

# Locality and Directionality in Inward-Sensitive Allomorphy: Russian and Bulgarian\*

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## 1. Introduction

In explaining the empirical facts of contextual allomorphy, theories of morphology make different sets of assumptions, which yield correspondingly divergent predictions about the kind of variation in allomorphic patterns we expect to find in the world's languages. Here we take up a set of views that is common to realizational theories like Distributed Morphology (DM; Halle and Marantz 1993, *et seq.*) and some versions of Stratal OT (Kiparsky, 2000), despite their many other differences.<sup>1</sup> In these theories the mapping from morphemes (abstract syntactic terminals) to phonological exponents arbitrates between possible forms on the basis of compatibility with sets of morphosyntactic features. In DM, the process of mapping morphemes to phonological strings (called Vocabulary Insertion, VI) is usually assumed to proceed root-outward and one terminal at a time.<sup>2</sup> These theories are additionally faced with at least two choices as to how much or how little information they make available for reference in allomorph selection. The first choice (*i*) concerns what kind of locality restriction, if any, should be imposed: how far away from each other can the conditioning morpheme and the morpheme that is subject to allomorphy be? A second choice (*ii*) is about whether morphosyntactic features should be rewritten by phonological ones on the process of translating from one to the other (exponence). Can allomorphy make reference to the morphosyntactic features of a given allomorph, even after that allomorph has been assigned a

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<sup>1</sup>For the sake of concreteness, in the theoretical implementation of our case studies and in the discussion that follows, we concentrate specifically on DM.

<sup>2</sup>An anonymous reviewer points out that a viable alternative involves simultaneous VI of all terminals within a spell-out domain.

phonological form? In this paper we present two case studies of Bulgarian and Russian contextual allomorphy, each of which bears on one of these central questions directly.

With respect to (i) it has been suggested that allomorphic sensitivity should only occur between morphemes that are adjacent to each other, either in a structural sense (Siegel, 1978; Allen, 1979; Bobaljik, 2012; Embick, 2003, 2010) or both in a structural and in a linear sense (Embick, 2010). The question is of importance because other prominent theories of exponence, for example Monostratal OT (McCarthy and Prince, 1993a,b), do not lead to such expectations. The adjacency constraint on allomorphy remains a matter of some debate, in particular because specific counter-examples — in Itelmen (Bobaljik, 2000) and Itzaj Maya (Radkevich, 2011) — have been subject to scrutiny and re-analysis (Bobaljik, 2012; Bonet and Harbour, 2012; Butler, 2012). Here (§2) we present another such case study from Russian, involving an unusual morphophonological pattern that encodes aspectual information within a certain class of Russian verbs. Derived imperfective aspect, which turns a perfective verb into an imperfective one, typically takes the form of a suffix with two allomorphs; in the paradigm of interest, however, this imperfective morpheme appears to be expressed as a different form of the root, rather than as a suffix. In other words, this is a case in which the realization of derived imperfective aspect must make reference to the identity of the root — an instance of (inward-sensitive) contextual allomorphy. We begin with the parse of the Russian verbal complex that is promoted in Svenonius 2004a,b, and demonstrate that this analysis leads to a situation in which this allomorphy must take place across a morpheme that intervenes both structurally and linearly. We argue, however, that further investigation of these patterns obviates the need for reference to non-adjacency in allomorphy. Understanding such apparent counter-examples is key to a better understanding of what kind of locality condition should be invoked in theories of contextual allomorphy. To the extent that putatively non-local instances of contextual allomorphy can be re-analyzed as local, theories that impose strict locality conditions on allomorphic interactions are vindicated.

With respect to (ii), the assumption that syntactic terminals are realized by phonological strings one at a time and root-outward is compatible with an understanding of exponence as involving *rewriting* of morphosyntactic features with phonological strings (Halle 1990:156, Noyer 1992:23, Bobaljik 2000:16). A consequence of this assumption is that only phonological features should condition inward-sensitive allomorphy, and only morphosyntactic features should condition outward-sensitive allomorphy. There are numerous apparent counter-examples, for example from Sanskrit case/number/gender (Lahne, 2006), Latin number in the perfect (Carstairs 1987, 154, Carstairs-McCarthy 2001), Turkish agreement suffixes (Carstairs 1987, 156), Hungarian (Carstairs, 1987, 156), and Zulu (Carstairs, 1987, 160). These counter-examples, too, have sometimes been subject to re-analysis (Bobaljik 2000:31, Adger et al. 2003). Here (§3), we present a novel case study from inward-sensitivity of the Bulgarian suffixal definiteness marker, and claim that its allomorphy requires simultaneous reference to both the morphosyntactic and phonological features of the host stem. This conclusion, if correct, contradicts the *rewriting* assumption, and necessitates a loosening of this particular restriction. We discuss a theoretical approach that would allow such a loosening while still remaining consistent with the principal assumptions of DM (Harizanov and Gribanova 2011, Bye and Svenonius 2012, Halle and Marantz 1993, Embick 2010:39).

## 2. Locality: Russian

The empirical focus of this section is a noncanonical aspectual alternation in a certain class of Russian verbs which raises important questions about locality in allomorphic interactions. Most Russian verb stems are imperfective (1a,2a); these can be perfectivized in multiple ways, one of which is the addition of an aspectual prefix (1b,2b). In canonical cases, this perfective form can once again be turned into an imperfective via the addition of a derived imperfective (DI) suffix (1c). The question marks associated with the verbal inflection in the gloss lines below are placeholders for an analysis which is elaborated in §2.3.<sup>3</sup>

- |  |  |
|--|--|
| (1) The typical DI pattern<br>(glosses underspecified):            | (2) The special DI pattern<br>(glosses underspecified):  |
| a. bol'-e-t'<br>hurt-?-INF<br>'to hurt' (IMPF)                     | a. sl-a-t'<br>send-?-INF<br>'to send' (IMPF)             |
| b. za-bol'-e-t'<br>PFX-hurt-?-INF<br>'to fall ill' (PFV)           | b. razo-sl-a-t'<br>apart-send-?-INF<br>'send out' (PFV)  |
| c. za-bol'-e-v-a-t'<br>PFX-hurt-?-DI-?-INF<br>'to fall ill' (IMPF) | c. ras-syl-a-t'<br>apart-send-?-INF<br>'send out' (IMPF) |
| d. *bol'-e-v-a-t'<br>hurt-?-DI-?-INF                               | d. *syl-a-t'<br>send-?-INF                               |

By contrast with (1), in the non-canonical cases under investigation in this paper, the derived imperfective is expressed not as a suffix, but rather as an alternation in the vocalic melody of the root (2c): DI forms realize a vocalic nucleus in the root, whereas perfective forms do not realize this vowel (2b). We follow Gribanova (To appear) in taking these vocalic alternations to be part of a more general phonological process — the familiar pattern of vowel-zero alternations found across Slavic (yer alternations) — which happens in this case to be triggered by specific morphosyntactic features on Asp. The crucial point for the current discussion is that the realization of DI features themselves — either as a suffix or as an alternation in the vocalic melody — is sensitive to the identity of the root. This non-canonical pattern is important to our understanding of locality conditions in allomorphic interactions because, depending on how the verbal complex is parsed, it is possible to construe the interaction between the syntactic instantiation of DI features and the root as a non-local one, both in structural and in linear terms. This is in fact the conclusion one is led to under the analysis of Russian verbal structure found in prominent analyses like that of Svenonius (2004a,b). However, we will argue here for an alternative parse of the Russian verbal complex, in which certain pre-inflection suffixes are instantiations of *v*, while others are genuine

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<sup>3</sup>Abbreviations: ACC *accusative*, DI *derived imperfective*, F *feminine*, FUT *future*, GEN *genitive*, IMPF *imperfective*, INF *infinitive*, IMPF *imperfective*, LP *lexical prefix*, M *masculine*, NEG *negation*, NMLZ *nominalizer*, PFX *aspectual prefix*, PFV *perfective*, PL *plural*, PST *past*, Q *polar question*, SG *singular*, SP *superlexical prefix*, TH *theme vowel*. The prime (') symbol marks palatalization, and two prime signs (') mark the Russian “hard” sign (the glide [j]). Transliterations use standard conventions for Russian, and reflect orthographic conventions unless otherwise specified. Broad phonetic transcriptions are also provided where necessary, with a superscript [<sup>j</sup>] for palatalization.

theme suffixes, inserted post-syntactically as sisters to an Asp head. This approach makes better sense of certain patterns involving the interaction of these vowels with the DI suffix, and resolves the non-locality issue, vindicating theories of allomorphy that restrict allomorphic interactions to structural and linear adjacency.

In what follows, we provide further empirical details associated with this pattern, and use the Svenonius 2004a,b analysis as a starting point for our discussion (§2.1). §2.2 works out an account of the pattern in (2) that is predicated on the structure elaborated in §2.1, in terms of a well-articulated DM model of allomorphic interactions (Embick, 2010). The pattern of interest is captured via a combination of inwardly-sensitive contextual allomorphy of the exponent of Asp to the root, in conjunction with the application of morphosyntactically triggered readjustment rules which yield the special vocalic pattern in the root. This approach has the consequence that the relevant allomorphic interaction must be non-local structurally and linearly. §2.3 argues instead for an alternative view, in which the relevant interaction is a local one. The crucial question concerns the status of the [-a-] vowel that appears in all three forms in (2); as its status is debatable, here we will use the neutral term ‘pre-inflection’ suffix. We propose a novel analysis in which this pre-inflection suffix is projected from the functional head Asp post-syntactically (Oltra-Massuet, 1999; Oltra-Massuet and Arregi, 2005; Embick and Halle, 2005), eliminating it as a potential intervener between the Asp head and the root. This alternative proposal has the beneficial consequence of yielding an analysis that is both consistent with prominent theorizing about locality in allomorphy, and elegant in terms of accounting for broader empirical patterns associated with the Russian verb. §2.4 concludes.

## 2.1. Initial observations

### 2.1.1 Morphosyntax: a starting point

We start from a prominent analysis of the Russian verbal complex put forth in Svenonius 2004a,b and extensions thereof (Gribanova, 2010, 2013). The glosses in what follows presuppose this analysis. The verb forms we will be investigating consist of five parts (3b): these include a lexical prefix (LP), the root, a pre-inflection suffix (often just a vowel, null in certain forms), a DI suffix (when it is a suffix), and inflectional information (gender, person, number).

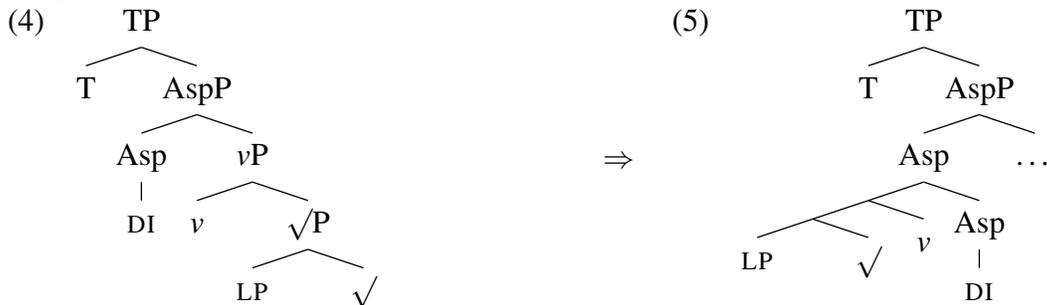
- (3) a. pod-pis-a-la  
 LP-write-v-SG.F  
 ‘she signed (something) (PFV) (based on Svenonius 2004b)
- b. pod-pis-∅-yva-la  
 LP-write-v-DI-SG.F  
 ‘she was signing (something)’ (IMPF) (based on Svenonius 2004b)

LP are perfectivizing, non-compositional prefixes which are not separable from the root.<sup>4</sup> Every LP that has a consonant-final variant also has a vowel-final variant in which the vowel is a yer — a lexically specified vowel which alternates in certain contexts with zero (*e.g.*, [pod-]~[podo-]).

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<sup>4</sup>Other classes of prefixes (superlexical, intermediate), categorized as different because of their more transparent, compositional semantics and numerous other distinguishing characteristics (Tatevosov, 2008; Svenonius, 2004a,b; Isačenko, 1960), are not directly relevant to the discussion in this paper and will not be mentioned further here.

Although we will ultimately argue against this analysis, it serves as a good starting point, as it is one of the few attempts to assign a syntactic structure to the relevant parts of the verbal complex, including the DI suffix, the pre-inflection suffix, and the prefixes. Below, (5) is derived via head-movement from (4), consistent with the observation that the verbal complex is a word-like unit, and not separable.



These structures are predicated on several assumptions, for example that morphosyntactic structures are syntactically composed via head-movement (Babko-Malaya, 2003; Fowler, 1994), that roots are categorized by functional heads (Arad, 2003; Marantz, 2007, *et seq.*), and that the verb movement is to a position just below T (Bailyn, 1995a,b). Finally, the LP perfectivizing prefixes are merged in a low position inside vP and the DI suffix is merged high, as a realization of Asp.

A major issue of contention here will be the status of the pre-inflection suffix — taken by Svenonius (2004b) to instantiate *v* — and its interaction with the DI suffix. Traditionally, the pre-inflection suffix is taken to be an indicator of conjugation class, and some overt version of it appears on the majority of Russian verb stems, both simplex and complex. A typical description (Levin, 1978) lists a number of these suffixes (6, based on Nevins and Bailyn 2008) and derives surface forms in conjunction with inflection via the use of a regressive vowel hiatus resolution rule that deletes the first vowel in morphologically derived sequences of vowels (Jakobson, 1948).

- (6)
- a. *-a-* e.g. pis-a ‘write’  
 pis+a+u → pišu ‘I write’  
 pis+a+l → pisal ‘he wrote’
  - b. *-aj-* e.g. pis-aj ‘piss’  
 pis+aj+u → pisaju ‘I piss’
  - c. *-i-* e.g. govor-i ‘speak’
  - d. *-e-* e.g. bol-e ‘hurt’
  - e. *-ej-* e.g. bol-ej ‘be sick’
  - f. *-nu-* e.g. ver-nu ‘return’
  - g. *-o-* e.g. kol-o ‘stab’
  - h. *-ova-* e.g. ris-ova ‘draw’
  - i.  $\emptyset$  e.g. stan- $\emptyset$  ‘become’

Initial evidence for associating the pre-inflection suffix with *v* comes from the observation that LP-root combinations appear not just in verbal forms, but also in nominal and adjectival forms; in the latter two cases, the verbalizing suffix is not present, with other endings instead signaling information about category type.

- (7) a. *razo-br-a-t'* ‘take apart’ (V)  
 b. *raz-bor-čiv-yj* ‘picky’ (A)  
 c. *ne-raz-ber-ixa* ‘confusion’ (colloq.) (N)  
 d. *raz-bor* ‘analysis’ (N)  
 e. *raz-bor-ka* ‘dismantlement’ (N)  
 f. *raz-bor-ščik* ‘person who does dismantlement’ (N)

As for cases in which the pre-inflection suffix is null (e.g. (3b)), Svenonius (2004b) takes this to be the result of Jakobson’s rule (stated above).

Nominalizations which include DI are always eventive; under the assumption that the verbalizing suffix both categorizes the verb and introduces an event (Svenonius, 2004b), this suggests further that DI can attach only in conjunction with the verbalizing suffix in this analysis.

- (8) a. *pod-pis-ø-yva-t'* ~ *pod-pis-ø-yva-nie* ~ *pod-pis'*  
 LP-write-*v*-DI-INF ~ LP-write-*v*-DI-NMLZ ~ LP-write  
 ‘to sign (IMPF)’ ~ ‘(the) signing’, \*signature ~ ‘signature’  
 b. *za-rabat-ø-yva-t'* ~ *za-rabat-ø-yva-nie* ~ *za-rabot-ok*  
 LP-work-*v*-DI-INF ~ LP-work-*v*-DI-NMLZ ~ LP-work-*n*  
 ‘to earn (IMPF)’ ~ ‘(the act of) earning’ \*earnings ~ ‘earnings’  
 c. *vy-strel'-ø-iva-t'* ~ *vy-strel'-ø-iva-nie* ~ *vy-strel*  
 LP-shoot-*v*-DI-INF ~ LP-shoot-*v*-DI-NMLZ ~ LP-shoot  
 ‘to fire (a gun) (IMPF)’ ~ ‘(the act of) firing (a gun)’ \*shot ~ ‘(a) shot’

Consistent with this observation, DI can attach only to verbs which already contain a LP, which is taken to attach within *vP*.

- (9) *kolot'* → *nakolot'* → *nakalyvat'(\*kalyvat')*  
*chop.INF<sup>I</sup>* → *chop enough of sth.INF.<sup>P</sup>* → *chop enough of sth.INF<sup>I</sup>*

A consequence of this overall view is that the DI suffix should be of the form [-*va-*] or [-*i/yva-*]. This, too, is not uncontroversial: previous analyses have also posited other realizations (Halle, 1963; Flier, 1972; Coats, 1974; Feinberg, 1990; Matushansky, 2009), and our final analysis will also propose a different set of allomorphs.

### 2.1.2 Phonological patterns

Given the morphosyntax we have established thus far, there are two ways of understanding the vocalic alternation pattern in (2); which view we choose ultimately determines the resulting analysis. Here we describe these two potential views and argue for one in which the vocalic melody of the special DI forms is the result of a general phonological process, and the lack of a suffixal exponent for DI is the result of inward-sensitive allomorphy to a specific set of roots. To start with, we provide some additional examples of the perfective and DI forms that participate in this alternation.<sup>5</sup>

<sup>5</sup>The vowels in the DI forms are transcribed here according to orthographic convention; in narrow phonetic transcription some of the root vowels transcribed as [i] are closer to [y].

PREFIXED PFV	DI	GLOSS	CROSS-CHECK
podobral	podbiral	‘picked up.1/2/3SG.M.PST’	<i>pobor</i> ‘tax’
razorval	razryval	‘rip up.1/2/3SG.M.PST’	<i>poryv</i> ‘burst’
obožralsja	obžiralsja	‘over-ate.REFL.1/2/3SG.M.PST’	<i>obžora</i> ‘glutton’
obosral ( <i>vulg.</i> )	obsiral ( <i>vulg.</i> )	‘covered in feces.1/2/3SG.M.PST’	<i>sorit’</i> ‘litter.INF’
otoslal	otsylal	‘sent away.1/2/3SG.M.PST’	<i>posol</i> ‘ambassador’
razodral	razdiral	‘tore up.1/2/3SG.M.PST’	<i>d’ornul</i> ‘tugged.SG.M’
rast’or	rastiral	‘ground up.1/2/3SG.M.PST’	<i>t’ortyj</i> ‘grated.M’
podžog	podžigal	‘set fire to.1/2/3SG.M.PST’	<i>izžoga</i> ‘heartburn’
podožgla	podžigala	‘set fire to.1/2/3SG.F.PST’	<i>izžoga</i> ‘heartburn’
podp’or	podpiral	‘prop sth. up.1/2/3SG.M.PST’	<i>opora</i> ‘support’
podozval	podzyval	‘call s.o. over.1/2/3SG.M.PST’	<i>zovu</i> ‘call.1SG’
obolgal	oblygal ( <i>arch.</i> )	‘to lie about.1/2/3SG.M.PST’	<i>lož’</i> ‘lie’

Figure 1: Irregular perfective / derived imperfective paradigm

Some initial observations about this pattern are in order here. Looking first at the prefixes, we can see that they exhibit a vowel-zero alternation (e.g. *pod-/podo-*). These alternations are uncontroversially generally taken to be part of a broader lexicon-wide pattern in Russian, and have been analyzed in generative phonology as the deletion, under certain circumstances, of certain [o] and [e] vowels which are specified in the underlying representation (Pesetsky, 1979; Bethin, 1992; Yearley, 1995). Following Yearley (1995), we will take there to be a yer in an underlying form when there is a morphologically and semantically related form in which that yer is vocalized; these forms are listed in the *cross-check* column in the table in *fig. 1*. Where we must specify a yer in an underlying representation, we capitalize it, to distinguish these from full, non-alternating *o* and *e*.

A crucial question for the current study is whether the alternating vowels in the roots in *fig. 1* are also yers. Are the two forms of the root suppletive allomorphs of each other, or are they derived via phonological rule from one underlying form? The answer is not straightforward, in large part because the vowel quality of the alternating vowel is not one that is typically associated with Russian yers: it is [i] and [y], rather than [o] and [e]. On the former view, there are two forms of every root in *fig. 1*: *-rv-* and *-ryv-*. The choice of form should depend on the features associated with Asp (DI or perfective), which is merged high above the root according to the structure in (5). This would then be an instance of potentially non-local outward-sensitive root suppletion, under a standard DM assumption that exponents are inserted root-outward. Such an account would stipulate two forms of every root in *fig. 1*, and it would allow us to maintain that the yer vowels are [o] and [e] exclusively. It would run the risk of a loss of generalization, however, in that it fails to capture the observation that the relation between the two forms of the root is completely systematic.

The latter view, which we advocate for here, relates the two surface forms of the root via phonological rule: they are derived from the same underlying form, which has a yer in its nucleus (e.g. *-rYv-*, where Y is a yer). This would require an application of a morphosyntactically triggered phonological rule: the features of Asp must dictate whether the yer is realized or not. In addition, the exponent of Asp must be null in these contexts, as opposed to suffixal; this would then be an instance of potentially non-local inwardly-sensitive allomorphy. This approach has the advantage of explicitly relating the two surface forms of the root, and it explains why this alternation is found

only in forms that are known independently to contain yer vowels (see the *cross-check* column). For further arguments that these vowels are indeed yers, despite their unusual vowel quality, see Gribanova To appear.

Having established this much about the derived imperfective paradigm in *fig. 1*, we move to considering the main issue of this case study: is the inward allomorphy between Asp and the root a local allomorphy?

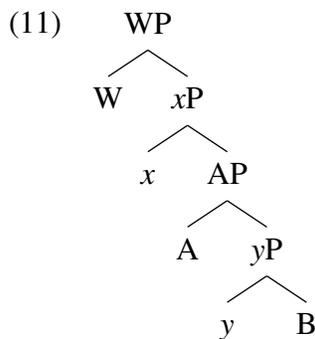
## 2.2. Analytical consequences

Our working hypothesis about the special DI pattern in (2) is that it involves inward-sensitive allomorphy of Asp to the identity of the root. In addition, the morphosyntactic features of Asp will need to trigger a phonological yer realization process in this set of roots. In DM terms, this effect can be achieved via two components of the theory. One component is a readjustment rule — a morphosyntactically triggered phonological rule — which will apply to a certain set of roots and their attached prefixes when Asp is the host of DI features.<sup>6</sup>

- (10) Asp[DI] → yer realization in the Root for {/bOr/, /zOv/, /dOr/, /rOv/, /žOr/ ... }<sup>7</sup>  
 Asp[DI] → yer deletion in the prefix for {/bOr/, /zOv/, /dOr/, /rOv/, /žOr/ ... }

A second component involves the exponence process, which in DM is achieved through Vocabulary Insertion (VI), which trades morphosyntactic features for phonological segments in a bottom up, cyclic fashion. In this case, VI will need to determine that the exponent of Asp is null in the context of this set of roots.

Importantly, VI has special locality restrictions imposed upon it by the theory as it is instantiated in Embick 2010. Locality domains are partially defined by category-defining heads, which are also considered to be phase-defining, and trigger spell-out to the interfaces as well as phonological and morphosyntactic opacity. In Embick 2010, the merger of a phase-defining head (*x*) in (2.2) induces spellout of everything contained in a phase (*y*) that *x* commands.



- (12) 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

VI is constrained not just by phases, but also by an adjacency condition. Morphemes must be structurally adjacent to each other in order to be sensitive to each other for the purposes of allomorphy;

<sup>6</sup>Readjustment rules have been the target of much criticism for their unrestrictedness and potential to weaken the strong predictions of DM (Siddiqi, 2006, 2009; Bye and Svenonius, 2012; Haugen and Siddiqi, 2013). For an approach to this particular pattern that obviates the need for readjustment rules, see Gribanova To appear.

<sup>7</sup>We take this list to reference specific roots which happen to contain yer vowels. When taken up by the phonological component, these yers will be either realized or deleted.

if they are not structurally adjacent, then any intervening structural material should be null (Embick, 2010). This null material may undergo *pruning*, an operation which eliminates structure that has no overt exponent; the result is a form of linear adjacency under which allomorphy is also permitted.

For our case study, a problem arises when we try to capture the observation that Asp must be inwardly sensitive to the identity of the root. The parse we have thus far been considering tells us that in the verbs at issue, *v* is both a structural intervener and a linear one, because it has an overt exponent (*-a-* in most forms).

- (13) a. Proposed parse according to §2.1:

pod-bi'r-a- $\emptyset$ -l  
 LP-root-*v*-DI-SG.M  
 'picked up (IMPF)'

- b. podo-'br-a-l  
 LP-root-*v*-SG.M  
 'picked up (PFV)'

This result points to one of two conclusions. One possibility is that this notion of locality is incorrect and should be in some way relaxed or restated. This would align the Russian case study here with the small class of putative counterexamples in which similarly non-local interactions seem to arise (Bobaljik, 2000; Radkevich, 2011). A second possibility is that the initial parse that we established for the Russian verbal complex in §2.1.1 is incorrect. In the following section, we argue in favor of the latter conclusion.

### 2.3. A revision: The contextual allomorphy is local

What the previous section demonstrated is that our initial parse of the morphosyntax of the Russian verbal complex leads to a locality puzzle: the relevant allomorphic interaction between Asp and the root in cases like (2c) would need to be neither structurally nor linearly adjacent. Here we propose an alternative parse which obviates the need for reference to a non-local allomorphy process.

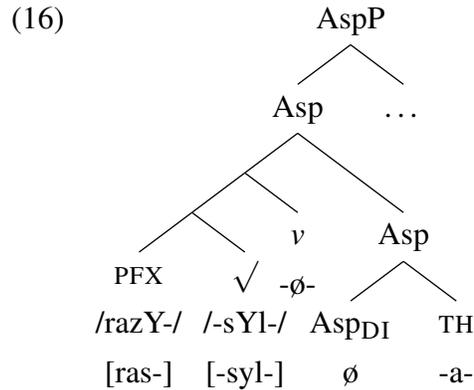
The core of our alternative proposal is that the *-a-* suffix that appears in these forms is actually a theme suffix, projected post-syntactically as a sister of the functional head Asp (Oltra-Massuet, 1999; Oltra-Massuet and Arregi, 2005; Embick and Halle, 2005). This particular vowel may be the theme suffix associated with either the perfective or the imperfective Asp, but in either case, the result yields a different parse of both these forms as well as more regular forms in the language.

- (14) a. pod-bir- $\emptyset$ - $\emptyset$ -a-l  
 LP-root-*v*-DI-THEME-SG.M  
 'picked up' (IMPF) (broad transcription: [pədbi'ral])
- b. podo-'br- $\emptyset$ - $\emptyset$ -a-l  
 LP-root-*v*-Asp<sub>PFV</sub>-THEME-SG.M  
 'picked up' (PFV) (broad transcription: [pədab'ral])

The projection of the dissociated THEME node in the post-syntax is conditioned by morphosyntactic features and structural configurations associated with particular functional heads; (16) and the other representations that follow are, then, the result of not just syntactic but also post-syntactic

operations, at least insofar as they include the post-syntactically projected THEME node.<sup>8</sup>

- (15) ras-syl- $\emptyset$ - $\emptyset$ -a-t'  
 apart-send- $\nu$ -DI-TH-INF  
 ‘send out’ (IMPF) (2c)



This proposal crucially relies on two hypotheses. The first is that the pre-inflection suffix is not an instantiation of  $\nu$ ; in fact, the exponent of  $\nu$  is null in many forms, though not all — as we will see shortly. Second, the pre-inflection suffix is not an instantiation of Asp itself, but is rather attached to Asp as a sister. Both hypotheses are supported by evidence from more regular perfective/derived imperfective alternations, in particular those where the exponents of Asp,  $\nu$  and THEME are all non-null. Recall the parse we began with in §2.1 for cases in which overt DI suffixation is attested:

- (17) a. Former parse according to §2.1:  
 pod-pis-a-la  
 LP-write- $\nu$ -SG.F  
 ‘she signed (something)’ (PFV) (broad transcription: [pədpi'salə])
- b. pod-pis- $\emptyset$ -yva-la  
 LP-write- $\nu$ -DI-SG.F  
 ‘she was signing (something)’ (IMPF) (broad transcription: [pad'pisyvələ])

The alternative proposal put forth here yields the following re-analysis of these forms:

- (18) a. Alternative parse proposed in §2.3:  
 pod-pis- $\emptyset$ - $\emptyset$ -a-la  
 LP-write- $\nu$ -Asp<sub>PFV</sub>-THEME-SG.F  
 ‘she signed (something)’ (PFV) (broad transcription: [pədpi'salə])
- b. pod-pis- $\emptyset$ -yv-a-la  
 LP-write- $\nu$ -DI-THEME-SG.F  
 ‘she was signing (something)’ (IMPF) (broad transcription: [pad'pisyvələ])

The result of this re-analysis is that the allomorphs of the regular DI suffix become [-i/yv-] or [-v-], not [-i/yva-] or [-va-]. This revision has the convenient advantage of helping us to better understand various regularly suffixed forms in which there is additional material between the root

<sup>8</sup>The data presented here are also consistent with a structure in which the pre-inflection suffix is merged syntactically above Asp, rather than as a dissociated morpheme and as a sister to Asp. As far as we know, there is no evidence that the pre-inflection suffix itself is independently responsible for any semantic or syntactic operations, and we therefore stick with the hypothesis about ‘theme’ vowels proposed in Embick and Halle 2005, among others.

and the DI suffix, i.e. in which all the exponents are non-null.<sup>9,10</sup>

- (19) a. Alternative parse proposed in §2.3:  
 kold-ov-ø-a-t'  
 cast.spell-*v*-Asp<sub>IMPF</sub>-THEME-INF  
 ‘cast spells’ (IMPF) (broad transcription: [kəlda'vatʲ])
- b. za-kold-ov-ø-a-t'  
 LP-cast.spell-*v*-Asp<sub>PFV</sub>-THEME-INF  
 ‘cast a spell’ (PFV) (broad transcription: [zəkəlda'vatʲ])
- c. za-kold-ov-yv-a-t'  
 LP-cast.spell-*v*-DI-THEME-INF  
 ‘cast a spell’ (IMPF) (broad transcription: [zəkəl'dovyvətʲ])
- (20) a. Alternative parse proposed in §2.3:  
 bol'-e-ø-ø-la  
 pain-*v*-Asp<sub>IMPF</sub>-THEME-PST.SG.F  
 ‘was ill’ (IMPF) (broad transcription: [ba'lʲelə])
- b. za-bol'-e-ø-ø-la  
 LP-pain-*v*-Asp<sub>PFV</sub>-THEME-PST.SG.F  
 ‘became ill’ (PFV) (broad transcription: [zəba'lʲelə])
- c. za-bol'-e-v-a-la  
 LP-pain-*v*-DI-THEME-PST.SG.F  
 ‘became ill’ (IMPF) (broad transcription: [zəbəlʲi'valə])

All of these forms have an overt realization of *v* that is distinct from the pre-inflection vowel, and co-occurs with it. The pattern involving [-ov-] forms is particularly telling: this suffix is associated with the formation of new and loan words and is for this reason extremely productive. On the view we initially outlined (21), we would have been forced to posit that the suffix was [-ova-]. Consequently, we would also have been forced to stipulate that the final segment of the theme suffix is deleted just in case it is followed by the DI suffix in forms like (21); this is, in essence, the conclusion reached by Svenonius (2004b).

- (21) a. Former parse according to §2.1:  
 kold-ova-t'  
 cast.spell-*v*-INF  
 ‘cast spells’ (IMPF) (broad transcription: [kəlda'vatʲ])

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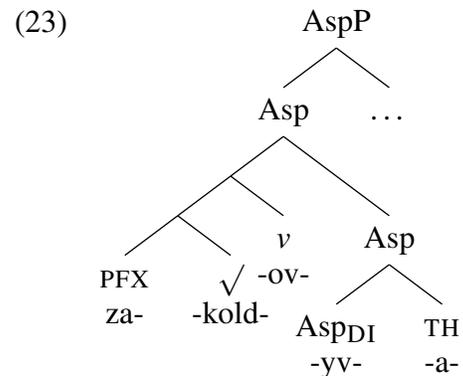
<sup>9</sup>The careful reader will notice that whether a theme vowel has an overt exponent, and its quality, are not determined solely by the features of Asp — compare (19a,b) with (20a,b). Some other information, such as class membership of the stem, must be invoked. We abstract away from this issue here.

<sup>10</sup>A referee notes that this general line of reasoning leads us to believe that Asp should not be able to trigger allomorphy on the root in (19,20), since *v* in these examples is non-null. This indeed borne out, in the sense that we are aware of no counter-examples in the Russian verbal complex. The vowel quality changes in the root, which are noted in the broad phonetic transcriptions, are not the result of allomorphy. Rather, they arise from general rules of vowel reduction which are phonologically regular and conditioned by stress placement.

- b. za-kold-ova-t'  
LP-cast.spell-v-INF  
'cast a spell' (PFV) (broad transcription: [zəkəlda'vatʲ])
- c. za-kold-ov-yva-t'  
LP-cast.spell-v-DI-INF  
'cast a spell' (IMPF) (broad transcription: [zəkəl'dovyvətʲ])

We propose that a more natural and consistent picture emerges if we take up the alternative parse proposed in this section. On that view, represented in (19c), the verbalizing suffix is [-ov-], and the appearance of [-a-] after [-yv-] is expected, as [-a-] is taken to be a theme vowel whose appearance is conditioned by the features of Asp (whether Asp is realized phonologically, or not). On this new proposal, then, the representation of a form like (19c) is as follows:

- (22) za-kold-ov-yv-a-t'  
LP-cast.spell-v-DI-THEME-INF  
'cast a spell' (IMPF)



A second piece of evidence that the pre-inflection vowel is a theme vowel associated with aspectual features is that alternations in the pre-inflection vowel sometimes reflect the aspectual interpretation of certain verbs. In most cases, either a prefix or a perfective (semelfactive) suffix must be added to the verb in order to perfectivize it. There is a subset of verb stems, however, which can be perfectivized just via a change in the pre-inflection vowel.

- (24) Making imperfective stems perfective:  
(adapted from Townsend 1975:114)

	IMPF	PFV	GLOSS
a.	bro'sat'	'brosit'	throw.INF
b.	kon'čat'	'končit'	finish.INF
c.	poku'pat'	ku'pit'	buy.INF
d.	li'šat'	li'šit'	deprive.INF
e.	pus'kat'	pus'tit'	let.INF
f.	re'šat'	re'šit'	decide.INF
g.	xva'tat'	xva'tit'	grab.INF; suffice.INF

It is important to note that in such cases, the [-a-] vowel shows up systematically in imperfective forms, rather than perfective ones. Thus, independent of how we choose to analyze the DI pattern at issue, we will need some way to model the fact that the pre-inflection vowel is associated in these forms with changes in aspectual information.

## 2.4. Summary

The re-analysis of the Russian verbal complex presented here has the theoretical advantage of not requiring that we abandon many prominent views of allomorphy in which locality plays a crucial role. The result is that we do not need to add this case study to the short and debatable list of non-local allomorphic interactions thus found in the literature (Radkevich, 2011; Bobaljik, 2000). This view, if correct, also tells us something more specific about the nature of the locality condition involved. The structural configuration we posit does not involve structural adjacency between the root and Asp, because there is a structural intervener. This intervener happens not to have an overt exponent in the cases of interest, which renders the root and Asp linearly adjacent; this result confirms Embick's (2010) approach to allomorphy, in which structural adjacency is not required, if interveners are not phonologically overt (i.e. they are pruned away). It further points to the theoretical possibility that a simple linear adjacency requirement may be sufficient; this is a question we leave for future work.

## 3. Directionality: Bulgarian

This section focuses on the question of whether and to what extent the direction of allomorphic sensitivity (root-inward or root-outward) determines the kinds of features (morphosyntactic, phonological) that are available for reference in allomorph selection. Theories that assume morphosyntactic features to be replaced by the phonological features that express them one terminal at a time proceeding from the root outwards (the *rewriting* assumption from §1; Halle 1990:156, Noyer 1992:23, Bobaljik 2000:16) predict that inward-sensitive allomorphy should have access only to phonological features. We discuss data on the definiteness marking patterns in Bulgarian, which suggest that this set of assumptions must be relaxed, since allomorphy makes reference to both phonological and morphosyntactic features.<sup>11</sup>

The Bulgarian definiteness marker is a suffix on the left-most head in the nominal phrase that exhibits number and gender concord:

- (25) a. staro-**to** dārvo  
old-DEF tree  
'the old tree'
- b. tri-**te** novi knigi  
three-DEF new books  
'the three new books'
- c. tvārde težka-**ta** masa  
excessively heavy-DEF table  
'the excessively heavy table'
- d. prohladna-**ta** i sveža večer  
cool-DEF and fresh evening  
'the cool and fresh evening'

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<sup>11</sup>A version of this argument appears in Harizanov and Gribanova To appear(b); for additional discussion and data, the reader is referred to that paper.

It is phonologically realized by one of its five allomorphs: *-a*, *-to*, *-te*, *-ta*, and a stress-attracting *-tá* (when not marked explicitly, stress is on the stem).

- (26) a. door ‘yard’ — *dvora* ‘the yard’  
 b. oko ‘eye’ — *okoto* ‘the eye’  
 c. učiteli ‘teachers’ — *učitelite* ‘the teachers’  
 d. voda ‘water’ — *vodata* ‘the water’  
 e. pésen ‘song’ — *pesentá* ‘the song’

Since the definiteness maker is invariably the most peripheral morpheme in its morphosyntactic word (both in terms of linear order and hierarchical structure), the choice among its allomorphs is inwardly sensitive to information associated with the stem to which it is suffixed:

- (27) a.  $\underbrace{\text{ROOT} - \text{DERIVATIONAL MORPHOLOGY}}_N - \underbrace{\text{NUMBER/GENDER MARKING}}_n - \text{D}[\text{DEF}]$   
 b.
- 
- ```

graph TD
  D1[D] --- n1[n]
  D1 --- D2[D]
  D2 --- DEF["[DEF]"]
  n1 --- N[N]
  n1 --- n2[n]
  n2 --- NUM_GEN["[NUM, GEN]"]
  
```

### 3.1. Empirical details

Allomorph selection references both morphosyntactic and phonological properties of the stem.<sup>12</sup> On the one hand, inward morphosyntactic sensitivity is needed to explain the definite marker’s distinct allomorphs in identical phonological environments. For instance, the members of homophonous pairs like (28) and (29), which only differ in gender, condition different exponents of the definiteness marker.

- (28) a. gaz (M) ‘gas (state of matter)’ — *gaza* ‘the gas’  
 b. gaz (F) ‘gas (fuel)’ — *gazta* ‘the gas’  
 (29) a. med (M) ‘honey’ — *meda* ‘the honey’  
 b. med (F) ‘copper’ — *medta* ‘the copper’

On the other hand, inward phonological sensitivity drives allomorph selection in morphosyntactically identical environments. For example, distinct plural variants of a given noun condition distinct allomorphs of the definiteness marker:

- (30) a. kolena, kolene ‘knees’  
 b. *kolenata*, *kolenete* ‘the knees’

<sup>12</sup>Halle and Matushansky 2013 offer an alternative analysis of the allomorphy exhibited by the Bulgarian definiteness marker, which relies only on the phonological properties of the stem. While it has a similar empirical coverage to the account we propose here, it places considerably more burden on the phonological component in terms of both the inventory of operations and the richness of (covert) representations.

- (31) a. ramena, ramene ‘shoulders’  
 b. ramen**ata**, ramen**ete** ‘the shoulders’

Consonant-final nominal stems are either masculine or feminine singulars. Members of the former class trigger the insertion of the *-a* of the definiteness marker, while members of the latter condition insertion of the stress-attracting *-tá* allomorph:

- (32) *Consonant-final; singular masculine*  
 a. brat ‘brother’ — brat**a** ‘the brother’  
 b. čaj ‘tea’ — čaj**a** ‘the tea’  
 c. moliv ‘pencil’ — moliv**a** ‘the pencil’
- (33) *Consonant-final; singular feminine*  
 a. krāv ‘blood’ — krāv**tá** ‘the blood’  
 b. prólet ‘spring’ — prolett**tá** ‘the spring’  
 c. dóblest ‘valor’ — doblest**tá** ‘the valor’

The rest of the nominal stems in Bulgarian are vowel-final. Any stem that ends in */a/* takes the *-ta* allomorph of the definiteness marker, as illustrated in (34). The class of */a/*-final stems includes stems of various morphosyntactic subclasses: masculine and feminine singulars as well as plurals.

- (34) */a/-final*  
 a. bašta (M) ‘father’ — bašt**ata** ‘the father’  
 b. sǎdija (M) ‘judge’ — sǎdij**ata** ‘the judge’  
 c. žena (F) ‘woman’ — žen**ata** ‘the woman’  
 d. postrojka (F) ‘building’ — postroj**kata** ‘the building’  
 e. kraka (PL) ‘feet’ — krak**ata** ‘the feet’  
 f. deca (PL) ‘children’ — dec**ata** ‘the children’

Of the remaining vowel-final stems — i.e. those that do not end in */a/* — any plural stem, which may end in */el/*, */il/* or */ol/*, takes the *-te* allomorph:

- (35) *Non-/a/-final; plural*  
 a. mǎže (PL) ‘men’ — mǎž**ete** ‘the men’  
 b. ženi (PL) ‘women’ — žen**ite** ‘the women’  
 c. sto (PL) ‘hundred’ — st**ote** ‘the hundred’

Finally, any nominal stem that does not fall in any of the classes described so far takes the *-to* allomorph of the definiteness marker. This includes any singular stem that ends in a vowel other than */a/* (regardless of gender):

- (36) *Non-/a/-final; singular*  
 a. more (N) — more**to** ‘the sea’  
 b. taksi (N) — taks**ito** ‘the taxi’  
 c. tatko (M) — tatk**oto** ‘the dad’

In sum, the following set of ordered *if*-statements fully describes the distribution of the definite marker’s allomorphs (Harizanov and Gribanova To appear(b)):

- (37) a. If the stem ends in a consonant and  
 i. if the stem is singular masculine, then DEF → *-a*  
 ii. if the stem is singular feminine, then DEF → *-tá*  
 b. Otherwise (i.e. the stem ends in a vowel),  
 i. if the stem ends in *-a*, then DEF → *-ta*  
 ii. if the stem is plural, then DEF → *-te*  
 iii. otherwise, DEF → *-to*

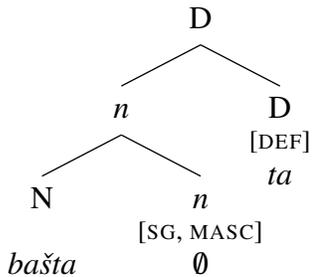
### 3.2. Analysis

To model the distribution of the definite marker's allomorphs in DM, we posit the following Vocabulary Items (where “#” signals the right edge of the stem to which DEF attaches and “C” stands for “consonant”):

- (38) *Vocabulary Items*  
 a. [DEF] ↔ *-a* / -C#, [SG, MASC] \_\_  
 b. [DEF] ↔ *-tá* / -C#, [SG, FEM] \_\_  
 c. [DEF] ↔ *-ta* / -a# \_\_  
 d. [DEF] ↔ *-te* / [PL] \_\_  
 e. [DEF] ↔ *-to*

In (39), for example, D[DEF] is realized by the allomorph *-ta* in (38c) because the final segment of its host is */a/*:

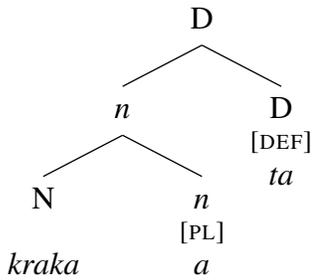
- (39)  $\sqrt{ba\check{s}ta-\emptyset-ta}$  ‘the father’



In DM, a Vocabulary Item is inserted at a terminal node if it is the most highly specified Vocabulary Item whose identifying features are a subset of features of that terminal node (Halle and Marantz 1993). Since all of the Vocabulary Items in (38) match the same one feature of D[DEF], namely [DEF], the context for insertion of a Vocabulary Item becomes relevant. In such cases, the Subset Principle (Halle and Marantz 1993), which governs the choice among competing Vocabulary Items in DM, dictates that the Vocabulary Item with the most specific context of insertion must be used. Therefore, in an example like (39), the *-a* allomorph (38a) is not inserted even though it does bear singular masculine features and the contextual specification of (38a) is partially matched; that is because the stem does not end in a consonant, and instead, the allomorph *-ta* in (38c) is inserted.

Now, consider a plural stem that ends in */a/*, as in (40), which also triggers the insertion of the allomorph *-ta* in (38c).

(40)  $\sqrt{\text{krak-a-ta}}$  ‘the feet’



Why is the *-ta* allomorph chosen in this case and not *-te*? Note that both of these allomorphs match the [DEF] feature of the terminal node and both of their contexts of insertion are satisfied. The standard version of the Subset Principle is underspecified with respect to ties between competing allomorphs whose context specifications are matched and is unable to arbitrate between these two candidates for insertion in (40). The theoretical question that arises is how to regulate competition among Vocabulary Items with morphosyntactic context (like *-te*) and Vocabulary Items with phonological context (like *-ta*) when both types of context are matched. We follow Harizanov and Gribanova 2011 and adopt a more articulated version of the Subset Principle, which treats phonological context (e.g. /al-final stem) as more specific for the purposes of allomorph selection than morphosyntactic context (e.g. plural stem). This version of the Subset Principle picks out the *-ta* allomorph in (40), since its context of insertion is more specific than that of the *-te* allomorph. Various intriguing questions arise with respect to this version of the Subset Principle, which are beyond the scope of this paper. On the empirical side, the crosslinguistic validity of the principle remains to be established (cf. Arregi and Nevins (2013)): is it a general property of competition for lexical insertion that phonological context counts as more specific than morphosyntactic context? On the theoretical side, how is the more specific nature of phonological context to be derived? Does it follow from some deeper principle(s) of grammar or the nature of phonological and morphosyntactic representations?<sup>13</sup>

A crucial assumption in this analysis of the distribution of the definiteness marker’s allomorphs is that lexical insertion makes reference inwardly not just to phonological information but also to morphosyntactic information. Recall that, if the *rewriting* assumption from §1 (Halle 1990:156, Noyer 1992:23, Bobaljik 2000:16) is adopted, as morphosyntactic information is associated with phonological exponence, this morphosyntactic information is used up and no longer part of the representation. Thus, in order to attain descriptive adequacy, our analysis must reject *rewriting* (Halle and Marantz 1993, Embick 2010:39) and allow lexical insertion to have simultaneous access to both morphosyntactic and phonological context.<sup>14</sup>

### 3.3. Motivating inward sensitivity

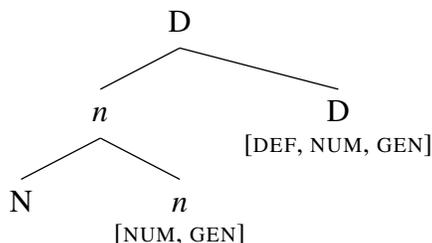
Another central assumption in our analytical approach to the allomorphy exhibited by the Bulgarian definiteness marker is its inward sensitivity to morphosyntactic features. This assumption was

<sup>13</sup>We thank an anonymous reviewer for raising many of these issues.

<sup>14</sup>Matushansky and Halle’s (2013) approach (see fn. 12) does not require the rejection of the rewriting assumption but needs to make recourse to a greater number of phonological rules and richer phonological representations. Additional trade-offs between the two approaches are worth exploring, especially in the larger context of theories of morphology more generally.

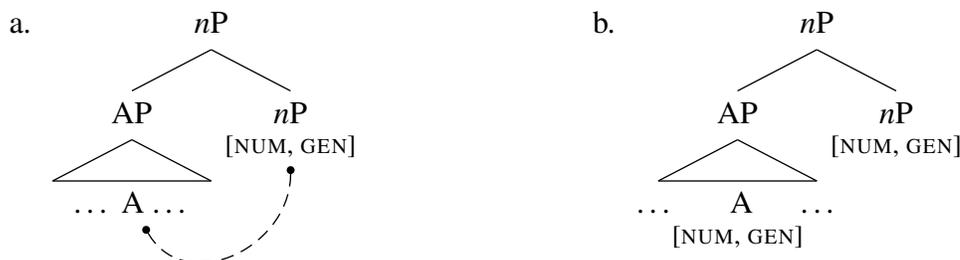
motivated above on the basis of the syntagmatic properties of the definiteness marker (see (27) and the surrounding discussion). However, it only holds if the definiteness marker — a D head in the syntax — can be shown not to carry itself the morphosyntactic features relevant for its allomorphy. In other words, if the definiteness marker is a bundle of features D comprised not just of [DEF] but also of number and gender features, as in (41), allomorph selection would be inward-sensitive only to the phonological features of the stem. The details of this alternative approach are worked out by Arregi and Nevins (2013). Here we follow Harizanov and Gribanova To appear(a) and argue that D[DEF] does not bear number and gender features.

(41) *Alternative analysis* (cf. (39) and (40))

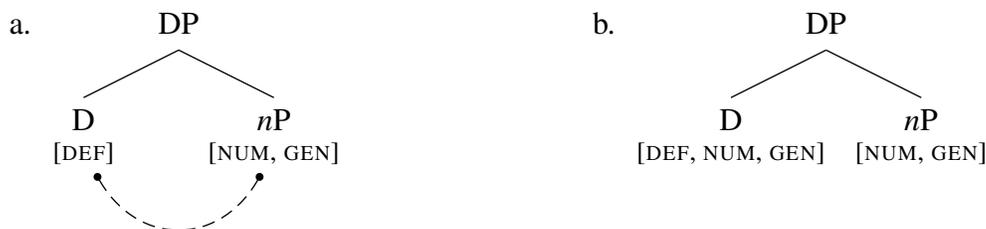


Since D[DEF] is not the source of number and gender features itself, according to this alternative analysis, it must have acquired them from elsewhere in the extended nominal projection. Suppose that the transmission of these features to D[DEF] is the result of the same mechanism of nominal concord that transmits these features to nominal modifiers, like adjectives:<sup>15</sup>

(42) *Feature transmission to A (adjectival concord)*



(43) *Feature transmission to D (cf. adjectival concord)*

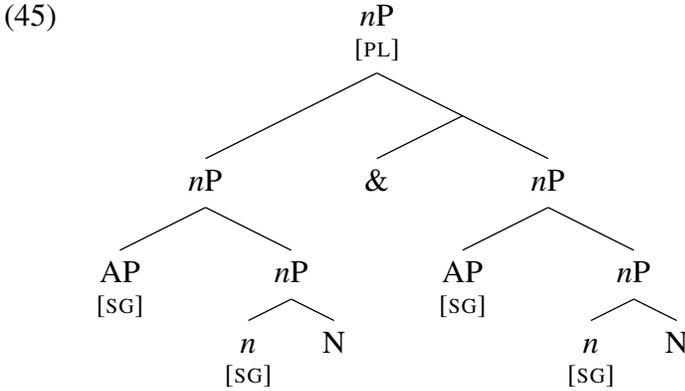


To show that assuming morphosyntactic feature concord on D leads to a contradiction, we consider the following type of configuration, where coordinated singular adjectives cooccur with a plural head noun:

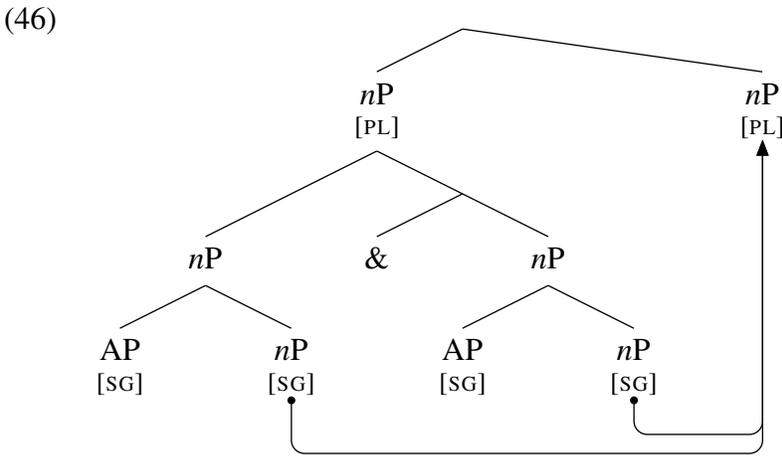
<sup>15</sup>We do not consider other possible mechanisms that transmit number and gender features to D[DEF] because it is unclear how such other mechanisms would be independently motivated.

- (44) bǎlgarsk-o i grǎck-o pravitelstv-a  
 bulgarian-SG.N and greek-SG.N government-PL  
 ‘a Bulgarian and Greek governments’  
 (two governments: a Bulgarian and a Greek one)

We follow Harizanov and Gribanova To appear(a) in assuming that such examples involve two coordinated *nPs*, which reflects the semantically plural interpretation, and each of them contains an AP. Each AP acquires the features of the *nP* it modifies (i.e. singular) in a canonical instance of concord within each *nP* conjunct, while the coordinate structure (*nP*) as a whole is plural by a general mechanism of number resolution in coordination:<sup>16</sup>



Then the identical *nPs* from each conjunct undergo across-the-board movement and adjoin to the coordinate *nP*, which contributes plural features to the raised noun via concord:



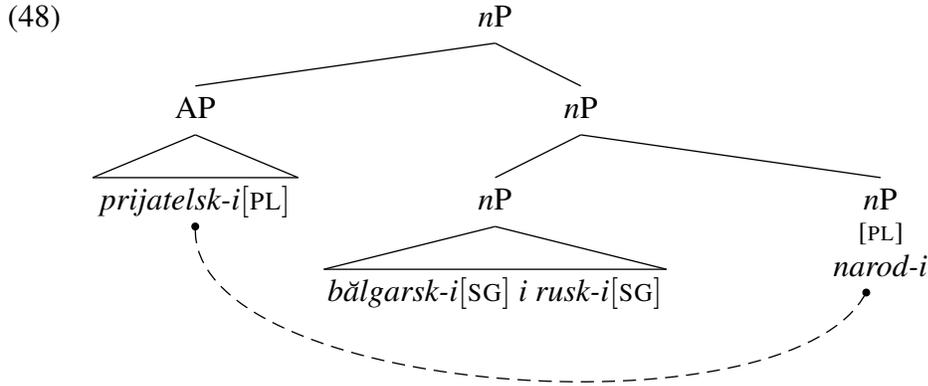
Consider now the following example, in which concord transmits plural features to an adjective (*prijatelski* ‘friendly’ in the example below) across the coordinate structure, whose conjuncts remain singular:

- (47) a. cvetn-i pǎrv-a i posledn-a stranic-i  
 colored-PL first-SG.F and last-SG.F pages-PL  
 ‘the colored first and last pages’

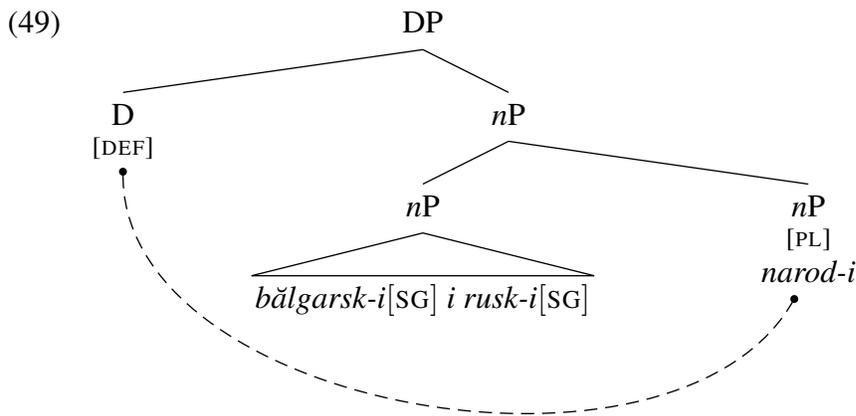
<sup>16</sup>We label the coordinate structure “*nP*” because it behaves like an *nP* constituent for present purposes. Here, we abstract away from questions about the proper analysis of the internal structure of coordinations and the syntactic status of the conjunction.

- b. \*cvetn-a p̃arv-a i posledn-a stranic-i  
 colored-SG.F first-SG.F and last-SG.F pages-PL

We assume that (47a) is associated with the underlying representation in (48); note, in particular, that the highest adjective, which scopes over the coordination, undergoes concord with the head noun and is plural.



The concord analysis of the definiteness marker in (43) predicts that, in the same configuration as (48), D[DEF] will undergo concord with the plural head noun and surface as one if its plural allomorphs (-*ta* or -*te*):



In this case, D[DEF] attaches to the left-most adjective, as expected — see (25d). Crucially, however, if the nouns involved are masculine or neuter, the definiteness marker surfaces as -*a* and -*to* respectively, not -*ta* or -*te*:

- (50) a. b̃algarsk-ij-a i rusk-i narod-i  
 bulgarian-SG.M-DEF and russian-SG.M nation-PL  
 ‘the Bulgarian and Russian nations’  
 b. \*b̃algarsk-ij-ta/te i rusk-i narod-i  
 bulgarian-SG.M-DEF and russian-SG.M nation-PL
- (51) a. b̃algarsk-o-to i gr̃ack-o pravitelstv-a  
 bulgarian-SG.N-DEF and greek-SG.N government-PL  
 ‘the Bulgarian and Greek governments’  
 b. \*b̃algarsk-o-ta/te i gr̃ack-o pravitelstv-a  
 bulgarian-SG.N-DEF and greek-SG.N government-PL

This difference in the behavior of adjectives and the definiteness marker suggests that the process that determines the form of the definiteness marker in Bulgarian is more local than concord. We take this as evidence that D[DEF] does not undergo concord, as in (49), but is inwardly sensitive to the morphosyntactic features of the stem to which it is suffixed in the post-syntactic component.

### 3.4. Summary

Taken together, the inward-sensitive allomorphy exhibited by the Bulgarian definiteness marker and its dependence on the morphosyntactic features of the stem that the definiteness marker attaches to, require the relaxation of the *rewriting* assumption. And while we have established in the context of Bulgarian definiteness marking that inward-sensitive allomorphy makes reference to both morphosyntax and phonology, an important related question about the mechanics of allomorphy remains open: what kinds of features does *outward-sensitive* allomorphy make reference to? — a question addressed by a couple of contributions to this volume (Yu To appear, Deal and Wolf To appear).

### 4. Conclusion

This paper has presented two case studies — both on Slavic languages, both on inward-sensitive allomorphy — that provide a way of discriminating among various theoretical choices available to DM and other realizational theories of morphology. As well as guiding crucial theoretical choices, in-depth empirical case studies of this kind are crucial to expanding our understanding of the intricacies of allomorphic behavior. In the case of Russian, the evidence pointed in favor of maintaining a restrictive assumption, namely that allomorphic interactions should be constrained by an adjacency requirement. Further, the analysis suggests that the requirement is a linear, rather than a structural one. In the case of Bulgarian, our analysis indicates that other restrictions, like the *rewriting* restriction, are too orthodox: the form of the Bulgarian definite article is inwardly sensitive both to phonological *and* morphosyntactic features, suggesting that they must both be available for reference at the point of Vocabulary Insertion.

### References

- Adger, David, Susana Béjar, and Daniel Harbour. 2003. Directionality in allomorphy: A reply to Carstairs-McCarthy. *Transactions of the Philological Society* 101(1):109–115.
- Allen, Margaret. 1979. *Morphological Investigations*. PhD thesis, University of Connecticut, Storrs.
- Arad, Maya. 2003. Locality constraints on the interpretation of roots. *Natural Language and Linguistic Theory* 21:737–778.
- Arregi, Karlos, and Andrew Nevins. 2013. Contextual neutralization and the elsewhere principle. In O. Matushansky and A. Marantz (Eds.), *Distributed Morphology Today: Morphemes for Morris Halle*, 199–222. MIT Press.
- Babko-Malaya, Olga. 2003. Perfectivity and prefixation in Russian. *Journal of Slavic Linguistics* 11(1):5–36.

- Bailyn, John Frederick. 1995a. *A Configurational Approach to Russian 'Free' Word Order*. PhD thesis, Cornell University.
- Bailyn, John Frederick. 1995b. Underlying phrase structure and 'short' verb movement in Russian. *Journal of Slavic Linguistics* 3(1):13–58.
- Bethin, Christina. 1992. *Polish syllables: The role of prosody in phonology and morphology*. Columbus: Slavic Publishers.
- Bobaljik, Jonathan. 2000. The ins and outs of contextual allomorphy. In K. K. Grohmann and C. Struijke (Eds.), *University of Maryland Working Papers in Linguistics, volume 10*, 35–71.
- Bobaljik, Jonathan. 2012. *Universals in Comparative Morphology: Suppletion, superlatives, and the structure of words*. Cambridge, MA: MIT Press.
- Bonet, Eulàlia, and Daniel Harbour. 2012. Contextual allomorphy. In J. Trommer (Ed.), *The Morphology and Phonology of Exponence*, 195–235. Oxford: Oxford University Press.
- Butler, Lindsay. 2012. Status: Local (aspect, transitivity and voice in Mayan status allomorphy). Unpublished ms., Poster presented at the Workshop on Locality and Directionality at the Morphosyntax-Phonology Interface, Stanford.
- Bye, Patrick, and Peter Svenonius. 2012. Non-concatenative morphology as epiphenomenon. In J. Trommer (Ed.), *The Morphology and Phonology of Exponence*, 427–495. Oxford: Oxford University Press.
- Carstairs, Andrew. 1987. *Allomorphy in Inflexion*. London: Croom Helm.
- Carstairs-McCarthy, Andrew. 2001. Grammatically conditioned allomorphy, paradigmatic structure, and the Ancestry Constraint. *Transactions of the Philological Society* 99(2):223–245.
- Coats, Herbert. 1974. On the alternation j/v in Russian. In D. J. Koubourlis (Ed.), *Topics in Slavic Phonology*, 29–42. Cambridge, MA: Slavica.
- Deal, Amy Rose, and Matthew Wolf. To appear. Outwards-sensitive phonologically-conditioned allomorphy in Nez Perce. In *The morphosyntax-phonology connection: locality and directionality*. Oxford University Press.
- Embick, David. 2003. Locality, listedness, and morphological identity. *Studia Linguistica* 57(3):143–169.
- Embick, David. 2010. *Localism versus Globalism in Morphology and Phonology*. Cambridge: MIT Press.
- Embick, David, and Morris Halle. 2005. On the status of stems in morphological theory. In T. Geerts, I. von Ginneken, and H. Jacobs (Eds.), *Romance Languages and Linguistic Theory 2003*, 37–62. Amsterdam: Benjamins.
- Feinberg, Lawrence. 1990. The morphology of Russian imperfective derivation. *The Slavic and East European Journal* 24(2):145–154.
- Flier, Michael S. 1972. On the source of derived imperfectives in Russian. In D. S. Worth (Ed.), *The Slavic Word*, 236–260. The Hague: Mouton.
- Fowler, George. 1994. Verbal prefixes as functional heads. *Studies in the Linguistic Sciences* 24(1).
- Gribanova, Vera. 2010. *Composition and Locality: The Morphosyntax and Phonology of the*

- Russian Verbal Complex*. PhD thesis, University of California Santa Cruz.
- Gribanova, Vera. 2013. Verb-stranding verb phrase ellipsis and the structure of the Russian verbal complex. *Natural Language and Linguistic Theory* 31(1):91–136.
- Gribanova, Vera. To appear. Exponence and morphosyntactically triggered phonological processes in the Russian verbal complex. *Journal of Linguistics*.
- Halle, Morris. 1963. O pravilax russkogo sprjaženija. In *American Contributions to the Fifth International Congress of Slavists, September 1963, Sofia*, 113–132. The Hague: Mouton.
- Halle, Morris. 1990. An approach to morphology. In *Proceedings of NELS 20*, 150–184, University of Massachusetts, Amherst. GLSA.
- Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In K. Hale and S. J. Keyser (Eds.), *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, 111–176. Cambridge, MA: MIT Press.
- Halle, Morris, and Ora Matushansky. 2013. On the morphophonology of the Bulgarian definite article. Unpublished ms.
- Harizanov, Boris, and Vera Gribanova. 2011. The role of morphological and phonological factors in Bulgarian allomorph selection. In N. LaCara, A. Thompson, and M. A. Tucker (Eds.), *Morphology at Santa Cruz: Papers in honor of Jorge Hankamer*, 31–40. Santa Cruz, CA: Linguistics Research Center.
- Harizanov, Boris, and Vera Gribanova. To appear(a). The interaction between across-the-board movement and morphology. In *Proceedings of the 49th annual meeting of the Chicago Linguistic Society*.
- Harizanov, Boris, and Vera Gribanova. To appear(b). Inward sensitive contextual allomorphy and its conditioning factors. In *Proceedings of the 43rd annual meeting of the North East Linguistic Society*.
- Haugen, Jason, and Daniel Siddiqi. 2013. Roots and the derivation. *Linguistic Inquiry* 44(3):493–517.
- Isačenko, Aleksandr V. 1960. *Grammatičeskij Stroj Russkogo Jazyka. Morfologija. Čast' Vtoraja*. Bratislava: Vydavatel'stvo Slovenskej Akademie.
- Jakobson, Roman. 1948. Russian conjugation. *Word* 4:155–167.
- Kiparsky, Paul. 2000. Opacity and cyclicity. *The Linguistic Review* 17:1–15.
- Lahne, Antje. 2006. When features are not deleted: Contextual allomorphy in Sanskrit noun declension. In G. Müller and J. Trommer (Eds.), *Subanalysis of Argument Encoding*, 143–160. Linguistische Arbeits Berichte 84.
- Levin, Maurice I. 1978. *Russian declension and conjugation*. Columbus, OH: Slavica.
- Marantz, Alec. 2007. Phases and words. In S.-H. Choe (Ed.), *Phases in the Theory of Grammar*, 191–222. Seoul: Dong In.
- Matushansky, Ora. 2009. On the featural composition of the Russian back yer. In G. Zybatow, D. Lenertová, U. Junghanns, and P. Biskup (Eds.), *Studies in Formal Slavic Phonology, Morphology, Syntax, Semantics and Information Structure: Proceedings of FDSL 7*, 397–410, Frankfurt. Peter Lang.

- McCarthy, John, and Alan Prince. 1993a. Generalized alignment. In G. Booij and J. van Marle (Eds.), *Yearbook of Morphology*, 79–153. Dordrecht: Kluwer.
- McCarthy, John, and Alan Prince. 1993b. *Prosodic Morphology I: Constraint Interaction and Satisfaction*. Cambridge, MA: MIT Press.
- Nevins, Andrew Ira, and John Frederick Bailyn. 2008. Russian genitive plurals are impostors. In A. Bachrach and A. I. Nevins (Eds.), *Inflectional identity*, 237–270. Oxford: Oxford University Press.
- Noyer, Rolf. 1992. *Features, positions and affixes in autonomous morphological structure*. PhD thesis, MIT, Cambridge, Massachusetts.
- Oltra-Massuet, Maria Isabel. 1999. On the notion of theme vowel: A new approach to Catalan verbal morphology.
- Oltra-Massuet, Maria Isabel, and Karlos Arregi. 2005. Stress-by-structure in Spanish. *Linguistic Inquiry* 36:43–84.
- Pesetsky, David. 1979. Russian morphology and Lexical Phonology. Unpublished ms., MIT.
- Radkevich, Nina. 2011. On locality in contextual allomorphy: Evidence from Mayan. Unpublished ms., Paper presented at NELS 42, Toronto, Canada.
- Siddiqi, Daniel. 2006. *Minimize exponence: economy effects on the morphosyntactic component of the grammar*. PhD thesis, University of Arizona.
- Siddiqi, Daniel. 2009. *Syntax within the Word: Economy, Allomorphy, and Argument Selection in Distributed Morphology*. John Benjamins.
- Siegel, Dorothy. 1978. The adjacency constraint and the theory of morphology. In M. Stein (Ed.), *Proceedings of the Annual Meeting of the Northeast Linguistic Society* 8, 189–197, Amherst. GLSA.
- Svenonius, Peter. 2004a. Slavic prefixes inside and outside VP. *Nordlyd* 32(2):205–253.
- Svenonius, Peter. 2004b. Slavic prefixes and morphology: An introduction to the Nordlyd volume. *Nordlyd* 32(2):177–204.
- Tatevosov, Sergei. 2008. Intermediate prefixes in Russian. In A. Antonenko, J. F. Bailyn, and C. Y. Bethin (Eds.), *Proceedings of the Annual Workshop on Formal Approaches to Slavic Linguistics* 16. Michigan Slavic Publications.
- Yearley, Jennifer. 1995. Jer vowels in Russian. In J. N. Beckman, L. W. Dickey, and S. Urbanczyk (Eds.), *Papers in Optimality Theory*, 533–571. University of Massachusetts, Amherst: GLSA.
- Yu, Alan. To appear. Outward-sensitivity in phonologically-conditioned suppletive allomorphy. In *The morphosyntax-phonology connection: locality and directionality*. Oxford University Press.

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