This talk brings evidence from Bulgarian and Russian to bear on two open questions about allomorphy:

1. What sort of locality restriction obtains between the conditioning morpheme and the morpheme that is subject to allomorphy?

2. Is there any connection between the direction of sensitivity (outward or inward) and the type of feature (morphosyntactic or phonological) that does the conditioning?

In this talk, we take up existing and fairly restrictive answers to each of these questions, both of them within late-insertion models of morphology arising out of, and broadly compatible with, Distributed Morphology (DM). In the case of (1), DM-compatible theories like that of Embick 2010 and Bye and Svenonius to appear, allow allomorphic interactions to take place only between morphemes that are string-adjacent. In the case of (2), there are stringent late-insertion proposals (Halle, 1990; Bobaljik, 2000) in which morphosyntactic terminals are rewritten root-outward by phonological segments; a consequent prediction is that only phonological features or idiosyncratic properties of roots (such as declension or conjugation class) should condition inward-sensitive allomorphy, and only morphosyntactic features should condition outward-sensitive allomorphy.

Our two case studies address each of these questions in the context of inwardly sensitive allomorphy, demonstrating that these restrictive conditions are too restrictive to account for the facts. The Russian case study demonstrates that inward-sensitive allomorphy can be found even when there are phonologically overt intervening morphemes (i.e. no string adjacency). The Bulgarian case study demonstrates that inward-sensitive allomorphy must be able to make reference to morphosyntactic features (gender and number) as well as the phonological shape of the conditioning allomorph. We explore or propose alternative versions of the relevant conditions that are better suited to account for the facts put forth here.

1. Locality
Within realizational theories like DM, there are two operations for realizing morphological exponents (following Embick 2010, i.a.). Vocabulary Insertion (VI) translates morphosyntactic features in a hierarchical syntactic structure into pieces of morphophonology, proceeds inside-out by morphosyntactic phase, and is constrained by linear adjacency of morphemes (2). Readjustment rules manipulate the morphophonological content of vocabulary items (often, but not always, Roots) after they have been inserted, and may violate linear adjacency: they require only that the morphosyntactic trigger and the undergoer of the rule be separated by no more than one cyclic head (3).
If \( x \) and \( y \) are cyclic heads, allomorphy is possible between:

- a) \( W \) and \( x \)
- b) \( x \) and \( A \)
- c) \( A \) and \( y \)
- d) \( x \) and \( y \), if \( A \) is null
- e) \( W \) and \( A \), if \( x \) is null
- f) \( A \) and \( B \), if \( y \) is null
- g) \( y \) and \( B \)

but not between \( W \) and \( B \)

If \( x \) and \( y \) are cyclic heads, Readjustment may apply:

- a) \( W \) triggering \( x \)
- b) \( x \) triggering \( A \)
- c) \( A \) triggering \( y \)
- d) \( x \) triggering \( y \)
- e) \( W \) triggering \( A \)
- f) \( A \) triggering \( B \)
- g) \( y \) triggering \( B \)

but not \( W \) triggering \( B \)

We argue that the Russian pattern should not be analyzed through \( \text{VI} \) and readjustment, though it is superficially similar to other phenomena that have been accounted for in just this way — e.g., German Umlaut and English irregular past tense morphology (Embick and Halle, 2005). Instead, we propose a reformulation of readjustment rules in which their application is linked to potentially non-local applications of \( \text{VI} \) (e.g., without linear adjacency).

Bare stems in Russian are almost always imperfective (4a), and can be made perfective by prefixation (4c). This complex perfective verb can be again made imperfective, in canonical cases via the addition of a secondary imperfective (2IMPf) suffix (4d).

(4) a. bolʼ-e-tʼ
   hurt-THEME-INF
   ‘to hurt’

b. *bolʼ-e-va-tʼ
   *hurt-THEME-2IMPf-INF

c. za-bolʼ-e-tʼ
   INCP-hurt-THEME-INF
   ‘to fall ill (perfective)’

d. za-bolʼ-e-va-tʼ
   INCP-hurt-THEME-2IMPf-INF
   ‘to fall ill (imperfective)’

Certain verbal complexes have yers — underlyingly present vowels which alternate with zero in certain contexts — in both the prefix and the root. For example, podobratʼ ‘to pick up’ contains a prefix-final -a- yer, which is vocalized, and a root-internal yer, which is deleted but shows up in morphologically related forms (e.g., pobor ‘tax’). In a subset of these cases, 2IMPf is realized not as a suffix, but as an exceptional (i.e. grammatically conditioned) instance of root yer realization. This results in paradigms like fig. 1, with prefixal yer deletion and root yer vocalization in the secondarily imperfectivized forms.
**Figure 1: Secondary imperfective paradigm**

We demonstrate that the behavior of the root yer in prefixed perfectives is phonologically optimizing, resolving undesirable consonant clusters, and that the prefixal yer’s behavior is part of a more general phonological pattern and is not grammatically conditioned. The empirical generalization to be captured is that a special subset of Russian yer-containing roots realize their yer in the 2IMPF morphosyntactic environment.

The default approach to such data in DM would involve insertion of a null affix at v in the context of a certain list of roots, in combination with the application of a readjustment rule that forces exceptional yer realization and vowel lengthening (Vlasto, 1986) in the context of those same roots. The difficulty with such an approach is that, under many DM-oriented analyses of Russian clause structure and verbal morphosyntax (Svenonius, 2004a; Gribanova, to appear, and references therein), the theme vowel, which acts as a verbalizer and is realized in v, appears between 2IMPF and the root (5).

(5) TP
    \[ \text{T \ AspP} \]
    \[ \text{Asp} \]
    \[ \ldots \]
    PFX Root \( v \)

According to Embick 2010, non-adjacent allomorphy is permitted as long as any intervening material is null; but the theme vowel in all the forms of fig. 1 is pronounced (penultimate -a-). This renders the necessary v interaction non-adjacent, in violation of Embick’s (2010) locality conditions on v. To alleviate this difficulty while minimally weakening the strong predictions made by Embick’s 2010 formulation, we propose that the (v) of the morphosyntactic triggers of non-concatenative effects may make reference to non-adjacent material. This approach makes the prediction that only morphosyntactic features which trigger non-concatenative effects may be allomorphically conditioned by non-adjacent infor-
2. Directionality
Contextual allomorphy exhibits bidirectional sensitivity: the form of a morpheme M can be determined by another morpheme that is either closer to the root than M, or farther away from the root than M (inward vs. outward sensitivity). A major question about allomorphy is whether its direction of sensitivity correlates with the type of feature that conditions allomorphy (see Carstairs-McCarthy 2001 for discussion). Here we take up Bobaljik’s (2000) claim that inward sensitive allomorphy only makes reference to non-syntactic (morphophonological) features while syntactic features are only relevant for outward sensitive allomorphy.

To account for this, Bobaljik (2000:3) assumes the following about the architecture of grammar and the nature of morphology: [A] Separation: morphology interprets syntax; i.e. phonological material undergoes “late”, post-syntactic, insertion; [B] Cyclicity: the insertion of phonological material proceeds root-outwards; and [C] Rewriting: as morphosyntactic features are expressed by phonological material, these features are used up and no longer part of the representation. A and B are standard within the theory of Distributed Morphology (Halle & Marantz 1993, et seq.) and C is easily accommodated within such a theory (although differing perspectives exist, compare e.g. Halle 1990 and Bobaljik 2000 with Halle & Marantz 1993). Based on data from definiteness marking in Bulgarian, we argue that both morphosyntactic and phonological features are relevant for inward sensitive allomorphy (contra Bobaljik). Therefore, the three assumptions above cannot all be maintained. We then explore and compare two versions of lexical insertion that are consistent with the retention of A and B, but reject the strongest version of C.

The suffixal definiteness marker (DEF) in Bulgarian is the most peripheral suffix to appear on a noun or nominal modifier (e.g. external to plural morphology) and exhibits inward sensitive allomorphy. Crucially, the form of DEF depends on both morphosyntactic and phonological properties of the stem to which it attaches (Franks 2001, i.a.). First, allomorph selection makes reference to the gender/number features of the noun which hosts DEF: the majority of masculine singular nouns take the -a allomorph (6); all feminine singular nouns take the -ta allomorph (7); all neuter singular nouns take the -to allomorph (8); finally, in the plural (where gender distinctions are neutralized), DEF is -te (9). Homonyms which take distinct allomorphs of DEF—(6b,c) vs. (7b,c)—clearly indicate that phonological information is not a sufficient conditioning factor.

(6) **Singular masculine**
   a. dvor ‘yard’ — dvora
   b. med ‘honey’ — meda
   c. präst ‘finger’ — präst a

(7) **Singular feminine**
   a. voda ‘water’ — vodata
   b. med ‘copper’ — medta
   c. präst ‘soil’ — prä st a
Second, the phonological shape of the host noun is another conditioning factor for allomorphy. There is a small set of vowel-final masculine singular nouns which end in -a or -o and they take the -ta and -to allomorphs of DEF, respectively (not -a) (10, 11). Similarly, there are a few pluralizing suffixes which end in -a and these are similarly followed by the -ta allomorph instead of -te (12). Thus, when DEF is attached to a stem ending in -a or -o, it is realized as -tV where V must match the vowel immediately preceding it (i.e. -a or -o). Furthermore, certain nouns in the language are exceptional in that they have two plural forms in free variation. Each of these appears with a different allomorph of DEF—(9b,c) vs. (12d,e)—demonstrating that gender/number features do not uniquely determine allomorph selection.

It is just in the case of stems ending in -a or -o that the shape of DEF will be unusual: -ta/-to instead of -a for masculine singular or -te for plural. For instance, the terminal node D[DEF] in the context of the singular masculine noun bašta ‘father’ is realized by the phonologically conditioned allomorph -ta as dictated by the final segment of the stem (a). But why does this allomorph win the competition for insertion over the morphosyntactically conditioned allomorph -a, which otherwise gets inserted in the context of singular masculine nouns? Since both allomorphs match the same number of features of the terminal node (DEF), the principle governing choice between competing allomorphs in Distributed Morphology (Subset Principle, Halle & Marantz 1993) should always choose the allomorph with the most specific context of insertion. This leads to the conclusion that the phonological context must be taken to be more specific for the purposes of allomorph selection than the morphosyntactic context (see Harizanov & Gribanova 2011). This analysis requires the rejection of assumption C so that lexical insertion has simultaneous access to both types of context. Bye & Svenonius (to appear) develop an alternative 2-step lexical insertion procedure which first matches possible allomorphs to a morpheme M according to M’s own features and its morphosyntactic context and then selects a unique allomorph on purely phonological grounds. For D[DEF] in the context of bašta ‘father’, this system chooses the set of allomorphs {-a, -ta, -to} as possible matches leaving the phonological component to decide the actual exponent (based on the phonological shape of the stem).

What remains to be demonstrated is that the features the form of DEF is sensitive to are,
in fact, morphosyntactic. Recall that, according to Bobaljik (2000), inward sensitive allomorphy can be conditioned by syntactically irrelevant morphophonological features such as idiosyncratic class features associated with specific roots or other morphemes (much like phonological features). This would be true regardless of whether roots are inserted early or late—either way, the morphophonological features associated with a particular root would be present before Vocabulary Insertion of an outer morpheme. The question is whether gender and number in Bulgarian nominal phrases are idiosyncratic properties of roots (or any other morphemes) available only after Vocabulary Insertion, or not.

First, consider number: generally, nouns in Bulgarian can be decomposed into a root/stem and a discrete non-null plural suffix (the singular suffix is usually, but not always, null):

(13)  

<table>
<thead>
<tr>
<th>Example</th>
<th>Singular Suffix</th>
<th>Plural Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>grad 'city'</td>
<td>gradove</td>
<td>d. pole 'field' — poleta</td>
</tr>
<tr>
<td>bulevard 'boulevard'</td>
<td>bulevardi</td>
<td>e. oko 'eye' — oči</td>
</tr>
<tr>
<td>majka ‘mother’</td>
<td>majki</td>
<td>f. vremena 'time' — vremena</td>
</tr>
</tbody>
</table>

This suggests a functional morpheme [Num], i.e. a feature bundle, composed of the 2-valued feature “number”. Assuming that all structure building is a syntactic matter, this feature bundle must be present before Vocabulary Insertion. Moreover, (a feature value of) number cannot be treated as an idiosyncratic property of roots (or the Num morpheme itself) given the highly productive nature of pluralization in the language: only a handful of nouns exist in just singular or plural. In other words, either value of the number feature can be instantiated unpredictably for a given ROOT-Num complex.

Gender suffixes can generally be reliably identified as separate from the root (masculine: ∅, feminine: -a, neuter: -e, -o). Following the same type of argumentation given for number morphemes, it can be concluded that gender morphemes must also be represented as separate feature bundles [Gen] during syntactic structure building. Therefore, gender cannot be (literally) an idiosyncratic property of roots. Though many (derived) nouns belong uniquely to one of three gender classes, suggesting some idiosyncracy, the gender suffix on many roots can also express more than one gender value (14). Thus, just like number, either value of the gender feature can be unpredictably instantiated for the same ROOT-GENDER complex.

(14)  

<table>
<thead>
<tr>
<th>Example</th>
<th>Gender Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>pevec ‘singer.M’</td>
<td>pevica ‘singer.F’</td>
</tr>
<tr>
<td>bălgarin ‘bulgarian.M’</td>
<td>bălgarka ‘bulgarian.F’</td>
</tr>
<tr>
<td>učitel ‘teacher.M’</td>
<td>učitelka ‘teacher.F’</td>
</tr>
<tr>
<td>aktjor ‘actor.M’</td>
<td>aktrisa ‘actress’</td>
</tr>
</tbody>
</table>

Finally, consider nominal concord for gender and number, which transmits values for these features onto all noun modifiers. These features are expressed by identifiable discrete suffixes on all adjectives in the language (with the exception of a small number of loans). This suggests that they are independent syntactic atoms and not (directly) associated with the roots to which the morphemes expressing them attach. Moreover, gender and number cannot be idiosyncratic properties of adjectival roots/stems, since any gender/number suffix
can attach unpredictably to any adjectival root. Relatedly, gender/number values cannot be introduced on adjectives (and other nominal modifiers) at Vocabulary Insertion unless concord/agreement is purely phonological. Since DEF appears on adjectives and behaves as expected based on the analysis provided above, it must be sensitive to features that are present before VI:

(15) a. nov film ‘new movie’ — novija film ‘the new movie’
   b. nova kniga ‘new book’ — novata kniga ‘the new book’
   c. novo menju ‘new menu’ — novoto menju ‘the new menu’
   d. novi knigi ‘new books’ — novite knigi ‘the new books’

We conclude on the basis of the Bulgarian data that inward sensitive contextual allomorphy can be conditioned by both morphosyntactic and phonological features. To model such data in a late insertion theory of morphology, lexical insertion (and, thus, allomorph selection) must be able to reference both types of information. What both of the analyses presented above have in common is that they allow the form of a morpheme M to be conditioned by both the morphosyntactic and phonological properties of material that is closer to the root than M.

References


