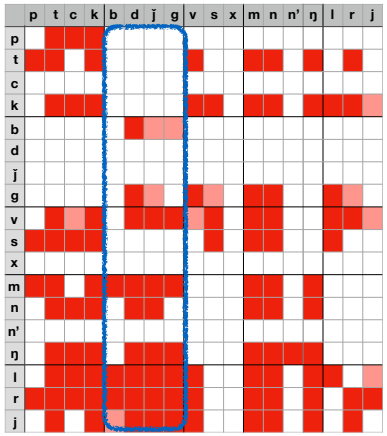
g = C1 more permissive than other voiced stops



Cluster phonotactics

How about *g*?

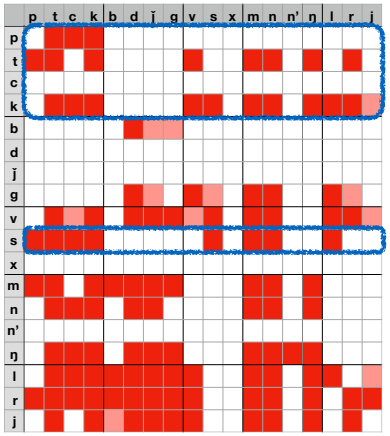
g = C2 just like other voiced stops



Cluster phonotactics

How about *s*?

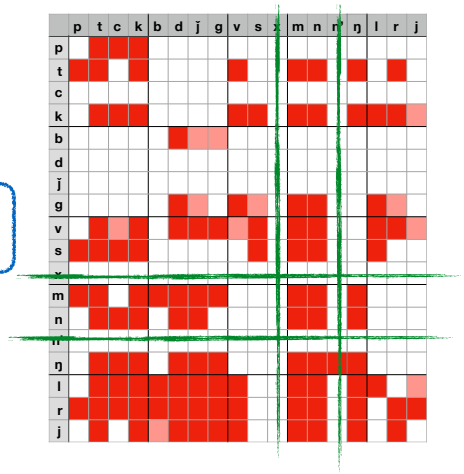
s patterns with voiceless stops



Cluster phonotactics

Other restrictions

no clusters with x=h or n'



Cluster phonotactics

Some points to take away

- Ban against N+continuant clusters: motivates assimilation process
  - But: N+*g* is attested — why then repaired across morphemes?
  - But: ban also includes *j, l, r* — what happens to those?
- *v* as C1 behaves phonotactically like a sonorant (like *l, r, j*)
- *g* as C1 doesn't behave like a voiced stop, combines relatively freely (but not quite like sonorants, C2 obstruent must be voiced)
- but: *g* as C2 behaves like other voiced stops
- So what is *g*? The mystery deepens …

More phonotactics

Word-final consonants

- Ban against word-final voiced stops (*b, d,* ǰ)
- But: *g* excluded from ban, occurs word-finally (as does *v*)
- Taking into account cluster phonotactics, larger generalisation: no voiced stops in codas (save *g*)
- Suggests that phonologically, *g* may not be a stop, at least not in codas.

Other processes

Voicing assimilation

- Across morpheme boundaries, a process of progressive voicelessness assimilation: /b, d, ǰ, g/ → [p, t, č, k] / [{p, t, č, k, s}] # __
/gus + du/	[gustu]	'eagle (dat.)'
/det + git/	[detkit]	'tundra (elative)'
- Note 1: *s* is phonologically voiceless (is a trigger)
- Note 2: *g* behaves like a regular voiced stop (is undergoer)
  - But coda *g* doesn't trigger assimilation: *gaag-tiki* 'swan (loc.)'
- More confusion: what is *g*? And what unites *v, s, g*?
- Next: a closer look at the phonetics.

Phonetic realisation

What is *v*?

- In most positions, [v ~ β], bilabial [β] seems more common
- Intervocalically, usually [w]
- In some (Southern) dialects, [w] across the board (Vasilevich 1948)
- Variable and gradient devoicing to [ɸ]
  (a) word-finally
  (b) before voiceless Cs
- Speaker on evengus.ru: suggests that all this is variable and gradient.

Phonological representation

What is *v*?

- Basic variant: [w] — found in all dialects, only variant in some
- Then gradient, contextual hardening to [v ~ β] in prosodically stronger positions (word-initial, postconsonantal), and gradient final devoicing.
- Proposal: This variation is phonetic, hence gradient.
- Phonologically, it behaves like a sonorant: combines freely (like other sonorants), not targeted by processes involving obstruents.
- Representation as an otherwise underspecified [labial] continuant.
- (Lookahead: I will analyse continuants as underlyingly mannerless; obstruents as having a Laryngeal node.)

Phonetic realisation

What is *g*?

- Word-initially and in postconsonantal onsets [g]
- Intervocalically and word-finally [ɣ]
  (and no gradient final devoicing)
- C1 in clusters variable, depends on C2
  ([g] if C2=stop/nasal, otherwise [ɣ])
- Dialect notes:
  - In some dialects, *g* may lenite further to [w] intervocalically, in some dialects intervocalic *g* is deleted (but still [ɣ] in codas) (Konstantinova 1964, Vasilevich 1948).
  - Onset *g* can be affricate [gɣ] (e.g. Tommot (Eastern); Andreeva 1988)

Phonological representation

What is *g*?

- A similar pattern to *v*: Hardening in prosodically strong positions.
- In 'strong' onsets [g], in weak onsets and codas [ɣ].
- But: not phonetic, but phonological variation.
- In strong positions, *g* patterns with stops (phonotactics, voicing assimilation), in weak positions not (phonotactics, doesn't trigger voicing assimilation); very little gradience.
- Proposal: *g* is underspecified for manner, hardening to [g] in strong positions as a phonological process.
  Note lack of contrast between a voiced stop and a continuant in the dorsal series, motivating underspecification.

Phonetic realisation

What is *s*?

- Considerable interdialectal variation (Vasilevich 1948):
- Literary Evenki and 'hissing' dialects of S. group: [s]
- 'Hushing' dialects of S. group: [ʃ]
- E. group: [s] but [h] intervocalically (similar lenition pattern as *v, g*)
- N. group: Debuccalisation to [h] across the board

Phonological effects

The impact of dialectal variation

- How does dialectal variation affect the nasal assimilation process?
- If features lack phonetic content, the process could survive and then create even 'crazier' alternations (e.g. /h/ → [n]).
- [h] in Northern dialects does not alternate. Process no longer applies.
- But: [ʃ] in hushing dialects still alternates with [n].
- In some Eastern dialects (alternations [s ~ h]), /s/ → [d]
  (Romanova & Myreeva 1964).
- In Even, /s/ no longer participates in the alternation (but /w, g/ do)
  (Malchukov 1995).

Phonological representation

What is *s*?

- Phonologically, a voiceless obstruent (phonotactics, triggers voicing assimilation).
- And a continuant (i.e. no manner specifications). Place: [coronal].
- Varieties with [ʃ]: same feature make-up.
  - As there is no [s-ʃ] contrast, no need to sub-specify [coronal] further. Exact realisation of the coronal fricative is a matter of (phonetic) convention.
- Varieties with [h]: not [coronal] but placeless, hence not alternating.
- Reminder that in some varieties, [s] no longer alternates with [n]: hints that alternation more 'costly' (to be addressed).

Summary

What are *v, s, g*?

- The 'crazy' class *v, s, g* has a phonetic commonality:
- All segments show considerable variation
  (and they are the only consonants in Evenki showing such variation).
- *v, g* in particular show strikingly similar behaviour.
- What's the connection?
- Proposal: These segments are continuants, in Evenki phonologically underspecified for manner, thus can vary in their surface realisation.
- These underspecified segments are the target of the nasalisation process.
- But wait — this isn't the full list of continuants! How about *j, l, r, h*?

Bringing in *j*

The palatal gap

- If continuants are the target of nasal assimilation, this should include *j* — so why is there no rule /j/ → [ɲ]?
- What happens to *j*-initial suffixes after N-final stems?
- /j/ deletes, e.g. accusative *-ja*

gara-ja	'branch'	*det-ja*	'tundra'	*sun-e*	'coat'

- Why? Nasalisation would yield [ɲ], but [ɲ] systematically excluded from clusters (see phonotactic constraints).
- Deletion of /j/ = alternative repair motivated by same constraint.

Other continuants

A note on liquids

- Cluster phonotactics: N+liquid not found; what happens to such clusters at suffix boundaries?
- Mixed picture: generally avoided, but no general phonological process; allomorphy
  - non-future *-ra*: *-na* after N
  - allative *-la*: *-dula* after all C (same with prolative *-li* / *-duli*)
  - comitative *-lbi*; N seems to delete
  - Deletion not unusual in verbal morphology, e.g. semelfactive *-sin*; N deletes in N-final stems (rather than triggering nasal assimilation of *s*).
  - (No data on a few other liquid-initial suffixes)
- Effect: no N+liquid output sequences.

Other continuants

And h?

- Glottal segment, no nasal counterpart, couldn't alternate.
- Restricted phonotactically: never occurs in clusters (Bojcova 1966)
- Couldn't find *h*-initial suffixes
- Disclaimer: situation different in Northern dialects where *s* > *h*. Here, N+*h* clusters are accepted

Summary

Where we are now

- Generalisation extends to other continuants: no N+*j* (and N+liquid)
- But different ways of satisfying the *N+cont constraint
- *v, s, j, g* (=/w, s, j, ɣ/) do form a natural class of segments; evidence from both phonetics and phonological behaviour
- Now: a brief sketch of a formalisation:
  - Features are privative, specifications are contrastive
  - Used: a liberal version of the Parallel Structures Model of Feature Geometry (Morén 2003, Iosad 2012)
    (or rather an eclectic mix of standard theory and this model)
  - Focus on laryngeal and manner specifications

Feature specifications

Voicing and manner

- No laryngeal node = sonorants *v, j, l, r, m, n, ɲ, ŋ*
  (Not subject to laryngeal agreement constraint)
- Laryngeal node = obstruents
- Voiceless obstruents *p, t, č, k, s*: [s.g.]
- C-manner(closed) = [stop]: marks stops (maybe also nasals?)
- C-manner(nasal) = [nasal]: marks nasals
- Continuants then characterised by absence of C-manner features
- Reconceptualising the nasal cluster constraint:
  Postnasal consonants must be specified for C-manner

Feature specifications

Chart

	[s.g.]	[stop]	[nas]
p t č k	✓	✓	
b d ǰ (g)		✓	
w r j ɣ			
s	✓		
m n ɲ ŋ		?	✓

Nasal assimilation

Analysis in Prose-OT

- Constraint: C after N needs Manner
- Mannerless consonants *v, s, j, g* affected
- Optimal repair: spread [nasal], satisfying DEP(F)
- Impossible for *j* because *Cɲ (no palatal nasal in clusters) — deletion is second-best
- A complication: why is morpheme-internal *Ng* allowed? Why not spread [nasal] there?

Getting *g*

Analysis in Prose-OT

- Generalisation: /Nɣ/ → [Nŋ] across morpheme boundaries, but [Ng] stem-internally.
- Constraint against [ɣ] in prosodically strong positions, [g] instead.
  - Adding [stop] optimal repair — fortition
- Postconsonantal position = strong, thus N+/ɣ/ → [Ng], satisfies constraint against nasal+continuant as well.
- Why not in nasal assimilation contexts? Possibly a Derived Environment Effect (DEE): spreading occurs only across morpheme boundaries.

Summary

Main points

- There's nothing crazy about the class of *v, s, g* in Evenki.
- Important: (a) to look at the actual phonetic realisation of segments, (b) to take into account global phonological constraints.
- A decontextualised look at single processes is not sufficient to determine their naturalness!
- Unnatural looking segment classes can result from the interaction of globally operating constraints.
- The link between the phonetic and phonological function of features can be maintained — via the contrastive function of features.
- Features are still anchored in phonetic substance but segments can be underspecified — the phonetic make-up is only partially determined by the phonology.

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