

Mid vowel alternations

Plan for today

- Mid vowel alternations and why they matter
- Mid vowels alternations in Russian: phonology or morphology?
- Extending the analysis: Polish, Ukrainian, Bulgarian
- Morphology vs. the standard generative approach

The basic pattern

Common Slavic vowels

| Height | Front | Central | Back |
|--------------|--------|---------|------|
| High | i | y | u |
| High reduced | ь | | ъ |
| Mid | ě e e̋ | | o ő |
| Low | | a | |

- The *ě vowel (yat', Cyrillic ъ) has varying reflexes across the Slavic world¹
 - Mid or high vowel or diphthong (Russian dialects, Ukrainian, parts of BCMS...)
 - Low vowel (Eastern Bulgarian...)
 - Merger with mid vowel (Polish, Russian...)

¹ e.g. Michael Samilov. 1964. *The phoneme jat' in Slavic* (Slavistic Printings and Reprintings 32). The Hague: Mouton.

Relevant processes

- Mid vowel backing *e > o (Polish, Sorbian, East Slavic)
- Mid vowel lowering *e > a (Polish, Sorbian)
- Yat' lowering *ě > a (Polish)
- Yat' raising *ä > e (Czech, Bulgarian)

The details differ, but two constants remain:

- The preceding vowel stays soft even if the following vowel is back
- Front vowels occur if there is something front in the right-hand context

Mid vowel alternations

The common denominator is that synchronically these processes tend to yield a pattern of alternation where

- X ~ X
- Y ~ Y
- X ~ Y

all exist.

Table 2: *Yatov preglas* in Bulgarian

| Non-alternating <i>e</i> | Non-alternating <i>'a</i> | <i>'a</i> ~ <i>e</i> |
|----------------------------|---------------------------------|-----------------------------|
| čest ~ česti 'frequent' | pol'ana ~ pol'ani 'clearing' | b'al ~ beli 'white' |
| oves ~ ovesen 'oat(y)' | jarъk ~ jarki 'bright' | r'adъk ~ redki 'rare' |
| med ~ meden 'honey(ed)' | kn'az ~ kn'azi 'prince' | sn'ag ~ snežen 'snow(y)' |
| elen ~ eleni 'deer' | xil'ada ~ xil'adi 'thousand' | c'al ~ celi 'whole' |
| led ~ leden 'ice' ~ 'icy' | kaf'av ~ kaf'avi 'brown' | gol'am ~ golemi 'big' |

Normally, we can handle this if $X \sim Y$ happens in some kind of conditioned environment. This is not the case here: the distribution is basically random

- Non-alternating $e < *e, *e$, also $*ě$ where the raising context is present across the board
- Non-alternating $'a < *ja$, borrowings
- Alternation $< *ě$ in non-raising ~ raising contexts

Why do mid vowel alternations matter?

- The three-way pattern has been taken as evidence for highly abstract analyses
- Sequences like $[C^j o C^j a]$ are problematic if palatalization always comes from a following front vowel, and need an account
- The alternations are riddled with exceptions and morphological conditions

Mid vowel alternations in Russian

The basic pattern

In Russian (and Belarusian), $*e > o$ after a soft consonant (including $č \check{z}$) before a hard consonant, and $*ě > e$ across the board

- $*e > o$ also happens word-finally
- The effect is only reliably visible in stressed syllables because of unstressed vowel reduction: $/e/$ and $/o/$ are not distinct after C^j
- The alternation is restricted to the context after a soft consonant, with the exception of the historically soft $*š \check{z}$

| Stable e | Stable o | e ~ 'o alternation |
|---|--|--|
| <i>strélĭ</i> ~ <i>strél'bi</i> 'shoot' | <i>t'ótuška</i> ~ <i>t'ót'a</i> 'aunt' | <i>jel'</i> ~ <i>jólka</i> 'fir tree' |
| <i>b'élij</i> ~ <i>b'el'en'kij</i> 'white' | <i>ved'óm</i> ~ <i>ved'ót'e</i> 'PRS theme vowel' | <i>sél'sk'ij</i> ~ <i>s'ola</i> 'village' |
| <i>v'éra</i> ~ <i>v'érit'</i> 'believe' | <i>jož</i> ~ <i>jóžit's'a</i> 'hedgehog' | <i>žónĭ</i> ~ <i>žén'it</i> 'wife' |

That looks like a lot of exceptions!

Some concerns

- Non-alternating *o* should lead us to expect underlying /o/, but then why are the preceding consonants soft?
- 'Before a soft consonant' does not quite work, because the immediately following consonant can be (or at least seem) hard in a cluster:
 - *č'ért'i* 'devil.PL' ~ *č'órt* 'devil.SG'
 - *s'éstr'in* 'sisterly' ~ *s'óstrĭ* 'sisters'

That said, in a lot of these cases soft and hard consonants do not contrast in clusters: there is a phonological contrast between [str] and [str'] in Russian, but not between [str] and [st'r]. Assuming the softness of the final consonant is derived from the suffix, as we should, we end up with an apparent Duke-of-York derivation /str+i/ → /s't'r'/ → [str'] (Phonetically, in fact, these consonants are usually 'intermediate', i.e. neither palatalized like soft ones nor velarized like hard ones. At least that's the claim in the literature!)

- We regularly find 'o before consonants softened by an epenthetic vowel: *m'ótl-i* 'brooms', *v'ódr-a* 'buckets' ~ GEN.PL *m'ót'el*, *v'ód'er*

Mid vowel alternations and morphology

Table 4: Overapplication of the Russian mid vowel alternation

| Regular form | Unexpected form | Suffix |
|-------------------------|-----------------|---------|
| <i>m'od</i> 'honey' | <i>m'ód'e</i> | LOC.SG |
| <i>m'órnut</i> 'freeze' | <i>m'órzl'i</i> | PST.PL |
| | <i>m'órn'i</i> | IMP.2SG |
| <i>p'os</i> 'dog' | <i>p'ós'ik</i> | DIM |

The classical analysis

What would Lightner² do?

That's right! An underlying /ɤ/!³

² Theodore M. Lightner. 1965. *Segmental phonology of Modern Standard Russian*. Cambridge, MA: Massachusetts Institute of Technology dissertation.

³ Theodore M. Lightner. 1969. On the alternation e ~ o in Modern Russian. *Linguistics* 7. 44–69. <https://doi.org/10.1515/ling.1969.7.54.44>.

| Rule | /vēr-ō/ | /vēr-ī-tī/ | /sěl-ō/ | /sěl-īsk-/ |
|----------------|--------------------|--|--------------------|-------------------------------------|
| Palatalization | v ^ʲ ērō | v ^ʲ ēr ^ʲ it ^ʲ | s ^ʲ ělō | s ^ʲ ěl ^ʲ īsk- |
| ě → ø / _C | | | s ^ʲ ölō | |
| Vowel shifts | v ^ʲ era | v ^ʲ er ^ʲ it ^ʲ | s ^ʲ ola | s ^ʲ el ^ʲ īsk- |

What about morphology?

The initial response is **cyclicity**

| Cycle | Rule | (mĕd)ŭ | (mĕd)ĕ |
|--------------|----------------|---------------------|-----------------------------------|
| First cycle | Palatalization | m ^ʲ ĕd | m ^ʲ ĕd |
| | Vowel backing | m ^ʲ öd | m ^ʲ öd |
| Second cycle | Palatalization | m ^ʲ öd+ŭ | m ^ʲ öd ^ʲ +ĕ |
| | Vowel shifts | m ^ʲ od | m ^ʲ od ^ʲ e |

More problematic is vacillation in apparently identical morphological environments:

| Basic form | Gloss | Derived form | Gloss |
|------------|----------|--------------|---------------|
| kol'ós-a | wheel-PL | kol'és-nik | 'wheelwright' |
| t'en'ót-a | mesh-PL | t'en'ót-nik | 'spider' |

- The implied cyclic structure is (kölēs-īn-īk)ŭ but ((tĕnĕt)-īn-īk)ŭ — but why?

A solution: consonant power

Hamilton:⁴

- Vowel power: soft consonants are derived from following front vowels, not phonemic^{5,6}
- Consonant power: traditional approach with phonemic soft consonants, in evidence from the start and through at least Halle⁷

Table 8: Russian mid vowel alternation under 'consonant power'

| Rule | /ver-a/ | /veriti/ | /s'ola/ | /s'ol-b'sk-/ |
|--|--------------------|--|--------------------|--------------------------------------|
| Palatalization | v ^ʲ era | v ^ʲ er ^ʲ it ^ʲ | s ^ʲ ola | s ^ʲ ol ^ʲ b'sk- |
| o → e / C ^j _C ^j | | | | s ^ʲ el ^ʲ b'sk- |
| Yer fall | v ^ʲ era | v ^ʲ er ^ʲ it ^ʲ | s ^ʲ ola | s ^ʲ el ^ʲ īsk- |

- Consonant softness is a combination of

⁴ William S. Hamilton. 1976. Vowel power versus consonant power in Russian morphophonemics. *Russian Linguistics* 3(1). 1–18. <https://doi.org/10.1007/BF00177211>.

⁵ That is, not found in URs

⁶ Theodore M. Lightner. 1963. Preliminary remarks on the morphophonemic component of Polish. In *Research Laboratory on Electronics quarterly progress report 71*, 220–234. Massachusetts Institute of Technology. HDL: 1721.1/53919; Lightner, "Segmental phonology of Modern Standard Russian".

⁷ Morris Halle. 1959. *The sound pattern of Russian: A linguistic and acoustical investigation*. 's Gravenhage: Mouton.

- Derived before front vowels: to account for palatalizing suffixes
- Underlying, visible before back vowels

Hamilton⁸ and Polivanova⁹ are (sort of) able to pull this off, because the structure of the Russian mid vowel alternation is somewhat different from that of the Bulgarian (Table 2):

- In Bulgarian, both [e] ~ [e] (underlying /e/?) and [a] ~ [a] (underlying /a/?) patterns occur after C^j, so [e] ~ [a] can't be either /e/ or /a/
- In Russian, [e] ~ [e] and [e] ~ [o] occur after C^j, but [o] ~ [o] is — overwhelmingly — restricted to preceding C. This opens up the possibility that [e] ~ [o] is /C^jo/ with a fronting rule

Unfortunately the prediction is that surface [C^joC^j] should be impossible other than by cyclicity, and this is wrong:

- Exceptions in suffixes: *n'es'-ó-t'e* 'carry-PRS-2PL', *z'eml'-ój* 'earth-INS.SG'...
- Non-alternations in root morphemes: *t'ót'-a* 'aunt', *šč'óč'-k-a* 'cheek-DIM', *p'ós'-ij* 'canine'...
- Non-alternations before C^j followed by yer: *v'ód'er* 'bucket.GEN.PL' (cf. *v'ódr-a* 'bucket.NOM.PL')

We need to either write them off, which seems suboptimal, or posit different URs for alternating and non-alternating /o/, which puts us back to square one, or even further behind¹⁰

The real solution: morphology

Three components of a working solution

- Face-value underliers: [e] ~ [e] = /e/, [o] ~ [o] = /o/
 - Consonant Power is right in not deriving [C^jo] from /Ce/, resolving many exceptions
- The right-hand context is not the softness of the consonant but whether the suffix triggers softening¹¹
 - Consonant clusters are not an issue
 - Soft consonants before a yer are not an issue: the GEN.PL zero/yer suffix is not softening

Here we encounter a key difference between structuralist morphophonemic approaches and generative phonology. In structuralism, as well as 'poststructuralism' as practised at least in Russia, morphophonology retains in autonomous status: the units are purely abstract and do not have phonological content. By contrast, in generative phonology the currency is always phonological units with phonological distinctive features. This is a big part of the reason the vowel power approach is so attractive: 'softening' suffixes soften not by accident but because soft consonants and front vowels are both [—back], and here we find that a **front** vowel is selected by softening

⁸ Hamilton, "Vowel power versus consonant power in Russian morphophonemics".

⁹ Anna Konstantinovna Polivanova. 1976. *Morfonologiya russkogo substantivnogo slovoobrazovaniya*. Moscow: Moscow State University dissertation.

¹⁰ Il'ya Borisovich Itkin. 2007. *Russkaya morfonologiya*. Moscow: Gnozis, pp. 235–236.

¹¹ Il'ya Borisovich Itkin. 1994. Eshche raz o cheredovanii e ~ 'o v sovremennom russkom yazýke. *Voprosy yazýkoznaniiya* 1994/1. 126–133; Itkin, *Russkaya morfonologiya*; Paul V. Cumberley. 2002. *Russian: A linguistic introduction*. Cambridge: Cambridge University Press.

suffixes. A more representationally elaborate generative approach should be able to keep the link between the phonological side of the alternation and its triggering intact.

- Focus on morphology over phonology mean we are in a better position to understand the morphosyntactic entanglements in play

Some morphological findings

Itkin¹² identifies several ‘indifferent’ suffixes, which soften preceding consonants but do not front an alternating vowel. It turns out that this class is not trivial morphologically or semantically. See Iosad¹³ for details.

- Fronting **inflectional** suffixes do not trigger front vowels (Table 4)
- Some of the most productive and semantically trivial suffixes do not trigger front vowels
 - Diminutive *-ik* (*p’ós’-ik* ‘dog-DIM’, *č’órt’-ik* ‘devil-DIM’)
 - Diminutive *-en’k* (*t’ópl’-en’k’-ij* ‘warm-DIM’, *p’óstr’-en’k’-ij* ‘multicoloured-DIM’)
 - Diminutive *-ec* (*šč’ót’-ec* ‘bill-DIM’, *v’ed’ór-c-e* ‘bucket.DIM’)
- Productive, semantically trivial, creating phonological opacity = Class 2, word-level
- Semantically nontrivial, phonologically transparent = Class 1, stem-level

Suffixes that force fronting of non-alternating vowels tend to look more like ‘Class 1’ suffixes in languages like English (*-al*, *-ity*): they are not always very productive, tend to create non-idiomatic semantics, but — as we see with the mid vowel alternations — are able to influence the phonology of what they attach to. By contrast, the ‘indifferent’ suffixes are either inflectional or highly productive and semantically trivial, and they do not influence the phonology, leading to opaque effects. This is a lot like English ‘Class 2’.

Summing up

- The mid vowel alternation in Russian behaves a lot like stem-level phonology in other languages.¹⁴ In one way, this is not surprising: the complicated derivations posited for Slavic have long been interpreted along stratal lines.¹⁵ However, the reasons are usually that we need to make the all the rules implied in the traditional generative account work, rather than more explicitly tied to morphosyntax
- Solutions that rely on morphological structure may not be as circular as argued by their opponents
- Phonological take-away: less need for abstract URs like /ǂ/ if we need to appeal to morphology to explain whether the alternation happens

¹² Itkin, *Russkaya morfonologiya*.

¹³ Pavel Iosad. 2020. Stratal Phonology and Russian morphophonology. *Rhema* 2020(1). 36–55. <https://doi.org/10.31862/2500-2953-2020-1-36-55>.

¹⁴ Whatever your theory of that distinction!

¹⁵ Lev Blumenfeld. 2003. Russian palatalization and Stratal OT: Morphology and [back]. In Wayles Brown et al. (eds.), *Annual workshop on formal approaches to Slavic linguistics: The Amherst meeting 2002*, 141–158. Ann Arbor, MI: Michigan Slavic Publications; Jerzy Rubach. 2008. An overview of Lexical Phonology. *Language and Linguistics Compass* 2(3). 456–477. <https://doi.org/10.1111/j.1749-818x.2008.00058.x>.

The basic mechanics

- Non-alternating [e] is /e/
- Non-alternating [o] is /o/ — including in /C^lo/
- Alternating [e] ~ [o]:
 - Morphology/lexical insertion provides for choice (not rewrite rule!)
 - [e] chosen before a softening suffix in the same cycle

Mid vowel alternations in Polish

The inventory of alternations

Table 9: Front mid vowel reflexes in Polish

| Common Slavic | Front context | Back context |
|---------------|--------------------------------|---|
| *e | <i>niesi-e</i> ‘carry-PRS.3SG’ | <i>nios-ę</i> ‘carry-PRS.1SG’ <i>sklep</i> ‘shop’ |
| *ě | <i>wierz-e</i> ‘faith-LOC.SG’ | <i>wiar-a</i> ‘faith-NOM.SG’ <i>chleb</i> ‘bread.NOM.SG’ |
| *ь | <i>cześć</i> ‘honour’ | <i>pies</i> ‘dog’ |

At face value, the alternations look quite similar. After a soft consonant, [ɛ] alternates with [ɔ] (if from *e) or with [a] (if from *ě).

- The back context is ‘a following hard coronal’, not just a ‘hard consonant’
- Surface [ɛ] from *ь almost never alternates with a back vowel, but clear examples of non-alternation in a paradigm are hard to come by for independent reasons
 - However, cf. *dzień* ‘day’, GEN.SG *dnia*, DIM *dzionek*; *wieś* ‘village’, GEN.SG *wsi*, DIM *wioska*

The abstract solution

By now we should be familiar with how this can be analysed¹⁶

| Rule | /wæɾ-a/ | /wæɾ-ɛ/ | /nɛs-ɛ/ | /nɛs-ɔ̃/ |
|---------------------|--------------------|----------------------------------|----------------------------------|----------------------------------|
| Palatalization | w ^j æɾa | w ^j æɾ ^j ɛ | n ^j ɛs ^j ɛ | n ^j ɛs ^{ɔ̃} |
| Pre-coronal backing | w ^j ara | | | n ^j ɔ̃s ^{ɔ̃} |
| Vowel shifts | | w ^j ɛɾ ^j ɛ | | n ^j ɔ̃s ^{ɛ̃} |
| Late rules | v ^j ara | v ^j ɛzɛ | ɲɛɛɛ | ɲɔ̃s ^{ɛ̃} |

¹⁶ Lightner, “Preliminary remarks on the morphophonemic component of Polish”; Edmund Gussmann. 1980. *Studies in abstract phonology* (Linguistic Inquiry Monograph 4). Cambridge, MA: MIT Press.

Unlike Russian, taking the back vowel as the UR does not work at all, for at least two reasons:

- Like in Bulgarian, the existence of non-alternating [C^ja] rules out /C^ja/ for *wiara: polana* ‘clearing’ ~ *polanie* ‘DAT.SG’
- Backing is narrowly conditioned by a hard coronal, front is very clearly the elsewhere context

Some problems with the abstract solution

- Similar issue with consonant clusters: *czarny* ‘black’ ~ *czernić* ‘blacken.INF’ (**czernić*), *plot-ł-y* ‘weave-PST-PL.F’ ~ *plet-l-i* ‘weave-PST-PL.M’ (**plećli*)
- Massive variation and irregularity within and across lexical items affected

| NOM.SG.M | NOM.PL.M | CMP | Verb | Gloss |
|----------|----------|-------------------|---------|---------|
| biały | biali | bielszy | bielić | ‘white’ |
| blady | bladzi | bladszy ~ bledszy | blednąć | ‘pale’ |

Towards a morphological approach

i Inflection vs. derivation

Unlike Russian, in Polish the mid vowel alternations **can** occur within inflectional paradigms, as in *wiara* ~ *wierze*, *niesie* ~ *niosę*. Still, this is rare and visibly on the retreat diachronically.

Gussmann¹⁷ expressly takes both alternations out of the phonological grammar and treats them as ‘morphological’.

¹⁷ Edmund Gussmann. 2007. *The phonology of Polish*. Oxford: Oxford University Press.

| UR | Back context | Front context |
|-----------------------|-------------------------------|-----------------------------------|
| /b ^j al/ | <i>biały</i> ‘white.NOM.SG.M’ | <i>biali</i> ‘white.NOM.SG.F’ |
| /b ^j el/ | | <i>bielić</i> ‘white’ |
| /jɛz ^j ɔr/ | <i>jezioro</i> ‘lake.NOM.SG’ | <i>jeziorze</i> ‘lake.LOC.SG’ |
| /jɛz ^j ɛr/ | | <i>pojezierze</i> ‘lake district’ |

That’s fine as far as it goes, but we still need to account for alternations in inflection.

Here, our architecture of suffix-driven allomorph selection seems to offer a way forward. In particular, in the abstract analysis we had to rule out fronting of underlying /C^ja/ (and perhaps /C^jo/), because this directionality simply does not work empirically. With allomorph selection, there is no directionality, and we are able to posit a similar analysis to what we did in Russian:

- [ɛ] ~ [ɛ̃] is underlying /ɛ/
- [Cʲa] ~ [Cʲã] is underlying /Cʲa/
- Alternating [ɛ] ~ [ɔ] and alternating [ɛ] ~ [a] is allomorph selection, with [ɛ] chosen before a softening suffix

! Important

This flips the directionality of the alternation, but correctly accounts for the fact that analogical levelling removes **front** alternants over time

| NOM.SG | LOC.SG 18th century | LOC.SG today |
|---------|---------------------|--------------|
| siostra | siestrze ~ siostrze | siostrze |
| jezioro | jezierze ~ jeziorze | jeziorze |

We can formalize the change by saying that levelling removes the conditioned allomorph, leaving the elsewhere allomorph in place.

Extending the framework

Mid vowel alternations in Ukrainian

💡 Tip

Ukrainian is unusual within Slavic in that the soft/hard contrast is neutralized before *e i, but the outcome is hard rather than soft. Why this happened and how this works has been a major question for phonologists all the way back to Jakobson's *Remarques*.

Ukrainian also has a version of the e ~ o alternation, with the following caveats:

- It only occurs after j č š ž
- It does not occur within inflectional paradigms at all
- There is a lot of levelling across lexical items

| Item | Polish | Ukrainian |
|------------------|-----------|-----------|
| 'evening.GEN.SG' | wieczoru | večora |
| 'evening.LOC.SG' | wieczorze | večor'i |
| 'supper' | wieczerza | večer'a |
| 'black' | czarny | čornij |
| 'blacken' | czernić | čorn'iti |
| 'monk' | | čer nec' |

| Item | Polish | Ukrainian |
|------|--------|-----------|
|------|--------|-----------|

Morphological structure and cyclicity

- Ukrainian and Polish both show so many exceptions as to make a morphological solution almost inevitable¹⁸
- Cyclic effects are stronger in Ukrainian:
 - Inflection: Polish (*wieczorz*)-e, (*nies-ie*) but Ukrainian only (*večor'*)-i
 - Derivation: Polish (*czern-i*)-ć vs. Ukrainian ((*čorn*)-i)-ti

Inflectional suffixes can still play into the alternation in Polish (though marginally by now), but inflectional alternations are fully levelled out in Ukrainian. In denominal and deadjectival verbs, softening stem-forming suffixes can trigger front vowels in Polish, while Ukrainian shows robust opacity.

This comparison should tell us something about the interaction of morphology and phonology, likely in a diachronic perspective.

Back to Bulgarian

- The usual account is this: in items undergoing the [e] ~ [a] alternation¹⁹
 - [a] occurs before a syllable with a back vowel, unless the intervening consonant (cluster) is or contains *j č ž šť žd*
 - [a] occurs in a word-final syllable
 - [e] occurs elsewhere, i.e. before a syllable with [i e] or before a postalveolar
- What is the analysis?

That's right! Scatton²⁰ analyses alternating [ʼa] as underlying /æ/, which raises to [e] before a syllable with a front vowel or [j]²¹

Is it the vowels?

If the alternation is triggered by vowels, how do consonants trigger [e]?

| Back context | Gloss | Front context | Gloss |
|--------------|-----------|---------------|----------------------|
| m'ára | 'measure' | mér'ъ | 'measure.PRS.1SG' |
| s'ánka | 'shadown' | zasénčъ | 'overshadow.PRS.1SG' |
| n'ákoj | 'someone' | néshto | 'something' |
| kr'ásъk | 'squeak' | krés'l'o | 'squeaker' |

Is it the consonants?

Could we say that fronting occurs before a soft consonant?

¹⁸ Not like Russian doesn't have exceptions! But historically we've tended to underplay them

¹⁹ It is very largely limited to stressed syllables; we ignore this here.

²⁰ Ernest A. Scatton. 1975. *Bulgarian phonology*. Columbus, OH: Slavica Publishers.

²¹ Because /tj dj sj zj/ is where the postalveolars come from.

On Monday we saw that consonants before [i e] are considered phonologically hard, but that does not have to follow: all we know is the contrast is neutralized.

Indeed, the usual account in generative phonology is /Ci/ → [Cⁱ]: why can't this be the case for Bulgarian?

Is it morphology?

Bulgarian also shows a lot of lexical exceptions to the generalizations, due to dialect mixing, inconsistent treatment of bookish borrowings, and general diachronic chaos.

| Noun | SG.M | SG.F | PL | Gloss |
|---------|---------|----------|---------|----------|
| l'ato | leten | l'atna | letni | 'summer' |
| v'ara | veren | v'arna | verni | 'faith' |
| žel'azo | železen | žel'azna | železni | 'iron' |
| sn'ag | snežen | snežna | snežni | 'snow' |
| gn'av | gneven | gnevna | gnevni | 'wrath' |
| cv'at | cveten | cvetna | cvetni | 'colour' |
| kol'ano | kolenen | kolenna | kolenni | 'knee' |

Unlike Russian and Polish (Ukrainian is slightly more complicated), cyclic misapplication in Bulgarian results in more [e]'s than would be expected under the regular pattern, not in overapplication of backing.

Summary

- Mid vowel alternations used to provide ample support for abstract analyses with absolute neutralization
- In the present-day languages, they tend to be deeply entwined with morphology
- Stratal analyses seem to work well in at least some cases, but much more work remains to be done
- A more surface-oriented analysis that acknowledges the role of morphology is feasible and has some advantages

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