1 Introduction

**Empirical Focus:**

- Russian prefixes (PFX) and prepositions (PREP): largely homophonous.

(1) a. Prepositions iz(o) rta ‘from mouth.GEN’
    v(o) sne ‘in sleep.LOC’

b. Prefixes iz(o)ˇ zdal‘a ‘got sick of waiting.MASC.PST’
    ot(o)spal ‘to sleep (a certain amount).MASC.PST’

- Together with their prosodic host, form a P-COMPLEX.
- Are they a unified class phonologically, morphosyntactically?
- See Matushansky 2002; Zubritskaya 1995; Gribanova 2009 for differing opinions.
- More recently, Blumenfeld (2012) demonstrates that:
  - phonological behavior at the boundary between PREP and their complements, or PFX and their verbal hosts, (the P-COMPLEX boundary) is sometimes variable;
  - this variability is systematic, and corresponds to two distinct prosodic structures for the P-COMPLEX;
  - the variability is partly conditioned by syntactic environment.

- The task at hand: a formal characterization of the syntactic conditions that translate into two different prosodic structures.

**Analytical Claims:**

- Both PREP and PFX can each be subdivided into two classes – homophonous but giving rise to distinct prosodic structures.
- The mapping from morphosyntactic to prosodic structure requires reference to the morphosyntactic environment in which these elements appear.
- What’s relevant: being able to reference a “reduced” syntactic structure, which maps to a reduced prosodic structure.

2 Phonology of the prepositional P-complex

**Observation:**

- Similar syntactic restrictions are observed in YR and SR.
- The branchingness of P’s complement is relevant to both phonological processes.

**Claim:**

- YR and SR depend on the prosodic structure of the P-COMPLEX, which depends on the syntactic context in which P appears.

2.1 Yer realization

- Historical short vowels ů, ų either delete or lower to o, e by Havlík’s Law (Kiparsky, 1979),
- depositing synchronic alternations between o, e and ø in both the root and the PREP.
- Result: PREP alternate between [C] and [CV] shapes; roots alternate between [CVC] and [CC] shapes.

<table>
<thead>
<tr>
<th>OLD RUSSIAN</th>
<th>RUSSIAN</th>
<th>OLD RUSSIAN</th>
<th>RUSSIAN</th>
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</thead>
<tbody>
<tr>
<td>rúť-ů</td>
<td>rot</td>
<td>‘mouth.NOM/ACC’</td>
<td></td>
</tr>
<tr>
<td>rúť-a</td>
<td>rt-a</td>
<td>‘mouth.GEN’</td>
<td></td>
</tr>
<tr>
<td>vů rúť-ů</td>
<td>v rot</td>
<td>‘in mouth.ACC’</td>
<td></td>
</tr>
<tr>
<td>vů rúť-ů</td>
<td>vo rtu</td>
<td>‘in mouth.LOC’</td>
<td></td>
</tr>
<tr>
<td>podú-žig-l-ů</td>
<td>podožog</td>
<td>‘kindled.MASC.PST’</td>
<td></td>
</tr>
<tr>
<td>podú-žig-l-a</td>
<td>podož-g-a</td>
<td>‘kindled.FEM.PST’</td>
<td></td>
</tr>
</tbody>
</table>
C-final PREP and PFX have V-final allomorphs: s(o) ‘with’; k(o) ‘to’; v(o) ‘in’; ot(o) ‘from side of’; iz(o) ‘from inside of’; pod(o) ‘under’, etc.

In PREP, YR is subject to a variety of phonotactic and lexical factors (cf. Steriopolo 2007; Blumenfeld 2012; Linzen et al. 2013).

(3) a. son ‘sleep’
    nom vo sne ‘in sleep’
    loc den ‘day’
    nom k o d n ‘to day’
    dat ves ‘all’
    nom so vsem ‘with all’
    instr rot ‘mouth’
    nom izo rta ‘from mouth’
    gen
b. pen ‘tree’
    nom s p n ‘from tree’
    gen j ‘day’
    nom k pa ‘from tree’
    gen

• Phonotactic YR: triggered by cluster constraints (Steriopolo, 2007)
  o *#ssC; *#vvC; *#svC; other sonority sequencing effects
  o Variable
  o Phonotactic motivations are insufficient: there are also lexically triggered cases of YR.

(4) a. so skorost’ju ‘with speed’
    so vremenem ‘with time’
    so vsem ‘with a lion’
    so vsem ‘with everything’
  b. v sneg ‘into the snow’
  c. vo sne ‘in a dream’
    ko dnu ‘toward the bottom’

• (4a): the regular phonotactic case;
• (4b): failure of YR in cases where phonotactic conditions are not met;
• (4c): overriding lexical effects in near-minimal pairs to (4b).

Blumenfeld 2012: 
  o YR depends on prosodic structure.
  o In lexical YR-triggering configurations, P is prosodically closer to its complement than in structures without YR or with phonotactic YR.
  o → Lexical YR has a more restricted prosodic context than phonotactic YR.

• Lexical and phonotactic YR apply within $\omega_{min}$.
• Phonotactic YR also applies variably within $\omega_{max}$.
• Syntactic effects constraining lexical YR:
  1. The triggering (pro)nominal must be the syntactic complement of the PREP.
  2. This complement should not be branching (no other complements, adjuncts).
• These conditions are necessary, but not sufficient to trigger YR; other lexical effects also apply.
• Supporting claims 1 and 2:

(7) a. k*(o) mne ‘to me’
    v*(o) mne ‘in me’
    s*(o) mnoj ‘with me’
  b. k(*o) to mne.
  c. v(*o) in mne.
  d. s(*o) with mnoj
  e. posle after "Emblematiki", Emblematics
      nesover’sennogo replica k to mne.

Variability in phonotactic YR:
Data was collected from the proxy measure for branchingness. In most of the branching cases, the target noun is followed by a genitive; this is used as a proxy measure for branchingness.

### Supporting claim 2, the relevant effects can be observed under the following circumstances:

- **PREP** occurring before CVC nouns that have a yer (i.e. CVC- alternates with CC-),
- that are not subject to overriding lexical **yr**.
- The lexical **yr** must be sufficiently frequent for the claim to be testable (excluding a handful of nouns such as *pěs* ‘dog’, *šov* ‘seam’).
- **The following items meet these conditions**: *son* ‘dream’, *zlo* ‘evil’, and *dno* ‘bottom’.
- Data was collected from the RNC, limited to works created after 1900.
- In most of the branching cases, the target noun is followed by a genitive; this is used as a proxy measure for branchingness.

<table>
<thead>
<tr>
<th></th>
<th>not followed by genitive</th>
<th>followed by genitive</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>v sne</em> (sg)</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td><em>vo sne</em> (sg)</td>
<td>4583</td>
<td>334</td>
</tr>
</tbody>
</table>

$\chi^2 = 195.5, p < 0.0001$

**Figure 1: v(o) sne ‘in sleep/dream’**

- **Of the 15 examples of v sne not followed by genitive, 10 are in fact not problematic:**
  - 4 involve quoted material (*v ‘Sne ob oseni’, in “The dream about autumn”)*
  - in 3 cases, the preposition *v* is selected by lexical items like *nuždat’sa* ‘need’, in which case **yr** regularly does not apply (Blumenfeld, 2012).
  - in the following 3 cases, the complement of *v* is actually branching:
    - (9) a. *kak v sne kožmarom*
      - *kožmarom* as in dream nightmarish
      - “as in a nightmarish dream”
    - b. *v sne do odsenija*
      - in sleep until nausea
      - “in sleeping ad nauseam”
    - c. *v sne posle pira*
      - in sleep after feast
      - “in sleeping after feast”

### 2.2 Stress retraction

- **Basic Accentuation Principle**: the leftmost underlying accent surfaces; if all morphemes are unaccented, the leftmost syllable is accented (Kiparsky and Halle, 1977).
- **PREP** are historically proclitics; when combined with unaccented nouns, they bear stress, giving the appearance of “retraction” of stress onto the **PREP**.
- Zaliznjak (1989) documents the gradual loss of this retraction in the synchronic grammar between the 12th–16th centuries; cf. also Ukiah 1998.
- **Lexical effects:**
  - (10) **without SR**
    - *za gorod* ‘for a city’
    - *pod goru* ‘under the hill’
  - (11) **with SR**
    - *za gorodom* ‘behind the city’
    - *pod goru* ‘downhill’

*Claim*: **sr** applies within $\omega_{min}$, and is thus subject to syntactic restrictions parallel to those of lexical **yr**.
1. The triggering (pro)nominal must be the syntactic complement of the PREP.
2. This complement should not be branching (no other complements, adjuncts).

- Again, these conditions are necessary but not sufficient for SR to apply.
- Data from the accented subcorpus of the RNC reveals:
  - There is a small but highly significant effect of branchingness (proxied by a following genitive) on the accented status of the prepositions на ‘on’, из ‘from’, по ‘on’, and до ‘until’.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>на N</td>
<td>19704</td>
<td>3575</td>
</tr>
<tr>
<td>на N</td>
<td>67320</td>
<td>14602</td>
</tr>
</tbody>
</table>

$\chi^2 = 77; p < 0.0001$

Figure 5: на N vs. на N ‘on N’

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>из N</td>
<td>3144</td>
<td>876</td>
</tr>
<tr>
<td>из N</td>
<td>14400</td>
<td>4657</td>
</tr>
</tbody>
</table>

$\chi^2 = 69.3; p < 0.0001$

Figure 6: из N vs. из N ‘out of/from N’

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>по N</td>
<td>6225</td>
<td>1070</td>
</tr>
<tr>
<td>по N</td>
<td>18964</td>
<td>4678</td>
</tr>
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</table>

$\chi^2 = 96.2; p < 0.0001$

Figure 7: по N vs. по N ‘along N’

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>до N</td>
<td>2629</td>
<td>402</td>
</tr>
<tr>
<td>до N</td>
<td>9044</td>
<td>1711</td>
</tr>
</tbody>
</table>

$\chi^2 = 12.6; p < 0.0005$

Figure 8: до N vs. до N ‘until N’

2.3 Summary

- The phonological claim: there are two kinds of P-COMPLEX, corresponding to two prosodic structures:
  (12) a. $\omega$ $\sigma$ $\omega$ $\sigma$
  b. $\omega$ $\sigma$ $\sigma$ $\sigma$

- Lexical and phonotactic $\mathrm{yr}$, SR apply within $\omega_{\min}$.
- Phonotactic $\mathrm{yr}$ also applies variably within $\omega_{\max}$.
- The choice between these structures depends on:
  1. phonotactics
  2. lexical factors
  3. syntax (the branchingness of $p$’s complement)

<table>
<thead>
<tr>
<th></th>
<th>PP</th>
<th>PP</th>
<th>PP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PP</td>
<td>N</td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>AP</td>
<td>N</td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>(maps to (12a))</td>
<td>(maps to (12a))</td>
<td>(maps to (12b))</td>
</tr>
</tbody>
</table>

- Claim 3 is taken up in the next section.

3 Mapping from syntactic structure

- The main point: what seems to matter for syntax-prosody mapping is the syntactic status (complement only) and size (not branching) of $p$’s sister.
- Our strategy: leverage an existing proposal that keys in on this very distinction (Hankamer and Mikkelsen, 2005, (h&m)).
- Crucial notions from h&m:
  - being the sister of a minimal N (Bare Phrase Structure: the projection is both maximal and minimal)
  - Extended Subset Principle

7

8
3.1 Hankamer and Mikkelsen 2005

- Core data: two realizations of Danish D: *den and the suffix -en.

(14) a. hest-en
   b. * den
   c. d’en

(15) a. * gamle
 b. * den gamle
   c. den gamle

Additionally: -en is lexically blocked in combination with a certain class of common gender complex Danish nouns (CG -ende).

The distribution of *den vs. -en bears some resemblance to Russian PREP:
- They are two exponents of the same morphosyntactic head (D or P).
- The choice of exponent depends on syntactic configuration.

H&M: in Danish, -en is realized only in the following configuration:

\[
\text{DP} \hspace{1cm} \text{D} \hspace{1cm} \text{def} \hspace{1cm} \text{sg} \hspace{1cm} \text{N} \hspace{1cm} \text{cg}
\]

- In more complex structures, e.g. when the phrase contains adjectival modifiers, the elsewhere form obtains.

- Since *den and -en realize the same feature bundle [D, def, sg, cg], the Vocabulary list contains two entries.

(17) a. -en \( \leftrightarrow \) [D, def, sg, cg] if sister to a minimal N that contains the features [sg] and [cg] and whose exponent is not besøgende, doende, forbipasserende, forretningsdrivende, konsul, lojeringe, medvirkende, n-skmmanderende, parrenår, rejsende, studerende, udenforstående, våghavende...
   b. *den \( \leftrightarrow \) [D, def, sg, cg] elsewhere.

- Both -en and *den realize the same set of features, but one is better suited to a particular syntactic context.
- To capture this, we need an extended version of the *Subset Principle:

(18) Extended Subset Principle

The phonological exponent of a Vocabulary item is inserted into a morpheme in the terminal string if the item matches all or a subset of the features specified in the terminal morpheme. Insertion does not take place if the Vocabulary item contains features not present in the morpheme. Where several Vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen. If two or more Vocabulary items contain the same features but differ in contextual specification so that the contextual specification of one item is a subset of the contextual specification of another, the item with the more restricted contextual specification must be chosen.

- DPs with adjectival modifiers: don’t fit the syntactic environment for -en insertion; the elsewhere form obtains.

3.2 Application to prepositions

- The PREPs in both prosodic configurations mean the same thing:

(19) a. \( \omega \) b. \( \omega \)

\[
\begin{align*}
&\sigma &\sigma &\sigma &\sigma &\sigma &\sigma &\sigma \\
&\text{iz} &\text{rta} &\text{iz} &\text{ortka} &\text{iz} &\text{ortka} \\text{ ('from the mouth'; no YR)} &\text{ ('from the mouth'; YR applies)} \\
&\text{na} &\text{zimu} &\text{na} &\text{zimu} &\text{na} &\text{zimu} \\text{ ('for winter', no SR)} &\text{ ('for winter', SR applies)}
\end{align*}
\]

- all that matters for lexical YR and SR is the syntactic environment in which they appear.
- \( \rightarrow \) We can apply Hankamer and Mikkelsen’s solution seamlessly to these cases.
- Although the phonemic representation of the relevant PREPs is identical, their prosodic behavior is not.
- We capture this via the Dm Vocabulary Insertion rule in (21), in which one of the will be more prosodically dependent than the other (represented by the dash).

(21) a. iz(o)\( \leftrightarrow \) [P] if sister to a minimal N.
   b. iz(o) \( \leftrightarrow \) [P] elsewhere.
4 Extension to prefixes

- The account extends naturally to the phonological behavior of verbal prefixes (PFX).
  - PFX come in the same two prosodic flavors as PREP.
  - This prosodic difference between “inner” and “outer” PFX correlates with the distinction between lexical (LP) and superlexical (SLP) prefixes.

- LP vs. SLP (Svenonius, 2004a,b):
  - Both classes are perfectivizing.
  - There are morphosyntactic distinctions between two classes (aspect, argument structure), but they are often homophonous.
  - LP: when combined with a particular stem, result in idiosyncratic, spatial or resultative meanings, do not stack in prefix stacking, and can change the root’s argument structure.
  - Contrast with SLP: contribute predictable, adverbial or quantificational meanings, do not change the argument structure of the verb, participate in prefix stacking (attach outside LP).

- SR and lexical YR apply only with LP.

4.1 Phonological evidence

- SR in past passive participles (verbal) (Ostrogorskaia-Jaksić, 1987): if there is more than one PFX, only the most inner one will be a LP.
- SR shows that the ωmax domain extends only to LP; SLP are prosodically adjoined.

- What about YR in SLP vs. LP?
- YR in LP is generally not variable.

- As for SLP, data are sparse:
  - Smaller inventory of SLP in Russian than in other Slavic languages.
  - Of those, only ot- and iz- are C-final SLP.

- Based on the evidence we have available to us (from Google), YR in the SLP P-COMPLEX is variable, just as it is with the outer PREP.

- Ja svoi tri s polnovoj žizni užė ot-spal.
  - I self’s three with half lives already SLP-sleep.PST.M.
  - ‘I have already slept my three and a half lives.’
- Deti užė pol dnevnogo sna ot-spalii.
  - children already half day sleep SLP-sleep.PST.PL.
  - ‘The children slept half of their daily measure of sleep.’
- Ja užė ves’ iz-ždalsja.
  - I already all SLP-wait.PST.REFL.M.
  - ‘I am sick and tired of waiting.’
(29) a. Na prirode v palatke užete svoe oto-spal.
   on nature in tent already self’s SLP-sleep.PST.M
   ‘I’ve slept my share in the tent out in nature.’

b. Ja v armii užete svoe oto-spal.
   I in army already self’s SLP-sleep.PST.M
   ‘I’ve already slept my share in the army.’

c. Tebja izoždalsja v pux i prax!
   you I SLP-wait.PST.REFL.M completely
   ‘I am completely sick and tired of waiting for you!’

4.2 Mapping from syntax to prosodic structure

• Previous syntactic proposals (Gribanova, 2010, 2013b) capturing the structural difference between LP and SLP:

(30)

\[
\begin{array}{c}
\text{TP} \\
T \quad \text{AspP} \\
\text{Asp} \quad \text{vP} \\
\text{SLP} \quad \text{RootP} \\
\text{LP} \quad \text{Root} \\
\end{array}
\Rightarrow
\begin{array}{c}
\text{TP} \\
T \quad \text{AspP} \\
\text{Asp} \quad \ldots \\
\text{RootP} \\
\text{LP} \quad \text{Root} \\
\end{array}
\]

(31) linearized: [SLP [LP root] v]

• A natural consequence of this analysis: LP will only ever have one non-branching complement (the root);

• SLP takes a branching complement.

• The account used for PREP extends naturally to the PFX cases:

(32) a. ot(o)\(\rightarrow\) [P] if sister to a minimal X.

b. ot(o) \(\leftrightarrow\) [P] elsewhere.

• What this means for the prosodic mapping:

  o LP obligatorily map to the reduced prosodic structure \(\rightarrow\) SR and lexical YR can apply.
  o SLP obligatorily map to the non-reduced structure (with recursion) \(\rightarrow\) SR may not apply, and YR will apply variably.

• Here, too, we take meaning differences between LP and SLP to be the consequence of the syntactic structure in which these prefixes appear, rather than being lexically encoded.

See Babko-Malaya 2003, Fowler 1994, Svenonius 2004a for similar proposals, with variations that do not concern us here.

5 Conclusion

• There are “inner” and “outer” prosodic structures for both PREP and PFX.

• The choice of prosodic mapping is conditioned by multiple factors. One is: the syntactic environment in which P appears.

• Non-branching complements of P get mapped to the ‘reduced’ prosodic structure.

• The striking observation: despite the syntactic differences between PREP and PFX — eg., verbal vs. nominal domain — both seem to pattern identically w.r.t.:
  o the splitting up into two prosodic structures;
  o the syntactic conditions that dictate the prosodic mapping.

• What is needed to make the mapping work:
  o the idea that competition for insertion considers not just how well phonological exponents match up with morphosyntactic features, also the syntactic context.
  o the idea that “sister of a minimal head” is a relevant notion (for Danish, and now Russian) for mapping to prosody.

• What’s next?
  o Incorporating other semantic, syntactic factors that condition the mapping (Blumenfeld, 2012).
  o Re-evaluation of the famous Russian bracketing paradox problem (Lightner, 1972; Pesetsky, 1979, inter alia) with this new analytical picture in hand.

Acknowledgments

For generous feedback and discussion of this research, we thank Arto Anttila, Boris Harizanov, Paul Kiparksy, Line Mikkelsen, and the Crosslinguistic Investigations in Syntax-Phonology (CrISP) research group. All errors are the authors’ responsibility.

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