A bad case of excessive computation: the role of morphology in palatalization-related alternations in Russian

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A bad case of excessive computation
The rôle of morphology in palatalization-related alternations in Russian

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Talk outline

1. Context
2. Two case studies from Russian
   ▶ Backness switch
   ▶ Palatalization
3. The advantages of modularity
4. Incursion of the idiosyncratic
5. Conclusion

Historical context

Generative phonology is said to basically start with Russian: Halle (1959)
Classic generative accounts such as Lightner (1972); Hayes (1984)
Also taken up within Lexical Phonology, figures in Kiparsky (1985)
Most analyses very abstract, sometimes even more so than Chomsky & Halle (1968)
Of course there is much work on Slavic within GP/DP (e.g. Gussmann 2007), but I am insufficiently familiar with that…

A typical example

From Halle & Matushansky (2002)
The following rules are all extrinsically ordered:

1. Palatalization: \([\text{back}] \) spreads \(C \leftarrow V\)
2. Velar mutation: dorsal \([-\text{back}] \) \rightarrow [coronal −ant +strident]
3. Iotacism: \(V_{[-\text{high}] \rightarrow [i]} / C_{[-\text{back}]\text{−}}\)
4. Depalatalization: š ž č → [+back]
5. Velar palatalization: \(k \ g \ x \rightarrow [-\text{back}] / _{-}V_{[+\text{high} \ −\text{round}]}\)
6. Hi-switch: \([\text{back}] \) spreads \(C \rightarrow V_{[+\text{high} \ −\text{round}]\text{−}}\)
Example derivation

\[ \text{ʃerst} \text{Istij} \quad 'furry' \]

\[ \downarrow \]

by Palatalization

\[ \text{ʃerst} \text{Istij} \]

\[ \downarrow \]

by Iotacism

\[ \text{ʃirst} \text{Istij} \]

\[ \downarrow \]

by Depalatalization

\[ \text{ʃirst} \text{Istij} \]

\[ \downarrow \]

by Hi-switch

\[ \text{ʃirst} \text{Istij} \]

The OT era

- Significant body of work arguing that Russian (and more broadly Slavic) data conclusively show that some sort of multiple-level serialism is unavoidable
  - Vowel reduction: Rubach (2000); Padgett (2004); Molczanow (2007)
  - Yers: Molczanow (2008); Gribanova (2009)
- Mostly occupied with recasting the SPE/LP analyses: well, of course you can't do them in parallel OT!
- Scheer (2010, §6.1.3): “[t]he whole derivational issue hinges on reranking, and on nothing else”.

What is at stake?

- The analysis of Russian
  - I am not aware of any work specifically refuting the serialism-based analysis of Russian
- The issue of intermediate levels
  - Where do the levels come from?
  - What is the distinction between a multi-level phonology and non-trivial components of a modular theory of grammar?
- The value of phonology-internal evidence
  - Can we say that purely phonological data can have a decisive say on the previous issue?
  - If yes, how overwhelming must the evidence be?

Goals of this talk

- The analysis of Russian
  - Discuss some specific alternatives to a serialism-based analysis
- The issue of intermediate levels
  - Show that given a narrow (essentially Trubetzkoyan) understanding of phonology and serious modularity, the case for serialism appears overstated
- The value of phonology-internal evidence
  - Discuss how the validity of the phonological analysis hinges on interface considerations which are rarely explored or even explicitly discussed (again cf. Scheer 2010 passim)
**Assumptions I**

- Minimalist feature theory (Morén 2003, 2007; Blaho 2008)
  - Only privative features
  - Contrastivist Hypothesis (Dresher 2009; Hall 2007): only contrastive features are active in the phonological computation (see Dresher *passim* on why this is essentially the Trubetzkoyan position)
  - Substance-free I: phonetic representation of a feature not necessarily uniform either across or within a language
  - Substance-free II: assignment of phonological features based on phonological activity within the language at hand
- Consequences:
  - Surface underspecification
  - Non-trivial phonetic component

**Assumptions II**

- Not every change you can write using IPA is the job of phonology
- Potential sources of variable realization of underlying phonological symbols ("phonetic grammar")
  - Allomorphy (not phonology: e.g. lexical insertion)
  - Manipulation of phonological symbols ("phonology", "computation")
    - General ("phonology" *per se*)
    - Item-specific ("morpheme-specific phonology")
  - Language-specific differences in the realization of (bundles of) symbols ("phonetics–phonology interface")
  - Phonetic factors: speech rate, aerodynamics, elasticity effects etc.
- Consequence: even if "phonology" is monostratal, the feed-forward model of grammar still introduces a kind of serialism, but with principled restrictions

**The basic facts**

- Most consonants have a palatalized counterpart, e.g. [t ʈ] [x ǁ] [ɭ ɭ] etc.
- Exceptions: [ʦ ʂʷ ʐʷ] (only non-palatalized), [ʃ ʃʲ] (only palatalized)
- Palatalized consonants have a pretty free distribution
  - But [ɭ ɭ ʃ] are impossible word-finally
  - And rare before non-front vowels, though not impossible and even created by the morphophonology (Timberlake 1978; Flier 1982)
- Conversely, [k ɡ x] are impossible (word-externally) before front vowels

**The traditional assumptions**

- Traditional as in going back to at least Halle (1959) and rarely challenged
- Six vowels, including [ɪ] which is at least [+high +back – round]
- Complementary distribution of [ɪ] and [ɨ] depending on palatalization of the previous consonants
- Note this requires [ʂʷɪ] [ʐʷɪ] [ʦɪ] but [ʃʲɪ]
- Assumption: at least [ʂʷ] and [ʐʷ] are underlyingly palatalized (we’ll see why in a minute)
- Not available in a contrastivist theory: (non-)palatalization is redundant on the "unpaired" segments
### The palatalizations I

- Mostly before front vowels:
  - C → ʲ
  - But the same affixes often trigger [k ɡ x] → [ʧ ʲ ʂʷ ʐʷ]

(1) a. (i) [ˈsvʲet] 'light' (n.)
   (ii) [svʲɪˈtʲitʲ] 'to illuminate'

b. (i) [ˈmuka] 'torment' (n.)
   (ii) [ˈmuʧɪˈtʲi] 'to torment'

- Another type where only the velars are affected:

(2) a. (i) [ˈstoɫ] 'table'
   (ii) [strʲɪˈlʲe] 'table (loc. sg.)'

b. (i) [ˈkrʲuk] 'hook'
   (ii) [krʲʊˈkʲe] 'hook (loc. sg.)'

### The palatalizations II

- Yet another type where everything undergoes surface palatalization

(3) a. (i) [ˈstoɫ] 'table'
   (ii) [strʲɪˈlʲe] 'table (loc. sg.)'

b. (i) [ˈkrʲuk] 'hook'
   (ii) [krʲʊˈkʲe] 'hook (loc. sg.)'

- Transitive palatalization: [t d s z] → [ʧ ʲ ʂʷ ʐʷ]

  - No relation to the frontness of the following vowel
  - Same output as [i]-palatalization

### The traditional approach

- Palatalization: triggered by [i]
  - [ti ki] → [tʲi ʧi]

- The other palatalization: triggered by [i] with later fronting following velars; ordering crucial
  - [ti ki] → [ti ki] → [ti kʲi]

- Across-the-board surface palatalization: word-level (Blumenfeld 2003) or some boundaries reproducing this effect (Plapp 1996); multiple levels crucial for counterfeeding of [i]-palatalization

- Transitive palatalization: often ignored or relegated to morphology despite the clear affinity to [i]-palatalization

### Reanalysis

- Joint work with Bruce Morén-Duolljá
- Email for details of analysis or see http://www.hum.uit.no/a/iosad/cv.html

- Redux:
  - There is no [i]
  - There is very little actual C ← V spreading of [a]back
  - The various outcomes of palatalization are ascribed to a floating feature
  - Lexical indexation allows Russian to realize a fair bit of the factorial typology for this floating feature
Backness switch and [i] I

- There is no /i/ in Russian
  - Phonetically it is a sort of diphthong: textbook knowledge in Russia, also Padgett (2001)
  - Basically the target is [i]
  - Phonologically it is not necessary
- The relationship between frontness and palatalization properties is complex
- Some non-front vowels trigger palatalization:
  1. [pʲɪˈsok] ‘sand’
  2. [pʲɪˈʃːʲanɨj] ‘sandy’
- Vice versa: slightly complicated
- All /e/’s do trigger palatalization (historical accident)

Backness switch and [i] II

- If all /i/’s are /i/’s, they are an example of front vowels failing to trigger palatalization
- Exception: /ki/ still comes out as [kʲi]
- It is in fact the only C ← V spreading process that does not fail
- The ban against [kʲi xʲi] is in fact a robust surface-true generalization (modulo boundary effects)
- Spreading of [a] to [dorsal] but not other places can be achieved by local conjunction
- Obviates the frankly weird rule fronting /i/ following non-palatalized dorsals only in order to front them afterwards
- Also solves the problem of the postalveolars
- The only part of the phonology where [ʂʷ ʐʷ] behave like non-palatalized consonants is where they cause [i] to appear instead of [i]

Backness switch and [i] III

- But [i] → [i] is not a phonological process: just the interface imposing velarization on non-palatalized consonants
- Therefore [ʂʷ ʐʷ] should in fact be palatalized in the output of phonology (corroborated by vowel reduction)
- Serialism involving non-contrastive features comes for free from the modular architecture
- Backness switch à la Rubach (2000) is unnecessary
- Promising general line of attack on much of “postlexical phonology”

Representational assumptions

- Based on a holistic approach to Russian phonology
- V-place[coronal]
  - Palatalization in consonants with a C-place (à la Clements)
  - The only place feature for the postalveolars
  - On its own: /i/
- Floating V-place[coronal] (unattached to a Root node) must attach to something to surface
- Factorial typology for floating feature
The constraints

- $\text{Max}(\text{V-pl}[\text{cor}])$, or $\text{MaxFlt}$ (Wolf 2007): self-explanatory
- $\text{DepLink}(\text{V-pl}[\text{cor}])$: do not create a new attachment for $\text{V-pl}[\text{cor}]$
- *$\text{C-pl}[\text{lab}]/[\text{cor}]/[\text{lab}]$: self-explanatory
- Conjunction of *$\text{C-pl}$ and $\text{DepLink}$: “do not attach $\text{V-pl}[\text{cor}]$ to this type of consonant”
  - Can be undominated $\Rightarrow$ no docking
  - Can be repaired by undoing the violation of $\text{DepLink} \Rightarrow$ no docking
  - Can be repaired by undoing the violation of *$\text{C-pl} \Rightarrow$ deletion of $\text{C-pl}$ and attachment of $\text{V-pl}[\text{cor}] = \text{postalveolars}$
  - Can be dominated $\Rightarrow$ docking of $\text{V-pl}[\text{cor}]$ leads to surface palatalization
- Ignoring additional complications which don’t change the picture...

Surface palatalization

- $\text{Max}(\text{V-pl}[\text{cor}]), \text{Max}(\text{C-pl}) \gg \text{DepLink}(\text{V-pl}[\text{cor}])$
- Realize both the consonant’s underlying feature and the floating feature

Place-changing palatalization

- Unified name for velar and transitive palatalization: same output, would be good to have a unified representation
- $\text{Max}(\text{V-pl}[\text{cor}]), *\text{C-pl} & \text{DepLink}(\text{V-pl}[\text{cor}]) \gg \text{Max}(\text{C-pl})$

No-docking scenarios

- The feature may fail to surface at all $\Rightarrow$ non-palatalizing suffixes, such as the /i/
- It may also force the epenthesis of some material to attach to
- Attested as labial epenthesis: /p b m f v/ $\rightarrow$ /plʲ blʲ mlʲ flʲ vlʲ/
- But the ranking is clearly contradictory: how can all these be attested in a single language?
Case studies  Morphophonological palatalization

Lexical indexation I

- For the sake of the argument, I propose accommodating the different palatalizing properties of Russian suffixes via lexical indexation (Pater 2009)
- So each class of suffixes has a corresponding ranking of the relevant constraints
- Contrast this with the Stratal OT approach of Blumenfeld (2003):
  - SOT: velar palatalization happens at the stem level, surface palatalization happens at the stem level, differences accommodated via stratum-specific ranking
  - Proposed approach: differences in the outcome of palatalization are due to arbitrary lexical indexes
- Loss of generalization relative to SOT, even though the insight can still be expressed (“such-and-such indexes are associated with word-level suffixes”)

Lexical indexation II

- Better empirical adequacy
  - Unified expression of place-changing palatalization
  - Correctly expresses the lack of a principled relationship between vowel frontness and palatalizing properties (other than diachronically)
  - Correctly expresses the types of palatalizing processes possible in Russian
- Give me empirical adequacy over loss of generalization any day

Discussion  The importance of modularity

Marrying OT and modularity

- Scheer (2010): the “strict parallelism” rhetoric of OT tends to take (some of) its practitioners too far down the non-modular path
- One way of reconciling OT with modularity: letting go of many of the alternations commonly assumed to fall within the purview of phonology
  - Phonology = categorical operations on distinctive features
  - Operations on non-distinctive elements of the signal: phonetics–phonology interface, phonetics
  - Operations with non-phonological conditioning: allomorphy galore?
- Presumption of guilt: not phonological unless proved otherwise

The phonetics–phonology interface I

- Massive pile of “data”: until the rise of Laboratory Phonology, the working assumption is “if you can write it in IPA, it’s phonology”, appealing to Jakobson et al. (1951); Chomsky & Halle (1968) and the idea of a “universal phonetics”, where all differences among the sound grammars of different languages are phonological by definition; also Hale & Reiss (2008)
- In much of LabPhon and its ilk the pendulum swings the other way: there is no separate module catering for categorical phonology, it is at best emergent (too many references to do justice to)
**The phonetics–phonology interface II**

- Other options (a selection):
  - Phonetics and phonology are orthogonal but simultaneously present: “sound phenomena can be classified on several dimensions, most of them continuous, which all together make the phenomenon relatively phonetic or relatively phonological” (Tucker & Warner 2010)
  - Phonetics and phonology are in principle separate but difficult if at all possible to disentangle (Cohn 2006)
  - Phonetics and phonology are strictly separate:
    - No universal phonetics: phonetics (or the interface) is non-trivial, e.g. Kingston & Diehl (1994); Kingston (2007)
    - Phonetics–phonology duplication is not a problem but an empirical fact, and the two can be disentangled: Myers (2000); Przedziecki (2005); Barnes (2006); Bermúdez-Otero (2010)

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**The phonetics–phonology interface III**

- Some corollaries of a modular architecture
  - The interfaces must be non-trivial, and consequently they can do (some of) the job of an expansionist phonology
  - There are also clear consequences: we cannot cure opacity just by shunting the lateish processes to the interface: evidence required (Myers 2000)
  - We have to live with a lot of duplication such as Bermúdez-Otero’s (2010) “rule scattering”
    - But it's OK if it gives better empirical adequacy
  - What about the other side?
Battling the idiosyncratic I

▶ Going back to Russian palatalization, it is arbitrary in at least two ways:
   ▶ Despite repeated attempts to analyze it as driven by the surface phonology, these analyses appear to be around ten centuries late: the mere triggering of palatalization is not a surface-phonological fact
   ▶ The distribution of palatalization types among triggering morphemes is quite arbitrary
   ▶ The second point means that I am not enough of a syntactician to convince myself one way or another whether the different palatalization-related rankings have some principled morphosyntactic rationale

Battling the idiosyncratic II

▶ But I suspect it’s a very tough nut to crack, especially considering the fact that allomorphs of the same morpheme can have differing palatalization properties.

(5) a. \([\text{tʲɪˈkʊ}]\) ‘I flow’
   b. \([\text{tʲɪˈtʃʊt}]\) ‘it flows’

(6) a. \([ˈtkʊ]\) ‘I weave’
   b. \([ˈt̚kʲɒt}\) ‘(s)he weaves’

▶ The empirical advantages are not as clear as in the case of phonetics
   ▶ In the case of phonetics, some manipulation is still there, just of a different kind
   ▶ If morphologically conditioned phonology is morphology, this would seem to be selection, not computation
   ▶ I wash my hands here

Summary

▶ Analysis of a number of phenomena in Russian which have traditionally been argued to support multiple-level derivations
▶ Claim: analysis more empirically adequate in terms of the phonological phenomena
▶ Loss of generality in terms of stating the conditioning, but arguably preferable over an elegant but insufficient analysis
▶ I am not really arguing for fully parallel OT, or even for OT as such
▶ My points regarding the proper domain of phonology hopefully apply to any theory of phonological computation, not just to OT
▶ Just showing that a number of reasonable assumptions in a modular theory phonological computation can help us run with this ball much further

Quis custodiet ipsos custodies?

▶ Can phonological data alone be used to resolve (e. g.) the number-of-levels debate?
▶ Answer: firm no
▶ “Empirical” arguments for or against this or that specific theory of phonological computation have little value outside of a fully fledged architectural theory
▶ My contribution in this is hopefully to raise the questions regarding the proper domain of phonological computation in a modular theory
References I


Bermúdez-Otero, Ricardo. 2010. Currently available data on English t/d-deletion fail to refute the classical feedforward modular architecture of phonology. Presentation at the 18th Manchester Phonology Meeting.


References II


References V


References VI


References VII


References VIII
